Obesity Facts

The European Journal of Obesity

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Printed in Germany on acid-free and non-aging paper (ISO 9706) by Printec Offset, medienhaus, Kassel

Obesity Facts
The European Journal of Obesity

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Vol. 12, Suppl. 1, 2019

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The European Journal of Obesity

28 April - 01 May, 2019
Glasgow, Scotland

26th European Congress on Obesity

Glasgow, UK, 28 April – 01 May, 2019

ABSTRACTS

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The European Journal of Obesity

Vol. 12, Suppl. 1, 2019

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Journal Information

Aims and Scope

'Obesity Facts' publishes articles covering all aspects of obesity, in particular epidemiology, etiology and pathogenesis, treatment, and the prevention of adiposity. As obesity is related to many disease processes, the journal is also dedicated to all topics pertaining to comorbidity and covers psychological and sociocultural aspects as well as influences of nutrition and exercise on body weight. The editors carefully select papers to present only the most recent findings in clinical practice and research. All professionals concerned with obesity issues will find this journal a most valuable update to keep them abreast of the latest scientific developments.

Special sections comprising a variety of subspecialties reinforce the journal's value as an exhaustive record of recent progress for all internists, gastroenterologists, endocrinologists, pediatricians, dieticians, nutritionists, bariatric surgeons, psychologists and psychiatrists, occupational health practitioners, sports medicine specialists, ecotrophologists, sociologists, and biologists as well as prevention and public health researchers. In addition, 'Obesity Facts' serves as an ideal information tool for the members of the pharmaceutical and food industry as well as those active in nutritional research and medicine.

ISSN Print Edition: 1662–4025
ISSN Online Edition: 1662–4033

Journal Homepage: www.karger.com/ofa
Bibliographic Indices: This journal is regularly listed in bibliographic services, including PubMed, MEDLINE, PubMed Central, Web of Science, Science Citation Index Expanded, Current Contents, Clarivate Analytics, Google Scholar, Chemical Abstracts Service, American Chemical Society, DOAJ: Directory of Open Access Journals, FSTA: Food Science and Technology Abstracts, Scopus, Embase, Pathway Studio, EMCare, WorldCat

Publication Data: Obesity Facts is published 6 times a year. Volume 12, each with 6 issues, appears in 2019.

S. Karger Verlag für Medizin und Naturwissenschaften GmbH
Wilhelmstr. 20A
79098 Freiburg (Germany)

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Medical and Scientific Publishers
Allschwilerstrasse 10
CH–4009 Basel
Switzerland

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Price list No. 8 of January 1, 2019 is effective.

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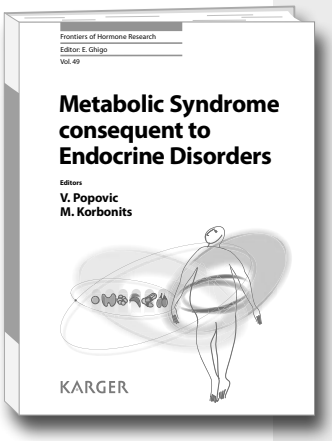

Metabolic Syndrome Consequent to Endocrine Disorders

Editors
Vera Popovic
Marta Korbonits

Metabolic Syndrome Consequent to Endocrine Disorders
Editors: Popovic, V. (Belgrade); Korbonits, M. (London)
X + 174 p., 19 fig., 13 in color, 4 tab., 2018
CHF 148.00 / EUR 138.00 / USD 174.00
Hard cover or online prices for personal customers
Prices subject to change, VAT not included
EUR price for eurozone countries, USD price for USA and Latin America only
ISBN 978–3–318–06334–9
e-ISBN 978–3–318–06335–6

Frontiers of Hormone Research, Vol. 49
Series Editor: Ghigo, E.; Guaraldi, F. (Turin)
ISSN 0301–3073 / e-ISSN 1662–3762

Listed in MEDLINE/PubMed

Fields of Interest: Endocrinology; Metabolism; Diabetes, Obesity, Reproduction

Hormonal dysfunction can have a major and often complex impact on all key components of the metabolic syndrome. This book comprises state-of-the-art reviews on the subject written by recognized experts in the field of endocrinology. Each chapter covers specific manifestations associated with the metabolic syndrome in classic endocrine diseases. Compelling questions are highlighted and future directions presented. The topics covered include hypopituitarism, adrenal insufficiency, acromegaly, glucocorticoid excess, androgen excess, hypogonadism, prolactin, and thyroid and parathyroid hormone abnormalities.
This book is meant to inspire subsequent research related to metabolic complications in endocrine diseases, thus enabling early detection as well as prompt and appropriate management.

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Abstracts

Obesity Facts 2019;12(suppl 1):1–290
Doi:10.1159/000489691

PLENARY LECTURES

Monday, 29 April 2019

PL2 - Precision Nutrition

PL2.01

Precision nutrition

Shai, I.[1]; Gepner, Y.[1]; Shelef, I.[1]; Schwarzfuchs, D.[1]; Zelicha, H.[1]; Tene, L.[1]; Yaskolka Meir, A.[1]; Tsaban, G.[1]; Wolak, A.[1]; Stumvoll, M.[2]; Blüher, M.[2]; Ceglarek, U.[2]; Dicker, D.[1]; Rinott, E.[1]; Kaplan, A.[1]; Rudich, A.[1]; Stampfer, M.[3]

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Background: We aimed to assess whether distinct lifestyle strategies can differentially affect specific body adipose depots.
Methods: We performed an 18-month RCT among 278 sedentary adults with abdominal obesity (75%) or dyslipidemia in an isolated workplace with a monitored provided lunch. Participants were randomized to isocaloric low-fat or Mediterranean/low-carbohydrate (MED/LC) diet+28 g walnuts/day with/without added moderate physical activity (PA; 80% aerobic; supervised/free gym membership). We followed VAT and dynamics of different fat depots (deep and superficial subcutaneous, liver, pericardial, muscle, pancreas, and renal sinus) by MRI.
Results: Of 278 participants (age = 48years, 89% men, BMI = 30.8 kg/m^2), 86% completed the trial. The low-fat group preferentially decreased reported fat intake (-21.0% versus -11.5% for the MED/LC; P<0.001), and the MED/LC group decreased reported carbohydrates intake (-39.5% versus -21.3% for the low-fat group; P<0.001). The PA+ groups significantly increased the METs/week versus the PA- groups (19.0 versus 2.1;P = 0.009). Whereas final moderate weight loss was indifferent, exercise attenuated the waist circumference rebound with the greatest effect in the MED/LCPA+ group (P<0.05). VAT (-22%), intrahepatic (-29%), and intrapericardial (-11%) fats declines were higher than pancreatic and femur intermuscular fats (1% to 2%) loss. Independent of weight loss, PA+ with either diet had a significantly greater effect on decreasing VAT (mean-of-difference = -6.67 cm^2; 95% CI = -14.8 to -0.45) compared with PA-. The MED/LC diet was superior to the low-fat diet in decreasing intrahepatic, intrapericardial, and pancreatic fats (P<0.05 for all). In contrast, renal sinus and femoral intermuscular fats were not differentially altered by lifestyle interventions but by weight loss per se. In multivariate models further adjusted for weight loss, losing VAT or intrahepatic fat was independently associated with improved lipid profile, losing deep subcutaneous adipose tissue with improved insulin sensitivity, and losing superficial subcutaneous adipose tissue remained neutral except for an association with decreased leptin.
Conclusion: Moderate weight loss alone inadequately reflects the significant lifestyle effects on atherogenic and diabetogenic fat depots. The MED/LC diet mobilizes specific ectopic fat depots, and exercise has an independent contribution to VAT loss. Fat depots exhibit diverse responsiveness and are differentially related to cardiometabolic markers. Distinct lifestyle protocols may uniquely induce fat mobilization from specific anatomic sites.

PL3 - What Is an Effective Treatment Outcome?

PL3.02

Children patient perspective: is obesity always a disease?

Ells, L. J.[1]; Hudson, C. M.[1]; Nnyanzi, L.[1]; Hanchard, M.[2]; Adamson, A. J.[3]

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Childhood obesity is one of the serious public health concerns of the 21st century, yet effective treatment solutions remain elusive. Although adult obesity has for some time, been declared a disease by the WHO and American Medical Association, it remains unrecognised as a childhood disease in many countries. Classifying childhood obesity as a chronic disease is important from a publish health perspective as it will help drive the development of prevention and treatment strategies, ensure health care policies and systems are responsive, and improve health care practitioner education. However, is this classification important to children and families?
Evidence has shown that obesity is often not viewed by families and children as a medical condition but rather a societal problem. Recent research has also demonstrated that whilst parents are aware their child is overweight, they are reluctant to label them as such. Although parents have been shown to disregard feedback on their child's weight status, as they deem health and happiness to be more important than weight, anthropometry remains the primary outcome measure of most treatment interventions.
The implications of the dissonance between the how health care practitioners, researchers and families view effective childhood obesity treatment will be discussed, alongside how improved awareness, training and new technology could be used to manage childhood obesity as a disease without the need for a label.

Tuesday, 30 April 2019

PL5 - Obesity as a Disease Process

PL5.01

Patient perspective: is obesity always a disease?

Sbraccia, P.

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Experts agree that obesity is a chronic disease; however, in many areas of medicine and among policymakers the belief that obesity is just a personal problem of bad choices is hard to dismiss.
The controversy around the issue of whether obesity is a disease goes back to almost 100 years ago; however, nowadays, while facing a devastating pandemic, we urge to take responsibility and move from philosophy to clinical action. In this regard, the 2013 decision of the American Medical Association goes in the right direction. The WOF define obesity of a chronic, relapsing, progressive disease. In its 2020 Impact Goals for cardiovascular health promotion and disease prevention, the American Heart Association defines ideal cardiovascular health to include a BMI <25.

***Please note:** By default, authors did not disclose any conflicts of interest unless explicitly stated in the abstract.

Two enemies in the pathway toward the recognition of obesity as a disease are the "obesity paradox" and the "metabolically healthy obese individuals (MHO)". The obesity paradox (the hypothetical mortality advantage of being overweight or obese), very often based on cross-sectional studies, may derive from selection and/or survival bias and intentional versus unintentional weight loss differences (reverse causation). Both the obesity paradox and MHO appear to be misconceptions: the Global BMI Mortality Collaboration (Lancet 2016) have unambiguously demonstrated the associations of obesity with higher all-cause mortality: no paradox, no healthy obese. In addition, data from a large cohort from a UK biobank have shown that increasing adiposity had a detrimental association with CVD, ruling out any misconception of a potential 'protective' effect of fat on CVD risk (Iliodromiti S at al, Euro Heart J, 2018). Finally, two large prospective studies investigating MHO CV risk, have clearly shown that they had a higher CV risk (Caleyachetty R et al, JACC 2017), and that even when metabolic health is maintained during long periods of time, obesity remains a risk factor for CV disease (Eckel N et al, Lancet DE 2018).
In conclusion, if we really want to reduce the prevalence of obesity and the long list of disabling and potentially deadly cardiometabolic, mechanical, neuropsychiatric and cancer promoting complications, immediate action should be taken to universally recognize obesity as a chronic disease.

PL6 - Healthy Adipocyte

PL6.01

Healthy adipocyte

Kopecky, J.

Department of Adipose Tissue Biology, Institute of Physiology of the Czech Academy of Sciences, Prague, Czech Republic

It remains to be clarified why a large subgroup (10-40%) of obese people remains metabolically healthy while the others develop various diseases – namely type 2 diabetes, dyslipidaemia, cardiovascular disease, and even cancer. In accordance with the emerging concept that the immune and metabolic systems are interconnected, the immunometabolism of white adipose tissue (WAT) and its secretory features probably belong to the major determinants. Several human studies together with results in mice document that beneficial metabolic effects of various life-style interventions, including physical activity, caloric restriction and dietary omega-3 fatty acids (FA), as well as the effect of some pharmaceuticals like thiazolidinediones, could reflect modulation of WAT immunometabolism to protect against adverse metabolic changes in obesity. Specifically, low-grade WAT inflammation and deterioration of WAT metabolism, which are associated with obesity, could be limited by the abovementioned interventions, reflecting the induction of "healthy adipocytes". These cells are endowed with a high activity of (i) futile metabolic cycle, which is based on hydrolysis of triacylglycerols (TAG) and re-esterification of FA in adipocytes (TAG/FA cycling), (ii) in situ FA synthesis (de novo lipogenesis; DNL), and (iii) mitochondrial citric acid cycle and oxidative phosphorylation that support both DNL and TAG/FA cycle. Sufficient activity of TAG/FA cycling in WAT is required for fast tuning of systemic lipid levels and prevention of lipotoxicity. DNL in WAT correlates with insulin sensitivity as well as resistance to obesity because it serves as a source of signalling molecules (lipokines, namely branched fatty acid esters of hydroxy fatty acids), and is required for sufficient generation of lipid fuels for thermogenesis in extra-adipose tissues. Therefore, in spite of its relatively low contribution to metabolic rate, WAT metabolism (i) is essential for adaptive thermogenesis, (ii) may affect propensity to accumulation of body fat, and (iii) may underlie the lean metabolic phenotype of some obese individuals. Although it is relatively difficult to achieve weight reduction in obesity, it might be feasible to abolish its adverse consequences on health by modulating WAT metabolism.

PL7 - Drive and Ambition in an Appetite Control System - An Update

PL7.01

Drive and ambition in an appetite control system - an update

Blundell, J.

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More than half a century ago the understanding of human appetite was dominated by the dual centre theory; hunger and satiety centres in the hypothalamus were believed to provide the excitation and suppression of neural activity responsible for starting and stopping episodes of eating. This view is now outdated and clearly inadequate. The point is that scientific explanations evolve and we should expect current explanations to be superseded by better ones. Current beliefs invoke control (of food intake) and regulation (of adipose tissue) linked through the principle of energy homeostasis. However, as Speakman (2014) has pointed out: 'if body fat is regulated, how come we have an obesity epidemic?' Since the studies of Kennedy (1950, 1953) hypotheses about appetite control have focussed on the issue of satiety – an inhibitory process – seeking an answer to the problem of overconsumption (produced by high energy, palatable food). In contrast the excitatory processes underlying appetite – what drives eating – have been neglected.
In the last few years a body of research using an energy balance framework has led to the summary (AJCN editorial, 2017) that 'Resting Metabolic Rate (RMR) and Fat-free Mass (FFM) are the strongest determinants of energy intake' From an evolutionary perspective this makes sense; the need for energy to maintain the body's vital organs (heart, liver, brain, kidneys, skeletal muscle) constitutes a drive to seek food (hunger). Outcomes from a linked research field have demonstrated that energy expenditure (PAEE) is important for understanding energy intake (appetite control), leading to the view that 'AEE and RMR together are key biological drivers for perceived need for food'. Recent evidence has demonstrated that AEE is an independent driver of EI. Also PA (reflected in EE) can reliably reduce body fat. Moreover, food choice is a major dimension of appetite that can provoke overconsumption, but is not heavily biologically programmed. Therefore, what is the importance of Drive and Inhibition in relation to the omnivorous habit of humans operating within a nutritional environment of abundance? Can these outcomes throw light on the importance of PA (EE) or Appetite (EI) for obesity?

PL8 - Diet, Body Weight Management and Cardiometabolic Risk

PL8.01

Diet, body weight management and cardiometabolic risk

Sievenpiper, J. L.

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Obesity, diabetes, and their downstream cardiometabolic complications have reached epidemic proportions and are projected to increase. Although diet remains the cornerstone of prevention and management, the optimal diet remains a source of debate. Over the last four decades, high fat intake was considered the main culprit in these epidemics and the target of clinical and public health interventions. The focus has now shifted to carbohydrates based on the "carbohydrate-insulin model" of obesity (in which carbohydrate induced hyperinsulinemia drives fuel partitioning with compensatory increases in intake and decreases in

energy expenditure leading to weight gain) with traditional carbohydrate staples like cereals, starchy vegetables, pulses, and pasta coming under attack. This continued reductionism that focuses on single macronutrients and a "one-size-fits-all" approach has been challenged by the best available evidence. High quality systematic reviews and meta-analyses show that are high in carbohydrates but low in glycaemic index (GI), high in fibre, or emphasise specific foods such as whole grains, pulses, or fruit decrease intermediate cardiometabolic risk factors in randomized controlled trials and are associated with decreased weight gain, diabetes incidence, and cardiovascular disease incidence and mortality in prospective cohort studies. The same benefits are seen for the dietary patterns (Mediterranean, DASH, Portfolio, and vegetarian dietary patterns) that emphasise these high-quality carbohydrates over a wide macronutrient-range. These data reflect the current shift in clinical practice guidelines for obesity, diabetes, and cardiovascular disease that focus on the values and preferences of individuals, allowing for flexibility in the proportion of macronutrients in the diet with a focus on quality over quantity and dietary patterns over single nutrients.

INTEGRATIVE SESSIONS

Sunday, 28 April 2019

IS1 - Gender Differences in Obesity

IS1.01

Epidemiological perspective

Heitmann, B. L.

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At both the global and the European levels there are vast gender related diferences in the occurrence of and morbidity related to obesity. The health consequences, partly dependent on gender differences in fat mass and distribution, show that obese women seem to have less metabolic complications compared to obese men, despite their higher adiposity. Also, obesity in childhood show gender differences with suggestions for stronger relations between obesity in childhood and adult health outcomes for boys than for girls. The current presentation will focus of on the health related gender differences in obesity in the context of how these differences seem to present over the life course.

IS1.02

Understanding clincial observations

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The tendency to become obese and to develop associated comorbidities depends on numerous factors including genetics, epigenetics, dietary habits, physical activity and the interaction between these factors. The sex of an individual also affects the propensity of an individual to become overweight or obese and this is partially due to differences in sex steroid levels. Estrogens can protect against weight gain and obesity-associated secondary complications and indeed, postmenopausal women have an increased risk for weight gain and other diseases. However, prepubertal differences also exist and the response to early obesogenic situations also affects males and females differently. Studies in animal models have helped to understand the possible mechanisms involved in the differential long-term metabolic responses to early dietary or hormonal changes. This conference will present various experimental paradigms where males and females respond differently to modifications in the early developmental environment and to later dietary challenges. These differential responses include not only variations in excess weight gain over time, but also in the development of associated pathologies. Special emphasis will be placed on the possible mechanisms involved and on the importance of studying both sexes when attempting to understand metabolic control and obesity.

IS1.03

One year effects of the ACOORH concept on weight control and metabolic regulation: results of a multicenter RCT in a real world setting reveal significance and gender differences

Banzer, W.[1]; Berg, A.[2]; Braumann, K. M.[3]; Führer Sakel, D.[4]; Halle, M.[5]; Martin, S.[6]; Mccarthy, D.[7]; Predel, H. G.[8]; Scholze, J.[9]; Seyller, C.[10]; Toplak, H.[11]

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Recent studies have emphasized that meal-replacement strategies are more effective in losing weight and fat mass than usual lifestyle intervention programs. Moreover, it has been shown that a meal replacement regimen high in soy protein may be more effective in improving anthropometric and metabolic measures and associated risk factors than a conventional low-caloric diet. Few data have been obtained in real world settings and/or have dealt with gender differences

To investigate that further, ACOORH (Almased Concept against Overweight and Obesity and Related Health Risk) was designed as a 1-year-multicenter RCT (Berlin, Düsseldorf, Essen, Frankfurt, Freiburg, Graz, Hamburg, Cologne, London, Munich, Strasbourg) for overweight and obese patients using a low-calorie, low-glycemic, soy-protein-rich product (Almased®) according to a pretested real world regimen without additional dietary intervention (1st week substituting three main meals/day, 2nd-4th week two main meals/day, and 5th-26th week one main meal/day, then diet alone) comparing this to a control group of life-style intervention with a dietician. Primary target variable was total body weight (BW; BMI), secondary targets included body fat (FM), lean body mass (LBM), fasting blood glucose and insulin levels (FBI), HbA1c, LDL-C, triglycerides (TG), serum leptin, measures of hemodynamometry endothelial (BP; PWV) and muscle strength.

463 non-diabetic participants (BMI 27–35 kg/m^2, 21–65 yrs) with at least one weight independent criterion of the metabolic syndrome were recruited and randomized (1:2) into a lifestyle (LS, n = 155) intervention consisting

of a fat restricted low calorie diet and increased physical activity versus a meal replacement (MR, n = 308) regimen. Baseline and 12-weeks data are available in female (n = 298) and male (n = 165) participants (31.6±2.36 kg/m², 50.4±9.6 yrs). Meal replacement strategy had a significantly higher (p<0.001) impact on weight, BMI, WC and FM during the intense 12 week intervention (MR: -6.3±4.08 kg, -2.2±1.40 kg/m², -6.4±5.87 cm, □-5.7±4.0 kg, □-4.9±3.35 kg) than the LS group (-3.2±3.69 kg, -1.1±1.24 kg/m², -3.6±4.99 cm, □-3.9±2.83 kg, □-2.2±3.21 kg). Significant benefits (p<0.001) were also observed for HbA1c, LDL-C and serum leptin levels in the MR group. Considerable improvements in FBI, HOMA index, TG and BP were recognized in both intervention groups. The one year follow-up data reveal a modest but statistically highly significant (p<0.001) better effect of the meal replacement strategy for BMI, body composition as well as strength in the male and FBI in females.
The results demonstrate significant benefits of the meal replacement strategy for body composition and weight-related risk factors after 12 weeks of intervention with a remaining benefit after 1 year.

IS2 - Physical Activity and Sedentary Behaviour

IS2.01

Sedentary behaviour

Tigbe, W. W.

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The Sedentary Behaviour Research Network defines sedentary behaviour is any waking behaviour characterized by an energy expenditure ≤1.5METs, while in a sitting, reclining or lying posture (Trembelay et al., 2017). Sitting, unlike standing, is associated with reduced skeletal muscle lipoprotein lipase activity and detrimental changes in lipid profile (Bey & Hamilton 2003; Hamilton et al., 2004 & 2007). Sedentary behaviour is an independent risk factor for obesity, diabetes, cardio-metabolic disease, some cancers, and musculo-skeletal and mental disorders. Importantly, these effects remain after adjusting for physical activity level.
The deleterious effects of sedentary behaviour have been known since 1950s (Morris et al., 1953) but our evolution probably explains why it is taking us long to reverse this behaviour pattern. Over the millennia, we had to work physically for long hours and rewarded ourselves we sedentariness during breaks. The Tsimane tribe of Bolivia also walk 17,000 steps a day to maintain their excellent cardiovascular health (Kaplan et al., 2017).
In modern societies the prevalence of sedentary behaviour is high throughout the day; at homes, during transportation, work and leisure time. However, walking delivery postal workers who sat 1.6h/day less than their office colleagues had lower 10-year coronary risk (Tigbe et al., 2017). They only sat less (1.9 h versus 4.1h) during the work hours (Tigbe et al., 2011). Outside work hours and during weekend the two groups have similar sedentary behaviour pattern, highlighting the importance of the workplace in reducing this health risk.
Health response to sedentary behaviour is dose-dependent. Mortality rate increase with time spent sitting (Katzmarzyk et al., 2009). An additional hour of time spent sedentary was associated with a 22% greater odds for type 2 diabetes and a 39% greater odds for the metabolic syndrome (van der Berg et al., 2016). Waist circumference was 2cm higher and Procam risk 0.2%, per average daily hour of sitting above 5h (Tigbe et al., 2017). LDL and HDL cholesterol also varied unfavorably for each hour of sitting above 5h/day.
Interventions to reduce sedentary behaviour are in development stage and give encouraging results. It is important to focus resources in this area

IS2.02

WHO guidelines on physical activity, sedentary behaviour and sleep in children under 5 years of age

Willumsen, J.

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Physical inactivity has been identified as a leading risk factor for global mortality and a contributor to the rise in overweight and obesity. Early childhood is a period of rapid physical and cognitive development and a time during which a child's habits are formed and family lifestyle habits are open to changes and adaptations. To meet daily physical activity time recommendations, particularly in children, the pattern of overall 24-hour activity needs to be considered, since the day is made up of sleep time, sedentary time and light, moderate- or vigorous-intensity physical activity. This guideline provides recommendations on the amount of time in a 24-hour day that young children, under 5 years of age, should spend being physically active or sleeping for their health and wellbeing, and the maximum recommended time young children should spend on screen-based sedentary activities or time restrained.
In developing these recommendations WHO fills a gap, as children under 5 years of age were not included in the Global recommendations on physical activity for health in 2010 and. This guideline also contributes to the implementation of the recommendations of the Commission on Ending Childhood Obesity and the broader Nurturing care for early childhood development framework that encompasses health, nutrition and safety needs, as well as early learning opportunities. The primary audiences for this guideline are policy makers in high as well as low- and middle-income countries, and those working in early childhood development services and providing advice and guidance to caregivers, such as community or family nurses or doctors, paediatricians or occupational therapists.
The presentation will outline the process of developing the guideline, briefly summarise the evidence behind the recommendations, the research gaps identified and the on-going development of tools to support local adaptation and implementation of the recommendations in diverse settings.

IS2.03

A systematic review of longitudinal changes in moderate-to-vigorous-intensity physical activity from childhood to adolescence

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Background: Moderate-to-vigorous-intensity physical activity (MVPA) has the greatest health benefits, but the frequency of MVPA in children and adolescence declines with age. The timing of this decline in MVPA and sex-based differences of the decline are not clear. We performed a systematic review of accelerometer-based longitudinal studies of MVPA to quantify the year-to-year changes in MVPA among children and adolescents of both sexes.
Methods: Longitudinal studies were identified by searching Medline, Embase, PsycINFO, SPORTDiscus, Physical Education Index, Web of Science, and other relevant databases up to Dec 2017. Only studies that reported MVPA (min/day) separately for boys and girls and had follow-up duration of at least one year were eligible for inclusion in the analysis. Two reviewers independently assessed study quality and extracted data. Pooled analysis of the relative change in MVPA per year (%) was performed.
Results: Out of 3,417 papers, 42 studies were included in the analysis, with a total sample of 18,518 participants age 3-18 years (boys = 7,890 and girls = 10,628). Relative change in mean MVPA declined by -3.7% [95% CI -5.6% to -1.7%] (P<0.001) each year across childhood and adolescence. The MVPA decline in boys was -3.4% [95% CI -6.0% to -0.9%] per year

(P = 0.010) but among the girls it was higher (-5.3% [95% CI -7.8% to -2.7%], P < 0.001). In both boys and girls aged 6-9 years MVPA declined by -6.7% [95% CI -9.0% to -4.5%] per year (P < 0.001).
Conclusion: This study suggests that the decline in MVPA starts at an early age and affects both sexes. Interventions to increase or maintain MVPA should be implemented early in life to realize its health benefits.

Tab. 1. Relative annual change (%) in minutes of Moderate-to-vigorous physical activity per day by sex and age at baseline.

	Boys		Girls		Overall	
	Mean	95% CI	Mean	95% CI	Mean	95% CI
Overall	-3.4	-6.0 to -0.8*	-5.3	-7.8 to -2.7*	-4.4	-6.2 to -2.6*
Age at baseline (years)						
3-5	-.2	-19.3 to 18.9	-1.6	-24.2 to 21.1	-.8	-13.8 to 12.1
6-9	-5.1	-7.9 to -2.3*	-8.4	-12.0 to -4.7*	-6.7	-9.0 to -4.5*
10-12	-2.0	-5.1 to 1.2	-3.2	-7.0 to .6	-2.6	-5.0 to -0.2*
13-18	-5.0	-12.1 to 2.1	-5.3	-7.4 to -3.1*	-5.2	-8.3 to -2.1*

* P < 0.05.

IS2.04

Does active commuting attenuate the association between adiposity and mortality?

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Background: Previous work using UK Biobank data has shown active commuting to be associated with a lower incidence of all-cause mortality, cardiovascular disease (CVD) and CVD mortality when compared to non-active commuting. Considering high adiposity levels are detrimentally associated with health outcomes, our study investigates how different modes of active commuting might attenuate the association between adiposity and adverse health outcomes.
Methods: This study includes prospective data from 163,149 UK Biobank participants (aged 37-73 years at baseline; 50.8% women). The exposure was baseline BMI category (normal BMI 18.5-25 kg/m^2; overweight 25-29.9 kg/m^2; obese >30 kg/m^2). The moderator was active commuting category (walking and cycling (mixed), cycling-only and walking-only; car commuters were used as a reference group). The outcomes were all-cause mortality, CVD incidence and CVD mortality. Cox proportional hazard was performed to investigate the association between BMI categories and health outcomes by commuting mode. Analyses were performed using a 2-years landmark analysis, excluding people with comorbidities at baseline and adjusted for an extensive list of confounding factors.
Results: Over a 5.0-year mean follow-up (range: 3.3-7.8) a total of 2,425 participants died and 7,973 developed CVD. Compared to those who were normal weight and reported mixed active commuting (walking and cycling to and from work; reference group), participants who were obese and reported being car commuters had a higher risk of all-cause mortality (HR: 1.32 [95% CI: 1.01; 1.73], p = 0.041), CVD mortality (HR: 2.06 [95% CI: 1.05; 4.04], p = 0.036) and CVD incidence (HR: 1.59 [95% CI: 1.36; 1.85], p < 0.0001). In contrast, those who were obese but reported being active commuters showed no association with all-cause mortality (HR: 1.04 [95% CI: 0.69; 1.56], p = 0.844), but maintained an association with CVD incidence (HR: 1.82 [95% CI: 1.48; 2.23], p<0.0001) and a trend towards higher CVD mortality (HR: 2.10 [95% CI: 0.89; 4.93], p = 0.089). Similar results were observed for overweight individuals. Likewise, when cycling-only or walking-only was used as the moderator, the results showed a similar pattern for both commuting modes.
Conclusion: Our findings, if causal, suggest that those who are overweight or obese could potentially attenuate the risk of all-cause mortality if they engage in active commuting. However, cycling and walking to and from work may not be enough to attenuate CVD risk associated with excess body weight.

Conflicts of Interest: None.

Funding: None.

IS2.05

Relations between gait patterns, body composition and physical fitness in women with severe obesity

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Context And Objectives: In the general population and in persons with obesity, walking is the most commonly performed physical activity. Gait analyses in obese subjects revealed decreased stability during walking but very few data are available in subjects with severe obesity. This study aimed to describe gait patterns in women with severe obesity and to analyze the relations of gait patterns with body composition, muscle strength and physical activity in these subjects.
Methods: Twenty women with severe obesity candidates to sleeve gastrectomy were recruited at the Department of Nutrition, Pitie-Salpetriere University hospital (Paris, France) (ClinicalTrials NCT03325764). Gait patterns were assessed with an instrumented walkway system (GAITRite mat) at the Department of Physical and Rehabilitation Medicine, Rothschild hospital (Paris, France). Gait parameters (walking speed in cm.s^{-1}, cadence in steps.min^{-1}, stride length and width in cm, and double support in % gait cycle) were measured while patients walked at a self-selected comfortable speed across the mat. Other outcomes measured were lower-limb muscle strength (counter-movement jump performed on a Kistler force platform), habitual physical activity (Actigraph accelerometer worn at the hip during 7 days) and body composition (DXA absorptiometry). Gait parameters were compared with reference values (McKay Gait Posture 2017; 58:78-87) using one-sample t-tests. Relations between gait patterns, body composition and muscle strength were analyzed with Spearman correlations.
Results: Mean (SD) age was 41.1 (1.6) y and BMI 43.9 (4.4) kg.m^{-2}. Self-selected walking speed, stride length and cadence were lower in women with severe obesity compared to reference values: 117.6 (11.6) vs. 133.1 (14.6) cm.s^{-1} (P<0.001), 125.3 (12.5) vs. 134.7 (11.8) cm (P = 0.002) and 113.6 (5.5) cm (P<0.001), respectively. Stride width and double support were larger in women with obesity compared to reference values: 12.0 (1.7) vs. 8.1 (2.6) cm and 27.6 (2.8) vs. 22.0 (2.4) % (all P<0.001), respectively. Body mass and body fat were negatively related with walking speed and positively related to double support (relations with body mass adjusted for height: r = -0.51, P = 0.03; r = 0.79, P<0.01, respectively). When adjusting for age and BMI, muscle strength was negatively related to double support (r = -0.49, P = 0.04, respectively). Physical activity was not significantly related to gait parameters.
Conclusion: In women with severe obesity, increases in body mass and body fat were associated with gait patterns reflecting dynamic instability. However, independently of age and BMI, muscle strength was favorably associated with stability, highlighting the importance of physical fitness in maintaining functional capacity in these patients.

IS3 - Effects of Obesity Treatment on Complications

IS3.02

Adipocyte autophagy

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Dys-regulated autophagy is now thought to contribute to multiple disease mechanisms including in obesity. Yet, how exactly it is altered, what are the tissue and even cell-type specific coordinates of such alterations, what are the causes, and importantly - the functional consequences - remain an area of intense controversy and investigation, whose results are required before means of "normalizing" autophagic function could be considered for therapeutic purposes.

In this presentation the above mentioned issues will be reviewed, highlighting the main outstanding topics, particularly relating to adipose tissue and adipocyte dys-regulated autophagy. The functional causes and consequences of dys-regulated adipose autopahgy, and how it may contribute to obesity-related co-morbidities will be presented, including the potential cross-talk with dys-regulated adipokine profile and intersection with adipocyte and adipose tissue and vascular macrophage lipid handling. Finally, the possibility that adipose autophagy and/or pathways responsible for its dys-regulation could assist in defining clinically-relevant obesity sub-types/sub-phenotypes, will be discussed.

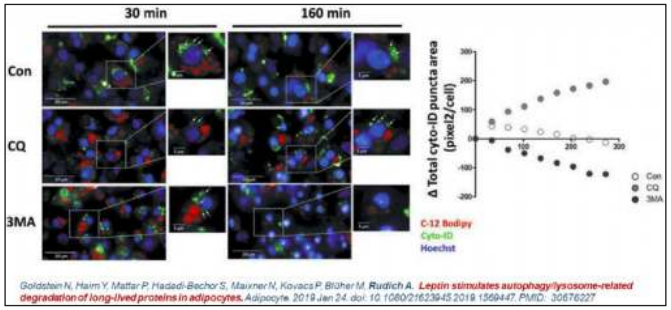

Fig. 1. Live-cell tracking of adipocyte autophagy.

IS3.03

Childhood obesity

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The three primary treatments for pediatric obesity include lifestyle modification therapy, pharmacotherapy, and metabolic and bariatric surgery. All of these treatments, to varying degrees, have been shown to improve obesity-associated co-morbidities including cardiovascular, metabolic, musculoskeletal, and mental health. The amount of BMI reduction needed to elicit meaningful improvements in obesity co-morbidities remains unclear, particularly for youth with severe obesity. Though a high degree of variability exists in terms of co-morbidity outcomes with various obesity treatments, some consistent trends have emerged for certain medications and with metabolic and bariatric surgery. As novel obesity treatments begin to emerge in the coming years, special focus should be placed on therapies that, in addition to eliciting weight loss, meaningfully address co-morbidities and reduce the risk of related diseases. Future research in pediatric obesity interventions should prioritize identification and characterization of predictors of response so that precision medicine approaches can be applied in the clinical setting to achieve the maximum amount of weight reduction and co-morbidity resolution as well as minimize risks for youth with obesity.

IS4 - Inter-Organ Crosstalk

IS4.01

Brain/adipose tissue axis

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Some humans appear to resist fat gain with overeating, whereas others readily store excess fat. The possibility that differences in the thermogenic response to food could be the causative factor of susceptibility to obesity was first proposed over a century ago. Moreover, the discovery of the adipose tissue hormone leptin, and the finding that the binding to its receptors in the hypothalamus reduces of food intake and increases energy expenditure, highlighted the interactions between brain and the adipose tissue as key regulator of whole-body energetic balance and size. Leptin elevates sympathetic-nervous-system (SNS) outflow to the periphery, activating lipolysis and thermogenesis in both the white adipose tissue (WAT) and the brown adipose tissue (BAT). It is well established that these molecular programmes are mechanistically activated by Norepinephrine (NE), the primary catecholamine secreted by the SNS. Recently, we found that NE availability in the adipose tissue can be peripherally controlled, and it regulates the susceptibility to obesity independent from caloric balance. Thus, this could prove to be an interesting molecular pathway for direct pharmacologic targeting in order to promote resistance to weight gain. In the attempt to explore the role of the SNS in the control of body weight, we developed a combination of genetic tools and drug modification techniques to manipulate NE availability in the adipose tissue, and probe the metabolic adaptions that happen independent from differences in food intake and locomotor activity. Our findings highlight the role of the sympathetic-adipose connection as the main controller of the capacity to mobilize and dissipate energy reserves, regulating adiposity levels beyond caloric balance.

IS4.02

GLP1

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GLP-1 was discovered in 1987, and the peptide was first shown to stimulate insulin secretion. Effects on appetite, satiety, sensation of fullness, and food intake were described first in 1998 in healthy human subjects. With the availability of GLP-1 receptor agonists developed for the glucose-lowering treatment of type 2 diabetes, additional effects like reductions in food intake and body weight and deceleration of gastric emptying became apparent. Typical adverse events like nausea, vomiting, or diarrhoea typically occur early after initiation of GLP-1 receptor agonist treatment and are observed less frequently with prolonged treatment. Physiologically, GLP-1 is produced in and secreted from the small intestines. In order to achieve its major biological effects, it has to signal to the endocrine pancreas (stimulation of insulin secretion, suppression of glucagon secretion), to the gastrointestinal tract (deceleration of gastric emptying) and to the hypothalamus (regulation of food intake). Vagotomy prevents GLP-1 effects on gastric emptying, so the parasympathetic nervous system is involved. GLP-1 receptor agonists released from subcutaneous depots reach concentrations much higher than physiological GLP-1 concentrations. Slowed gastric emptying and increased gastric content are not what causes "gastrointestinal" adverse events, since even profound deceleration of gastric emptying is not associated with such symptoms. Most likely, a direct interaction with the central nervous system (brain stem) is mediating such sensations. Of even more importance is the reduction in appetite and food intake induced by GLP-1 receptor agonists, which leads to an average reduction in body weight of 3 kg with first- and second generation compounds (exenatide, liraglutide, dulaglutide), but up

to 7 kg with third-generation representatives (semaglutide), and maybe, even more with GLP-1 receptor agonists also interacting with glucagon or GIP receptors. Therefore, GLP-1 receptor agonists are not only considered for the glucose-lowering treatment, with weight reduction as a secondary activity ("nice to have"), in patients with type 2 diabetes, but also for the treatment of obesity (even in the absence of diabetes).

IS4.03

Neuromedin U is a gut peptide that alters oral glucose tolerance by delaying gastric emptying via direct contraction of the pylorus and vagal-dependent mechanisms

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Introduction: The gut-brain peptide neuromedin U (NMU) decreases food intake and body weight, and improves glucose tolerance. Here, we determined how acute NMU administration impacts glucose excursion.
Methods: NMU and NMU receptor expression were investigated throughout the gastrointestinal tract. Glucose tolerance tests were performed after peripheral injection of NMU in sham or vagotomised C57BL/6NRj mice. Gastric retention was evaluated. Direct impact of NMU on pyloric contraction was assessed ex vivo in isometric chambers. Vagus afferent implication was assessed in vivo by comparing c-FOS immunoreactive neuron number in hypothalamic structures of interest.
Results: While a single peripheral injection of NMU in mice prevented the rise of glycaemia upon an oral but not an intraperitoneal load of glucose, it unexpectedly prevented insulin secretion, and only slightly improved peripheral insulin sensitivity. NMU peripheral administration abrogated gastric emptying. NMU receptors NMUR1 and NMUR2 were detected in pyloric muscles and NMU was able to directly induce pyloric contraction in a dose-dependent manner ex vivo. Part of this effect was abolished in vagotomized mice suggesting implication of the vagus tone. Accordingly, peripheral injection of NMU was associated with increased number of c-FOS positive neurons in the nucleus of the solitary tract, which was partly prevented in vagotomized mice. Finally, NMU kept its ability to improve oral glucose tolerance in obese and diabetic murine models.
Conclusion: These data demonstrate that NMU blocks gastric emptying directly by inducing pylorus contraction and indirectly by a nervous pathway involving afferent vagal fibres. This blockade reduces intestinal nutrient absorption and thus improves oral glucose tolerance.

Conflict of Interest: None Disclosed.

Funding: This work was supported by Inserm and University Paris Diderot.. MLG received funding from Société Francophone du Diabète, SFNEP and Institut Benjamin Delessert.

IS4.05

Influence of hyper-energetic, high-fat feeding on circulating hepatokines in healthy men: a randomised crossover study

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Introduction: Leukocyte-cell derived chemotaxin 2 (LECT2), fibroblast growth factor 21 (FGF21) and fetuin-A are liver-derived proteins (hepatokines) which can influence substrate metabolism and insulin sensitivity. Hepatokines are modulated by chronic energy status and associated metabolic disease; however less in known about their sensitivity to acute nutrient and energy manipulation. This study explored the influence of hyper-energetic, high-fat feeding on circulating hepatokine concentrations and examined the time-course of these responses.
Methods: In a randomised, counterbalanced, crossover design, 12 healthy men (mean ± SD: age, 24 ± 4 years; BMI, 24.1 ± 1.5 kg/m^2) completed two seven-day diets separated by a three-week washout period: a hyper-energetic, high-fat diet (HE-HFD; +50% excess energy, 65% fat) and a control (habitual) diet. Before (baseline) and after each diet, whole-body insulin sensitivity was assessed during an oral glucose tolerance test using the Matsuda Insulin Sensitivity Index; whilst body fat percentage was measured via bioelectrical impedance analysis. Fasting venous blood samples were obtained at baseline and after 1, 3 and 7 d of each diet for measurement of plasma LECT2, FGF21, fetuin-A, glucose, insulin, triacylglycerol, non-esterified fatty acids, and the homeostatic model assessment of insulin resistance (HOMA-IR).
Results: Anthropometric and metabolic responses to the diets are shown in Table 1. Compared with control, body mass and BMI tended to increase (both $P \leq 0.057$) after the HE-HFD. HOMA-IR was significantly increased after 3 d of the HE-HFD compared to the control diet, whilst whole-body insulin sensitivity was reduced by 31% after 7 d (both $P \leq 0.021$). Fasting plasma LECT2 concentrations were significantly higher than control after both 3 and 7 d of the HE-HFD (both $P \leq 0.004$; Fig. 1A). Furthermore, fasting plasma FGF21 was significantly higher after 1 d ($P = 0.008$) and tended to be higher after 3 d of the HE-HFD ($P = 0.040$, NS after Bonferroni adjustment; Fig 1B); whilst fasting plasma fetuin-A tended to be higher after 7 d of the HE-HFD ($P = 0.028$, NS after Bonferroni adjustment; Fig. 1C).
Conclusion: This study demonstrates that in conjunction with impairments to whole-body insulin sensitivity and fasting glucose metabolism, acute hyper-energetic, high-fat feeding modulates circulating hepatokines in humans. Specifically, both circulating LECT2 and FGF21 are increased rapidly (within 1-3 days) in response to overnutrition; however the FGF21 response appears to diminish after seven days. Subtle increases in circulating fetuin-A may also begin to occur after seven days of high-fat overfeeding.

Conflict of Interest: None.

Funding: This research was funded by the NIHR Leicester Biomedical Research Centre.

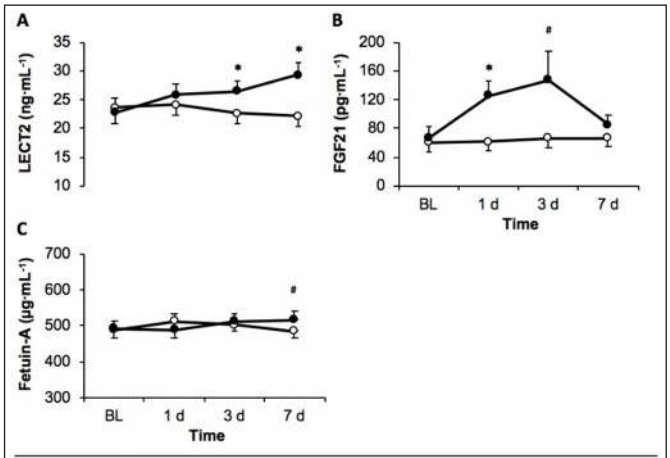

Figure 1. Fasting plasma concentrations of leukocyte cell-derived chemotaxin 2 (LECT2) (A), fibroblast growth factor 21 (FGF21) (B) and fetuin-A (C) during the seven-day control (○) and hyper-energetic, high-fat (●) diets. BL, baseline. Data are presented as means ± SEM. *Significantly different from control diet at same time point ($P < 0.05$). #Tended to differ from control diet at same time point (unadjusted $P < 0.05$, but NS after Bonferroni adjustment).

Fig. 1.

Tab. 1. Anthropometric and metabolic responses during the seven-day control and hyper-energetic, high-fat diets.

	Diet	BL	1 d	3 d	7 d
Anthropometric responses					
Body mass (kg)	Control diet	77.1 ± 4.3	-	-	77.1 ± 4.3
	HE-HFD	76.8 ± 3.7	-	-	78.0 ± 4.1#
BMI (kg/m^2)	Control diet	24.2 ± 1.6	-	-	24.2 ± 1.6
	HE-HFD	24.1 ± 1.5	-	-	24.5 ± 1.5#
Body fat (%)	Control diet	13.5 ± 3.8	-	-	13.3 ± 3.8
	HE-HFD	13.9 ± 3.1	-	-	13.8 ± 3.2
Metabolic responses					
Fasting glucose (mmol/L)	Control diet	4.9 ± 0.4	4.8 ± 0.4	4.6 ± 0.4	4.8 ± 0.4
	HE-HFD	4.8 ± 0.4	5.0 ± 0.3*	5.0 ± 0.5*	5.0 ± 0.3
Fasting insulin (pmol/L)	Control diet	25 ± 12	28 ± 13	22 ± 9	23 ± 7
	HE-HFD	27 ± 11	30 ± 8	30 ± 8	31 ± 11
Fasting TAG (mmol/L)	Control diet	0.75 ± 0.19	0.76 ± 0.19	0.74 ± 0.20	0.86 ± 0.29
	HE-HFD	0.82 ± 0.16	0.63 ± 0.20	0.57 ± 0.16*	0.57 ± 0.16*
Fasting NEFA (mmol/L)	Control diet	0.37 ± 0.13	0.30 ± 0.12	0.33 ± 0.16	0.32 ± 0.13
	HE-HFD	0.31 ± 0.12	0.26 ± 0.14	0.30 ± 0.09	0.25 ± 0.09
HOMA-IR	Control diet	0.8 ± 0.4	0.9 ± 0.5	0.7 ± 0.3	0.7 ± 0.3
	HE-HFD	0.8 ± 0.4	1.0 ± 0.3	1.0 ± 0.3*	1.0 ± 0.4
Matsuda ISI	Control diet	15.1 ± 6.6	-	-	17.1 ± 8.6
	HE-HFD	15.0 ± 6.3	-	-	11.8 ± 5.8*

Data are means ± SD. BL, baseline; HE-HFD, hyper-energetic, high-fat diet; BMI, body mass index; TAG, triacylglycerol; NEFA, non-esterified fatty acids; HOMA-IR, homeostatic model assessment of insulin resistance; ISI, insulin sensitivity index. *Significantly different from control diet at the same time point ($P < 0.05$). #Tended to differ from control diet at the same time point ($P < 0.06$).

IS5 - Innovative Approaches - Drugs and Devices

IS5.01

New drugs

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Recent advances in metabolic diseases research suggest that gut hormones reside at the core of key signalling patterns and offer superior potential for transformative precision medicines. Over the last two decades, we discovered and tested a large series of combination therapies based on multiple gastrointestinal and adipocyte derived signals. Among those, balanced single molecule peptide hormone based GLP1-glucagon and GIP-GLP1 co-agonists exhibited superior body weight loss and glucose metabolism benefits in preclinical models of obesity and diabetes as well as now in clinical phase 2 trials. A series of single molecule GIP-GLP1-glucagon tri-agonists showed even better metabolic and body weight benefits in mouse and rat models of obesity and diabetes. In a parallel approach single molecule conjugates combining a peptide (e.g. GLP1) with a steroid (e.g. estrogen) were generated to maximise metabolic benefits and minimise potential toxicity by specifically targeting a subset of nuclear hormone receptors in peptide-receptor carrying cells. The above described novel single molecule approaches to polypharmaceutical therapeutics carry the potential to offer relevant new solutions for the prevention and treatment of obesity and diabetes.

IS5.03

Deep brain stimulation

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Treatment of obesity is challenging and bariatric surgery by far the most effective treatment option available. Since only few drug treatment options are on the market, alternative strategies are desired. Deep brain stimulation gained a lot of attention during the past years also in the treatment of obesity. The current presentation will highlight these development but will also discuss gaps in knowledge.

IS6 – Pregnancy and Post-Partum

IS6.01

Epidemiology maternal obesty and pregnancy outcomes

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Globally, the number of women who are obese when they conceive has reached epidemic proportions, and many women develop obesity in relation to childbearing. It is well documented that maternal obesity increases risk of adverse outcomes in both the mother and child. Obese women have impaired fecundity, and when they conceive, they have an excess risk of gestational diabetes and preeclampsia during pregnancy. They are also more likely to give birth pre- or post-term and to have cesarean sections or instrumental deliveries. Offspring of obese mothers have on average higher birth weight, and their risk of infant- and childhood obesity is increased. However, the most serious complication related to maternal obesity is, that throughout gestation and after birth, offspring of obese mothers had impaired survival with increased risks of miscarriage, stillbirth, and neonatal mortality. Also, their risk of congenital malformations is increased. This talk will focus on the impaired fetal and neonatal survival in offspring of obese mothers by presenting results from epidemiological studies and discuss clinical implications in a global context.

IS6.02

The SWAN Trial, postnatal weight management

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Objective: To assess feasibility of conducting a future definitive RCT of effectiveness of lifestyle information and Slimming World groups to support postnatal weight management.
Design: RCT
Method: Women with overweight or obese BMIs at antenatal booking or women with normal BMIs who gained excessive gestational weight as assessed at 36 weeks gestation were recruited. Consented women were randomised to standard care plus lifestyle information and access to Slimming World sessions commencing from 8-16 weeks postnatally, or standard care only. Questionnaires were completed at 36 weeks gestation, 6 and 12 months postnatally. Acceptability and experiences of intervention and trial procedures were assessed through questionnaires (6 + 12 months postnatally), interviews with intervention women at 6 months (n = 13), and women from both groups at 12 months (n = 17).
Primary assessment was difference in weight between groups at 12 months. Secondary assessments included physical and mental health, diet, smoking, alcohol, physical activity, body image, breastfeeding, acceptability of study processes, NHS resource use. Quantitative analysis was by intention to treat. Qualitative data were analysed thematically using Framework method. Emergent themes were categorised using the Capability-Opportunity-Motivation model. The required sample size was 130 women at 12 month follow-up.
Results: 193 women were recruited (98 intervention, 95 control), the majority with BMIs ≥25 kg/m^2. 140 women completed 12 month follow-up assessments. Half the intervention group attended at least one Slimming World session, most within 10-16 weeks postnatally. At 12 months weight loss was greater in intervention women, with those who attended 10+ groups achieving most loss. Non-attendance related to 'opportunity' and 'motivation'. Social benefits and capability in relation to weight management plans were reported by those who attended full sessions. Wider commencement and longer intervention times were proposed by women. All trial procedures were acceptable.
Conclusion: It was feasible to recruit and retain women with BMI ≥25 kg/m^2 to a postnatal weight management intervention. Approaches to recruit women with excessive gestational weight gain need to be reconsidered. Women who stayed for 10+ Slimming World sessions reported the greatest benefit in relation to motivation and social support to manage their weight. Findings, including NHS costs, will inform a definitive RCT.

IS6.03

Adverse perinatal outcomes associated with pregnancy after bariatric surgery: a systematic review and meta-analysis

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Introduction: Maternal obesity is associated with adverse outcomes for both mother and baby. Bariatric surgery before pregnancy improves comorbidities associated with maternal obesity such as gestational diabetes and hypertension. Some bariatric procedures, such as gastric bypass, affect the absorption of micronutrients and therefore may impair fetal development. This systematic review and meta-analysis investigated the association between pregnancy following bariatric surgery and some adverse perinatal outcomes.
Methods: Searches were conducted in Medline, Embase, PsycINFO, CINAHL, Scopus, and Google Scholar from inception to December 2018. Reference lists and citations of included studies and relevant reviews were searched, as well as hand searching of various journals. Observational studies comparing perinatal outcomes post-bariatric surgery to pregnancies without prior bariatric surgery were included. Study screening, data extraction, and quality assessment were carried out in duplicate. Outcomes of interest were: perinatal mortality, congenital anomalies, preterm birth, post-term birth, small for gestational age (SGA), large for gestational age (LGA), and neonatal intensive care unit (NICU) admission. Random effects meta-analysis was carried out for all outcomes. Subgroup analysis was carried out by type of surgery where possible. The study protocol is registered on PROSPERO (CRD42017051537).
Results: Thirty-three studies met the inclusion criteria, involving 14,880 pregnancies after bariatric surgery and 3,979,978 controls. Odds ratios (OR) were significantly increased after bariatric surgery for pre-term birth (1·57, 95% CI 1·38-1·79), NICU admission (1·41, 95% CI 1·25-1·59), perinatal mortality (1·38, 95% CI 1·03-1·85), and congenital anomalies (1·29, 95% CI 1·04-1·59). Post-term birth decreased significantly after bariatric surgery (OR 0·46, 95% CI 0·35-0·60). SGA increased (OR 2·72, 95% CI 2·32-3·20) and LGA decreased (OR 0·24, 95% CI 0·14-0·41) after gastric bypass, but not after gastric banding. Babies born after bariatric surgery were over 200g lighter than those born to mothers without bariatric surgery (weighted mean difference -242.4g, 95% CI -307.4g to -177.4g).
Conclusion: Bariatric surgery, in particular gastric bypass surgery, prior to pregnancy can increase the risk of some adverse perinatal outcomes. These women require specific preconception and pregnancy nutritional guidance and increased monitoring of fetal growth and development.

Conflict of Interest: None.

Funding: Newcastle University Research Excellence Academy PhD Studentship.

IS6.04

In gestational diabetes mellitus, maternal third trimester visceral adipocytes are hypertrophic with enhanced basal and isoproterenol stimulation of lipolysis

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Basal fat cell lipolysis is elevated in obesity and is associated with IR. Obesity increases GDM risk, and the maternal dyslipidemia observed in GDM may result from enhanced adipocyte lipolysis. We hypothesized that in GDM there is impaired adipogenesis resulting in hypertrophic adipocyte expansion, adipocyte IR, enhanced lipolysis and higher adipocyte expression of lipid storage and lower expression of differentiation genes relative to controls.
Third trimester subcutaneous adipose tissue (SAT) and visceral adipose tissue (VAT) biopsies were collected from BMI matched healthy (n = 24) and GDM (n = 23) pregnant women undergoing elective caesarian section. After isolation of adipocytes, adipocyte lipolysis: basal and isoproterenol (200 nmol/L)-stimulated +/- insulin (10 nmol/L) were assessed by measurement of non-esterified fatty acid (NEFA) release. Fat cell insulin sensitivity index (FCISI) was calculated as a percentage inhibition of isoproterenol-stimulated lipolysis by insulin. Adipocytes diameters were measured manually by two independent observers. Messenger RNA expression of lipid storage and differentiation genes was quantified relative to the control gene PPIA by RT-qPCR.
In VAT, adipocytes from GDM mothers had 14um larger mean diameter than controls (P = 0.01). VAT adipocyte mean volume in GDM was

twice that of controls (P = 0.01). The basal lipolysis rate was significantly higher in GDM compared to controls [0.4(0.5) vs 0.1(0.6) mmol/L/ug of DNA, P = 0.039]. Moreover, GDM VAT adipocytes had higher lipolysis in response to isoproterenol compared to controls [2.2(2.2) vs 1.01(0.7), P = 0.039]. FCISI was not different between the groups, although the controls were 6 times more insulin sensitive than the GDM. In SAT, mean adipocyte diameter and volume did not differ between GDM and controls. Lipid differentiation gene expression did not differ between GDM adipocytes and controls. There was significant upregulation of the lipid storage gene CIDEC in VAT adipocytes from GDM mothers compared to controls.

Our results provide evidence that in GDM, visceral adipocytes expand in a hypertrophic manner with increased accumulation of lipids in these adipocytes. Hypertrophic expansion of VAT adipocytes may be one of the contributors to the increased basal lipolysis rate seen in this depot via increased IR. Thus, dysregulation of VAT adipocytes basal lipolysis may be important primary event contributing to the emergence of IR in women with GDM. Moreover, catecholamine action is markedly increased in VAT adipocytes suggesting that more fatty acids are produced from this depot in GDM. This will favor portal release of fatty acids and could be an important factor triggering metabolic abnormalities associated with central fat accumulation in obese pregnant women.

Monday, 29 April 2019

IS8 - Innovative Approaches - Digital Technology

IS8.01

Key challenges faced in obtaining engagement with digital behaviour change interventions and potential solutions

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Introduction: Digital behaviour change interventions (DBCIs), including websites, smartphone applications and wearables, can be used to deliver behavioural support when required at low unit cost and can overcome geographical barriers to access. Low engagement with DBCIs is a major issue that needs to be overcome for them to maximise their potential. The use of different definitions and measures of engagement in the scientific literature is hindering attempts to aggregate data in meta-analyses, necessary for scientific progress. This talk i) outlines key challenges faced in obtaining engagement with DBCIs and ii) discusses potential solutions.

Methods: This talk will draw on findings from a recent systematic review and a series of qualitative and quantitative studies involving different DBCIs.

Results: Key challenges faced in obtaining engagement with DBCIs are to i) better understand how to usefully define and measure engagement, ii) better understand how engagement with the technology is related to successful behaviour change, and iii) to formulate an evidence-based model of how to promote engagement in practice. Findings from a recent systematic review and a series of qualitative and quantitative studies suggest that engagement is underpinned by both behavioural and experiential dimensions, that it can be measured via a novel self-report measure and that it arises from the interaction between characteristics of the user, the intervention (e.g. behaviour change techniques, design features), the context in which the intervention is used and the target behaviour itself. Behaviour change techniques and design features that support users' motivation to change and their beliefs about the perceived usefulness of the technology are promising modifiable targets for the promotion of engagement with DBCIs. Future research will need to test these hypotheses using novel, experimental methodologies, such as factorial and single-case designs.

Conclusion: To improve engagement with DBCIs, we need to recognise that engagement has both behavioural and experiential dimensions. We have yet to formulate an evidence-based model of how to promote engagement in practice; this requires the deployment of novel study designs.

IS8.02

Obesity management eHealth

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Obesity is one of the major public health problems in Finland. At present, more than 2.5 million Finns of working-age population are at least slightly overweight (BMI ≥ 25 kg/m²). Modern treatment of obesity is based on behavioral changes that modify one´s daily lifestyle. Treatment of obesity requires long-term interventions. Nevertheless, it is challenging to provide long-term treatment due to limited resources. Thus, new intervention methods are needed. It has been demonstrated that internet-based technologies enable to provide treatment to a larger number of patients with health problems. However, little is known about the utilization and effectiveness of online-programs using novel interactive technologies in treatment of obesity.

The Healthyweighthub.fi online portal for the management of obesity was launched in spring 2016. The aim was to create a program, which not only includes physical exercise and nutrition, but also integrates acceptance-based treatment (ABT), coping with stress, and significance of rest, to make the program a more holistic intervention. The purpose of this study was to evaluate the effects of an internet-based weight management program on weight management, health, and quality of life of overweight people over the age of 18. Furthermore, the aim was to assess which factors predict long-term success in weight management.

The Healthyweighthub.fi Weight Management Program is a follow-up study examining the effect of eHealth weight loss and maintenance program at Helsinki University Hospital, Finland. In the Healthyweighthub.fi, the patients receive both information and treatment of obesity. The patients were enrolled through referrals from primary care, occupational health, other hospitals, or from private health care units. The inclusion criteria was body mass index (BMI) more than 25 kg/m² without severe complications, age over 18 years, and access to the internet with either a computer or a smartphone. The program collects data on weight, use of the service and discussions with the coach. Data on lifestyle, physical exercise, nutrition, psychological factors and sleep were collected by using questionnaires. The study comprised those, who participated in the weight loss program in 2016 – 2018. Results of the efficacy and cost-effectiveness will be included in the presentation.

IS8.03

Efficacy and safety of EndoBar bariatric embolization for weight management in morbid obesity: results of prospective randomized, sham controlled, single-blind 12-month trial

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Background: Obesity is a growing pandemic, associated with adverse cardiovascular and metabolic conditions. Ghrelin stimulates food intake. Catheter-directed left Gastric Artery Bariatric Embolization (GABE) causes a reduction in plasma ghrelin (PG) and weight loss (WL) as demonstrated in animal models and pilot clinical studies.

Objective: Evaluate efficacy and safety of the Endobar Lamina embolization system (ELES) for the treatment of obesity.

Methods: 44 men & women,BMI 35.0 – 55.0 kg/m^2 were randomized 1:1 to blinded treatment with GABE or sham procedure. GABE was performed using Endobar Lamina™ Embolization System.
(Endobar Solutions, Orangeburg, NY, USA) and BeadBlock Embolic Bead 300-500mmicrospheres (Biocompatibles UK). Esophagogastroscopy was performed before and 1 week after GAE to assess gastric abnormalities. Weight and fasting PG levels obtained at baseline and 1-, 3-, 6- and 12-mths post procedure. At 6 mths, Sham group was unblinded and received GABE. Both GAE and Sham Control crossover to GABE groups were followed for a total 12 mths.
Results: GAE was successful in all patients with no serious periprocedural complications. Significant and progressive WL was observed at 6 mths and maintained to 12 mths. PG in the GAE group decreased by 22% (67.91 pg/ml) at 12mths compared to baseline. WL was 6.5% greater in the GAE group vs the sham group at 6 mths (Table 1).

Tab. 1. Mean % TBWL at 6 and 12 mths post-procedure for ITT (n = 40) and PP (n = 31) groups, patients randomized 1:1 to a sham-control or procedure (GAE).

Primary End Point Sham Control GAE p-value
% TBWL, mean (SD)
6 mths post-proc.
ITT 2.77 (3.89) 6.40 (3.89) 0.0521†
PP 1.76 (2.35) 8.25 (6.06) 0.0011†
12 mths post-proc.
ITT 6.49 (7.28) 0.0008‡
PP 8.07 (7.18) 0.0065‡
ITT = Intent-to-treat, PP = Per protocol

† independent sample t-test
‡ paired sample t-test

Conclusion: GAE using the ELES is safe and accompanied by significant and maintainable weight loss with a demonstrated reduction in ghrelin levels.

References

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2. Kipshidze N, et al:Endovascular bariatrics: first in humans study of gastric artery embolization for weight loss. JACC Cardiovasc Intervent.2015; 8(12):1641–4.

Conflict of Interests: Martin Fried was Principal investigator of the Study, Nodar Kipshidze was Part-time consultant, statistical analysis for Study sponsor, Nicholas Kipshidze is founder of Endobar.

Funding: Study was funded by Endobar.

IS8.04

Deep transcranial magnetic stimulation in patients with obesity: Italian safety data

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Introduction: Deep Transcranial Magnetic Stimulation (dTMS) allows the modulation of the dopaminergic system, involved in eating behavior and food craving, through an external helmet-shaped device. The use of dTMS in obesity is a new application, but clinical effects on body weight and food craving in subjects with obesity have recently been reported [1]. dTMS is safe, painless and usually well tolerated. The most commonly reported adverse effects (AE) are headache and neck pain, the most worrisome is the induction of seizure. Safety data in subjects with obesity are needed.

Methods: We analysed safety data on the use of dTMS in adult patients with obesity (February 2015-October 2018). Subjects were randomly assigned to 15 sessions of sham (S) or real dTMS treatment (R1Hz or R18Hz).
Results: Overall 35 of 56 subjects (62.5%) reported AEs. Specifically, 7 of 16 subjects (43.8%) in S, 9 of 13 (69.2%) in R1Hz and 19 of 27 (70.4%) in R18Hz experienced AEs. In total 60 AEs were recorded: 11 in S, 17 in R1Hz and 32 in R18Hz. The vast majority of AEs were "non serious" (58 of 60, 96.6%). Only 2 AEs were "serious": 1 traumatic bone fracture (R 1Hz) and 1 incidental meningioma (R18 Hz). They were both unexpected, there was no assessed causality with dTMS and led to treatment discontinuation. The most frequently reported AE was headache (38.3%) followed by neck/torso pain (13.3%), drowsiness (8.3%), flu-like syndrome (8.3%) and insomnia (5.0%). Headache was mainly mild (52.2% vs 26.1% moderate and 21.7% severe) and it occurred in 12.5% of S, 38.5% of R1Hz and 51.9% of R18Hz subjects. It was severe in 1 of 5 R1Hz (20%) and in 4 of 14 R18Hz subjects (28.6%). Headache resolved, often spontaneously (21 of 23, 91.3%) or with medications (2 of 23, 8.7%). Neck/torso pain was reported as follows: 18.8% (3 of 16) S, 7.7% (1 of 13) R 1Hz, 14.8% (4 of 27) R 18Hz. Drowsiness was more common in R1Hz (2 of 13, 15.4%) than in S (1 of 16, 6.3%) and R18 Hz (2 of 27, 7.4%). Flu-like symptoms were reported more in S (3 of 16, 18.8%) than in R 18 Hz (1 of 27, 3.7%), but not reported in R1Hz. Insomnia was seen in a higher proportion in R1Hz (2 of 13, 15.4%) than in R 18Hz (1 of 27, 3.7%), with no events in S. Other reported AEs (<5% of subjects) were: asthenia, hypertension, vertigo, skull paraesthesia, tinnitus, eyeball pain, toothache, conjunctivitis, urinary infection, and hypotension. We did not record any case of epilepsy.
Conclusion: Adults with obesity well tolerated dTMS, with no new safety concerns. The most frequently reported AEs had already been seen with dTMS.

[1]Luzi L., Chronic effects of repetitive TMS on satiety and body weight control, Diabetologia (2017) 60 (Suppl 1): S107.

Funded by the Italian Ministry of Health RF-2011-02349303. No conflict of interest.

IS10 - Meal Timing

IS10.01

Effect of time-restricted eating on behaviour and metabolism in overweight individuals at risk of type 2 diabetes

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Disruption of circadian rhythms leads to obesity and metabolic disorders. We have shown that timed feeding provides a time cue and resets the circadian clock leading to better health. In contrast, a high-fat diet leads to disrupted circadian expression of metabolic factors and obesity. We also found that combination of a clock-resetting feeding regimen with the clock disrupting high-fat diet resulted in reduced body weight suggesting that the timing of food intake is extremely important. This included the novel finding that an isocaloric feeding can lead to a different body weight if given at different times throughout the day. This novel concept was applied and corroborated in clinical trials, i.e., a high-calorie breakfast with reduced intake at dinner was beneficial and useful for the management of obesity and the metabolic syndrome in obese women, in lean women with polycystic ovary syndrome and in type 2 diabetes patients. We showed that breakfast consumption acutely affected clock and clock-controlled gene expression leading to normal oscillation, whereas breakfast skipping adversely affected clock and clock-controlled gene expression and was correlated with increased postprandial glycemic response in both healthy individuals and individuals with diabetes.

IS10.02

The impact of meal timing and protein on appetite and obesity

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Dietary advice for weight management in humans is based on the assumption that 'a calorie is a calorie' and that meal timing is inconsequential. However, accumulating evidence in the area of chrono-nutrition, refutes this notion and verifies the importance of meal timing in energy balance and cardio-metabolic health and disease. Further, preliminary dietary intervention studies in humans seem to suggest that calories ingested at different times of the day have different effects on energy utilisation, leading to differential weight loss, even at iso-caloric amounts. The mechanisms involved in this mealtime-dependent differential weight loss are unclear, but they may include: 1) behavioural adaption such as altered (increased or decreased) physical activity or energy expenditure at other times of the day, and/or 2) the influence of normal biological circadian/diurnal rhythms on energy metabolism at different times of the day. It is of course the type of foods you choose and portion sizes that have the biggest impact on your health. But if it is the case that time of eating is linked to bodyweight and health, then we will be able to give better dietary advice to people not only related to nutritional content but also of time of eating. So how can we assess these claims about when to eat? Actually, the truth is that one diet message does not fit all people. Some people will be able to control body weight better with a big breakfast and some with a large evening meal, we need stratified nutrition advice. As we understand this interaction of time of day and metabolism better, we will be able to give more accurate dietary advice to the individual that is not only related to nutritional composition, but also time of eating. But first, we need more chrono-nutrition research (time of eating linked to circadian rhythm) to fill in some of the gaps in our knowledge.

Reference

1. Ruddick-Collins, Johnston, Morgan, Johnstone The Big Breakfast Study: Chrono-nutrition influence on energy expenditure and bodyweight Nutr Bull. 2018 Jun; 43(2): 174–183.

IS10.03

Proof of concept RCT investigating the impact of matched weight loss via intermittent or continuous energy restriction on appetite control

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Introduction: Achieving weight loss (WL) through continuous energy restriction (CER) has been proposed to be problematic due to losses in lean mass, compensatory drive to overeat and weakened satiety. Intermittent energy restriction (IER) has generated interest in recent years as an alternative behavioural WL strategy. Currently, the effects of CER vs. IER on appetite control are unknown when the degree of WL is matched.
Methods: 54 women with overweight and obesity were recruited for this parallel group controlled feeding RCT to ≥5% WL (within 12 weeks) via CER (25% daily energy restriction with all foods provided) or IER (ad libitum day interspersed with 75% energy restriction with LighterLife total diet replacement products provided). Probe days were conducted by blinded investigators at baseline and post-WL, and included body composition, resting metabolic rate, energy intake, appetite sensations, satiety quotient and eating behaviour traits. These were preceded by 7-day free-living physical activity and dietary intake monitoring. Following completion of baseline measurements, 46 participants (BMI = 29.2±2.4 kg/m^2; age = 34.7±10.7 y) were allocated to IER (n = 24) and CER (n = 22). Participants met with a dietitian each week to collect foods for individualised meal plans and track WL.
Results: 37 participants completed the intervention and 30 reached ≥5% WL [CER (n = 18): 6.3±0.8% in 57±16 days vs. IER (n = 12): 6.6±1.1% in 67±13 days; p = 0.43 and p = 0.10, respectively]. Fat mass (CER: -3.7±1.0 kg, IER: -4.1±1.6 kg) and fat-free mass (CER: -1.3±0.9 kg, IER: -1.3±0.8 kg) were reduced to a similar extent after both diets (p<0.001). No changes in RMR were observed (p = 0.86). Both diets led to an increase in dietary restraint and craving control (p<0.001), and decrease in disinhibition, susceptibility to hunger and binge eating score (p<0.001). Hunger decreased after WL (p<0.05), with no differences between diets. Satiety quotient and energy intake at an ad libitum test meal did not differ between diets after WL.
Conclusion: These proof of concept data show that controlled WL of ≥5% achieved via CER or IER similarly reduced hunger and eating behaviours that promote overconsumption. This suggests that moderate dietary-induced WL does not lead to compensatory adaptations in appetite. Whether the rate and extent of WL influences the degree of compensation remains to be elucidated.
This trial was registered at clinicaltrials.gov as NCT03447600.

Conflict of Interest: None Disclosed.

Funding: This work was funded by a Research Fellowship awarded to Kristine Beaulieu by the European Society for Clinical Nutrition and Metabolism (ESPEN). We are grateful for in-kind support from LighterLife UK Ltd.

IS11- Joint Session with ESPEN: Obesity in the Elderly

IS11.02

Protein metabolism and anabolic resistance in obesity

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Skeletal muscle protein is constantly being synthesized and broken down, with a turnover rate of about 1-2% per day. The rate of skeletal muscle protein synthesis is regulated by two main metabolic stimuli, food intake and physical activity. Food intake, or more specifically protein ingestion, directly elevates muscle protein synthesis rates. The dietary protein derived essential amino acids act as signaling molecules activating anabolic pathways and provide precursors for muscle protein synthesis. Ingestion of a meal-like amount of dietary protein elevates muscle protein synthesis rates for several hours, providing evidence that 'you are what you just ate'. When food is ingested after a bout of physical activity the post-prandial muscle protein synthetic response is augmented, with higher muscle protein synthesis rates sustained over a more prolonged period of time. In other words, when you ingest protein following a bout of physical activity 'you become even more of what you just ate'. In contrast, when protein is ingested following a period of inactivity the post-prandial muscle protein synthetic response is blunted, coined anabolic resistance. Therefore, disuse makes you 'become less of what you just ate'. These concepts play a key role in the prevention and management of age related muscle loss and the development of chronic metabolic diseases.

IS11.03

Supplementation of food components

Roche, H. M.

University College Dublin

Age is associated with progressive incidence of obesity and lower skeletal mass, both of which can contribute to Type 2 Diabetes (T2D) and sarcopenia. Dietary exposure, lifestyle, gender and to a lesser extent genetics, are important triggers that can either accentuate age related diabetes and sarcopenia. Sub-acute chronic low-grade inflammation is a common theme across these diet-related, metabolic diseases. More recently, the concept of metabolic inflammation is gaining interest in terms of a

complex paradigm that may play a role in obesity, sarcopenia and T2D. To this end, this presentation will explore the inter-relationship between inflammation and metabolism, in an attempt to elucidate the extent to which metabolic-inflammation may (or may not) play a role in age related metabolic deregulation. This field is challenged by poor biomarkers that accurately reflect the dynamic inter-relationship between sub-acute chronic inflammation and metabolism. Therefore we will explore how nutrigenomics approaches may provide the opportunity to more comprehensively define the metabolic- inflammation. Both nutrition and physical activity have an important potential impact on health. Whilst less is known in relation to the inter-relationship between nutrition, physical activity and metabolic-inflammation this presentation will illustrate some examples wherein recent studies advance human health research. From the Personalised Nutrition perspective, we will explore potential of more targeted approaches in terms of understanding an individual's dietary, metabolic and inflammatory phenotype, as well as sensitivity to lifestyle / environmental stressors. Controversies pertaining to whether Personalised Nutrition approaches may (or may not!) improve the selection of nutritional and lifestyle interventions / therapies for sub-groups with a view to attaining greater efficacy.

IS12 - Weight Management as a Treatment for Diabetes

IS12.01

Lifestyle modification

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Type 2 diabetes is usually associated with a raised body mass index. Excess body weight increases an individual's requirement for medical management, in turn encouraging further weight gain. Intentional weight loss in overweight and obese adults with type 2 diabetes can improve metabolic control and at weight losses >15% body weight, diabetes remission becomes possible.

Internationally, current clinical guidelines for management of both type 2 diabetes and obesity advocate lifestyle modifications. Ideally treatments should comprise weight management advice and regular physical activity. Behavioural strategies to maximise implementation and long-term weight maintenance are also recommended. Weight management ought to include weight loss and maintenance phases. Programmes are judged effective by 1) weight loss 2) retention and 3) use of antidiabetic therapies. Cultural appropriateness and modes of delivery are considered in relation to effectiveness of interventions in specific population groups. An overview of current weight management strategies together of duration of health benefits will be provided.

IS12.02

Pharmacology and surgery

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Type 2 diabetes is strongly associated with obesity and therapies that support weight loss should be the mainstay of treatment. Many of the pathophysiological processes in type 2 diabetes can be reversed with weight loss, but despite recent successes with meal replacement approaches in some studies, weight loss is difficult to achieve and maintain with lifestyle alone. Three main approaches can complement lifestyle support; choosing diabetes treatments that are weight neutral or help with weight loss; use of drugs to support weight management, and bariatric surgery. Patients prefer treatments that support weight loss with low risk of hypoglycaemia, and modern diabetes therapies especially GLP-1 receptor agonists and SGLT2 inhibitors can help people achieve this goal. They also reduce cardiovascular disease and help protect against renal damage. Several drugs approved for weight management can also be used in people with diabetes and some such as the GLP-1 RA liraglutide also have direct glucose-lowering effects. Others with supportive data in diabetes include orlistat, naltrexone/bupropion and phentermine / topiramate. For those with more severe obesity, or in those with less severe obesity but a recent (<10 years) history of diabetes, bariatric surgery may be an option. Procedures that mainly restrict the size of the stomach such as sleeve gastrectomy and gastric banding or that bypass the stomach (such as Roux-en Y gastric bypass (RYGB) are all effective but direct comparisons are limited. Long term data is favourable in terms of diabetes improvement and remission, and suggests better outcomes for cardiovascular disease, but has to be balanced against long-term adverse events, including abdominal pain, dumping and hypoglycaemia. Future pharmacological and physical approaches are attempting to mimic the benefits of bariatric surgery, and some are showing promise.

IS12.03

Efficacy and safety of liraglutide 3.0 mg in individuals with overweight or obesity and type 2 diabetes (T2D) treated with basal insulin: the SCALE Insulin Trial

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Introduction: Liraglutide 3.0 mg is approved for weight management in adults with and without T2D. Liraglutide up to 1.8 mg has been used in combination with insulin for treatment of T2D, but combination of a 3.0 mg dose with insulin has previously not been investigated.

Methods: The 56-week double-blind SCALE Insulin trial randomised individuals with T2D with overweight or obesity (BMI ≥27 kg/m²) to liraglutide 3.0 mg or placebo, both as adjunct to intensive behaviour therapy (IBT). All study participants were on stable treatment with basal insulin and up to 2 oral antidiabetic drugs. Primary endpoints were mean change in body weight (%), and proportion with weight loss (WL) ≥5% at week 56, using all observed values regardless of week 56 treatment status, and a jump-to-reference multiple imputation approach to missing data, based on values from placebo group.

Results: Mean baseline characteristics at randomisation (n = 198) for liraglutide 3.0 mg included: 55.9 years of age, 54.5% females, 101 kg, BMI 35.9 kg/m², diabetes duration 11.4 years and HbA1c 7.9%. Corresponding placebo values (n = 198) were: 57.6 years, 50.0% females, 99 kg, BMI 35.3 kg/m², 12.8 years, and HbA1c 8.0%. Of those randomised, 195 were exposed to liraglutide 3.0 mg and 197 to placebo, with 166 (83.8%) and 168 (84.8%) still on drug at 56 weeks. Respective mean weight change at week 56 was –5.85% and –1.53%, respectively, estimated treatment difference (ETD) –4.32 (p<0.0001). WL ≥5% was observed in 51.80% participants on liraglutide and 23.98% on placebo, odds ratio (OR) 3.41 p<0.0001. Respective values for >10% WL were 22.77% and 6.55%, OR 4.21, p<0.0001 (other efficacy outcomes in table). HbA1c reduction was greater with liraglutide than placebo (–1.09 vs –0.55%, p<0.0001), and there were respective changes in insulin dose of +2.8U and +17.8U from a baseline mean (both groups) of 38U (ETD -15U, p<0.0001). Documented hypoglycaemia (on-drug) occurred at respective rates of 7.42 and 9.38 events/subject-year with liraglutide 3.0 mg and placebo, with 3 and 2 severe events in each group, respectively. Adverse event incidence was similar for liraglutide 3.0 mg and placebo, except gastrointestinal events (liraglutide 3.0 mg, 62.1%; placebo, 46.7%).

Conclusion: In insulin-treated T2D, liraglutide 3.0 mg was superior to placebo with respect to mean and categorical weight loss, as well as improvements in glycaemic control without increasing the risk of hypoglycaemia. No new safety or tolerability issues were observed.

Funding: Research relating to this abstract was funded by Novo Nordisk.

Tab. 1.

Endpoint at 56 weeks	Liraglutide 3.0 mg	Placebo	Treatment difference
Change in weight change (%)	–5.85	–1.53	ETD: -4.32 p<0.0001
WL ≥5% (%)	51.80	23.98	OR: 3.41 p<0.0001
WL ≥10% (%)	22.77	6.55	OR: 4.21 p<0.0001
Change in waist circumference (cm)	–5.28	–2.56	ETD: –2.71 p<0.0001
Change in HbA1c (%)	–1.09	–0.55	ETD: –0.53 p<0.0001
Change in heart rate (beats/min)	1.35	–0.16	ETD: 1.51 p = 0.084
Change in systolic blood pressure (mmHg)	–5.62	–1.62	ETD: –3.98 p = 0.0014
Change in diastolic blood pressure (mmHg)	–2.34	–0.94	ETD: –1.40 p = 0.091
Change in SF-36 Physical function score	2.68	2.28	ETD: 0.39 NS
Change in IWQoL-Lite CT Physical function score	8.20	5.74	ETD: 2.46 NS

IS12.04

Long-term validation of diabetes remission scores after bariatric surgery in the Swedish Obese Subjects (SOS) study

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Introduction: Diabetes remission is common after bariatric surgery, however not all people with type 2 diabetes achieve remission.[1] Attempts have been made to establish models that can accurately predict diabetes remission, to be used in clinical practice. The original DiaRem score[2] and its improved versions, DiaBetter[3] and advanced (Ad)-DiaRem,[4] predict short-term remission with increasing prediction accuracy. The aim of this project is to assess the accuracy of these scores when predicting long-term remission and microvascular diabetes complications, i.e. up to 10 years follow-up in the Swedish Obese Subjects (SOS) study.
Methods: The SOS study is an ongoing, nonrandomized, prospective study of 4047 participants; 2010 who underwent bariatric surgery and 2037 matched controls given usual care. Inclusion criteria were age 37–60 years and BMI of ≥34 kg/m² in men and ≥38 kg/m² in women. For participants in the surgery group, DiaRem, DiaBetter, and Ad-DiaRem scores were calculated based on age, HbA1c, oral diabetes medication(s), insulin use, and diabetes duration. Diabetes duration (years) as a single predictor was used for comparison. Areas under receiving operator characteristic (ROC) curves (AUC) with 95% confidence intervals (95% CI) were calculated. Remission was defined as fasting blood glucose <110 mg/dL (plasma glucose 126 mg/dL) and no diabetes medication.
Results: For diabetes remission, AUCs (95% CI) were 0.64 (0.56-0.72), 0.81 (0.75-0.87), and 0.79 (0.72-0.86), respectively, for DiaRem, DiaBetter, and Ad-DiaRem scores, at two years. At ten years, the predictive ability of the scores decreased resulting in AUCs of 0.59 (0.51-0.66), 0.74 (0.67-0.80), and 0.69 (0.62-0.76), respectively. Diabetes duration as single predictor performed equally well compared with DiaRem-related scores; AUCs were 0.84 (0.78-0.90) and 0.75 (0.69-0.81), at two and ten years, respectively.
When assessing the predictive ability of scores for development of microvascular diabetes complications over 10 years of follow-up, AUCs were 0.68 (0.58-0.77), 0.80 (0.73-0.87), and 0.78 (0.70-0.86), respectively, for DiaRem, DiaBetter, and Ad-DiaRem scores. Again, diabetes duration as single predictor performed equally well with an AUC of 0.78 (0.70-0.86).
Conclusion: These results show that diabetes duration as a single predictor works equally well as more complicated scores when assessing diabetes remission and risk of developing microvascular diabetes complications two and ten years after bariatric surgery in the SOS study.

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Conflict of Interest: None Disclosed.

Funding: Swedish Research Council, Swedish state (ALF-agreements).

Tuesday, 30 April 2019

IS13 – Chronobiology

IS13.01

Lifestyle factors, circadian misalignment and metabolic health

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Kenneth P. Wright Jr.

The circadian timekeeping system regulates the timing of human physiological processes across the 24h-day so that metabolic physiology is prepared for energy intake and physical activity during the biological day and for sleep and related functions during the biological night. High melatonin levels, driven by the master circadian pacemaker in the suprachiasmatic hypothalamus, define the internal biological night. Circadian misalignment often occurs when wakefulness and energy intake occurs during the biological night. This talk will discuss how lifestyle factors such as sleep and work schedules contribute to circadian misalignment, and the physiological mechanisms by which circadian misalignment contributes to dysregulated metabolic physiology and risk of obesity and diabetes.

IS13.02

Clinical aspects of chronodisruption in adipose tissue

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Classically, nutrition studies were based in the "what" the individual eats, i.e., energy intake and macronutrient composition. Currently, meal timing is also being considered as a novel aspect that may influence obesity and other degenerative diseases. In 2013, a study conducted in a Spanish population that followed a weight loss treatment based in the Mediterranean diet, showed that food timing was a predictive factor in weight loss. Almost at the same time, it was published a similar study of weight loss with a follow-up of 12 weeks which showed that those individuals who eat more (energy) during dinner, lost less weight and had less glucose tolerance, than those who eat more at breakfast, keeping the energy of the midday meal the same. These two studies opened a new line of research based in meal timing and its impact on obesity, weight loss, and glucose tolerance. New controlled laboratory studies are necessary to explain the mechanisms involved in the different response of late eaters and early eaters to treatment. One possible explanation is that meal timing is an external synchronizer of adipose tissue peripheral clocks and that therefore if affects weight loss, however, 13-day laboratory protocol shows that changes in the AT clocks with food timing are mild. The genetics of the subject could also be involved. Our study shows that only those subjects who present a genetic variant in the perilipin gene, were affected by food timing in weight loss. Genetic influences appear to account for a significant proportion of the variability in food timing, particularly breakfast. Thus, interventions related to food timing may be more effective when▪▪▪▪▪.

IS13.03

Circadian rhythms in childhood obesity: impaired melatonin profile associated to altered metabolic markers

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Introduction: Circadian rhythms are the changes in biological processes occurring with a period of 24h, such as numerous reactions involved in the metabolic homeostasis. Melatonin is the main circadian hormone, which level increases in the evening in preparation for sleep. Alterations in circadian rhythms are evidenced by impaired melatonin expression, and in adult age, this condition is associated to metabolic dysregulations.
Methods: One group of obese children and a control group were constituted based on their BMI percentile for age and sex. The variations of the main circadian hormone, melatonin, are assessed in saliva by immunoassay, while hormonal levels are measured in blood samples with Luminex technology. Life habits are assessed by self-reported questionnaires. Preliminary results on 14 patients (7 obese and 7 controls).
Results: The children from the obese group displayed poorer metabolic characteristic and increased inflammation markers: C-reactive protein, Gamma-glutamil transferase, albumin, monocyte chemoattractant protein-1 are altered. In the control group, melatonin in saliva increased during the evening (+20,46±16,1), whereas in the obese group, the melatonin profile was altered and globally decreased (-3,05±28,4).
Conclusion: In conclusion obesity seems to be associated with circadian rhythm impairment even at a young age. The continuation of this study, in association with other studies investigating circadian rhythms and health during childhood will facilitate the development of life habits prevention campaigns, adapted to the children physiology and development.

IS13.04

Association of polymorphisms of FTO and CLOCK genes with the weight response after bariatric surgery

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Background: Epidemiological studies have shown the association between polymorphisms of the FTO and CLOCK genes and the prevalence of obesity, but available data in weight loss after bariatric surgery (BS) are scarce.
Rationale: Analyze the association between two polymorphisms of the FTO gene and three polymorphisms of the CLOCK gene related to the weight response after BS.
Methods: Longitudinal study with 9 years of follow-up in 447 patients with morbid obesity (71.1 % women) undergoing BS.The effect of polymorphisms (SNPs) rs9939973 and rs9939609 of FTO gene and rs3749474, rs1801260 and rs4580704 of CLOCK gene on weight evolution is analyzed, as the excess weight loss percentage (EWL%), at each time of follow-up. The mean follow-up is 6.5 ± 1.8 years. The evaluation of the selected SNPs is analyzed by allelic discrimination using Taqman® probes. The study of the association of haplotypes and genotypes is carried out through the SNPstat program, with comparisons adjusted by sex and surgical technique. Statistics: descriptive data as mean (SD) and unpaired T-test between groups.
Results: Patients with the GG genotype of FTO_rs9939973 and TT genotype of FTO_ rs9939609 have a significantly lower mean EWL% (mEWL%) from 6 months (m) to 6 years or 8 years (y) after BS, in comparison to the other genotypes according to inheritance model. GG genotype, mEWL%: 63.32 vs 71.39 (6m), p = 0.002; 67.70 vs 75,76 (6y), p = 0.037. TT genotype, mEWL%: 63.97 vs 71.64, p = 0.003; 63.05 vs 74.79, p = 0.048. In the same way, subjects carrying the TT genotype of CLOCK_ rs3749474 have lower mEWL% at 6m (64.73 vs 70.37; p = 0.024), 4y (72.65 vs 79.71; p = 0.026) and 6y (63.90 vs 75.82; p = 0.005). Subjects that are carriers at the same time of the GG genotypes of FTO_rs9939973, TT of FTO_ rs9939609 and TT of CLOCK_rs3749474 present significantly less mEWL% from 6m (59.64 vs 73.13; p = 0.007) to 7y, with the greatest difference of means (54.07 vs 76,21; p = 0.021).
Conclusion: The GG genotype of FTO_rs9939973, the TT genotype of FTO_ rs9939609 and the TT genotype of CLOCK_rs3749474 are associated with a lower weight loss after BS. The combination of the 3 SNPs in the same subject denotes a remarkable resistance to weight loss. These genotypes should be considered in the evolution of weight loss after BS.

Funding: Fundación Mutua Madrileña, Fundación de Estudios Metabólicos.

IS13.05

Hypothalamic ataxin-2: resetting the clock on obesity

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Introduction: Hypothalamic dysfunction is one of the major complications of obesity that is believed to be the driver of several features of this disorder (1). This has to due with the maintenance of energetic homeostasis by regulating food intake and other functions, such as circadian rhythm (1). Studies show that circadian rhythm deregulation can predispose for obesity and, that in turn, obesity can promote alterations in the circadian clock (2). However, the mechanisms involved are still unclear. We suggest that hypothalamic ataxin-2 might be a key player in this mechanistic regulation due to its relevant role in both metabolism and circadian rhythm (3).
Aim: The aim of this work was to understand the role of hypothalamic ataxin-2 in the regulation of circadian rhythm as a mechanism that underlies metabolic regulation.
Methods: We used gene delivery approach specifically overexpress ataxin-2 in in the hypothalamus of ataxin-2 knockout (ATXN2 KO) mice fed with an ad libitum high fat diet (HFD) for 8 weeks; food consumption and animal weight were assessed. Insulin tolerance was evaluated and behavioral tests performed. In the end of the study, we evaluated clock genes expression (BMAL1, PER2) in the the hypothalamus.
Results: Here we show that ATXN2 KO mice, as described, are obese and insulin resistant; however, these mice have similar food intake to the wild type (WT) littermates. Interestingly, ATXN2 KO mice exhibit circadian rhythm behaviour alterations, with hyperactivity during the light period. This increased activity during the supposedly inactive period might be causative for the metabolic phenotype of this mouse model, thus promoting obesity and insulin resistance. Furthermore, these mice also presented an increased BMAL1 and PER2 mRNA expression in the hypothalamus. The rescue of ataxin-2 in the hypothalamus had no effect on body weight, however decreased diurnal hyperactivity, improved insulin sensitivity, and re-established BMAL1 levels and PER2 mRNA expression.
Conclusion: These results suggest that ATXN2 KO mice present a disruption in circadian rhythm, which might determine the obese phenotype of this mouse model. Moreover, ataxin-2 in the hypothalamus could be a relevant player of circadian rhythm regulation thus impacting metabolism. Considering all these evidences, we suggest that ataxin-2 might be a new potential target for therapeutic approaches not only for obesity but also for other pathologies, that might be characterized by circadian rhythm dysfunctions.

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IS14 - Stress and Eating Behaviour

IS14.01

Stress and obesity: implications for prevention and treatment

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Stress is a fundamental link between having a low socioeconomic position (SEP) and weight gain, and is a key driver of obesity. At particular risk are genetically-susceptible infants and children exposed to early-life adversity and a disharmonious family milieu. This is likely to result in considerable psychological and emotional distress, insecurity, low self-esteem, apathy, mental health issues and a heightened sensitivity to stress. These inherently uncomfortable internal states can trigger a cascade of weight gain-inducing effects including increased circulating cortisol and allostatic load, low-grade inflammation, appetite up-regulation, cognitive impairment, and possibly reduced basal metabolism. Stress and emotional turmoil also create a perfect foil for self-medication with calorie-dense ultra-processed junk food, to alleviate stress and uncomfortable internal states. Since infancy and childhood are also the most critical periods for establishing adipocyte quantity, these children are generally on a steep upward body weight trajectory that eventually manifests as obesity and (likely) severe obesity. A related hypothesis is that the body adapts to the excessive and prolonged internal stress by up-regulating its stores of adipose tissue to promote survival. This would explain why weight loss maintenance remains a largely unsolved clinical challenge, and also why the body activates a multitude of defenses against long-term weight loss (increased ghrelin, decreased leptin, decreased metabolism, unchanged adipocyte quantity, etc). Stress (particularly more or less chronic varieties) therefore appears to be a critical driver of weight gain and obesity, challenging the simplistic notion of obesity as a fundamental result of unhealthy lifestyles. While lifestyle factors such as intake of junk food undoubtedly play a major part in the epidemic, we also need to recognize that stress and early-life adversity play important roles, often in conjunction with lifestyle factors in the development of obesity. Apart from improving the generally obesogenic environment, we may also improve prevention efforts by ensuring that infants and young children grow up in a harmonious family environment. I also propose that stress reduction therapies and psychological counselling play a much larger role in the treatment of obesity.

IS14.02

Cognitive processes in obesity

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"Eat less, eat better, exercise more: change your lifestyle". Most of the obese people do know this and if they could, obesity was not a problem. Though the advice might be correct, it appears to be extremely difficult to change one's lifestyle. Unhealthy habits usually are ingrained and hard to change, especially for people with an "obese cognitive profile". Knowledge of the cognitive mechanisms that maintain unhealthy eating habits is necessary for the development of interventions that can change behavior effectively. I will discuss some cognitive processes that maintain unhealthy eating habits and make healthier eating difficult, like dysfunctional beliefs, increased food cue reactivity and weak inhibition skills. An effort is done to translate this knowledge into new interventions that aim to tackle the sabotaging cognitive processes and therefore the unhealthy lifestyle.

IS14.03

"Everyone doesn't want to play with her any more": children's emerging understandings of body weight change and weight bias: an interview study with 4- to 9-year-olds

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Introduction: Children as young as 4 years old negatively stereotype peers with larger bodies but little research has explored young children's perspectives on the causes and consequences of weight change. This interview-based study investigated children's understanding of how weight change occurs, of possible motivations for weight change, and of the perceived consequences of weight loss or gain.
Method: 92 children aged 4-9 years (mean = 7.1, 45 girls) read a book in which the main character had either a typically-sized or larger body. Each child then viewed and discussed with a researcher a drawing of the character, shown to have either lost or gained weight, in a semi-structured interview. If the child noticed the character's weight change, the researcher asked the child for possible causes, motivations and consequences, focusing on the reactions of the character's hypothetical peer group and friends. Interview transcripts were analyzed using thematic analysis.
Results: All children aged ≥6 years noticed the weight change, as did 75% of 4- and 5-year-olds. Children causally attributed weight changes to food more frequently than physical activity; older children also suggested biological/genetic reasons for weight gain. Some boys <6 perceived that weight gain represented "growing big and strong" and conferred physical dominance. However, most younger children viewed weight gain as negative (and weight loss as positive) but could not explain why. In contrast, children aged ≥6 highlighted specific costs of weight gain, including stigmatisation as 'lazy' or 'greedy'; older girls emphasised relational consequences including social ostracism, bullying and loneliness. However, several children asserted that the character's peers would accept them regardless of body size: "even if she did change, they would always be her friend". Suggested motivations for weight loss included aesthetic concerns and, more frequently, the wish to "get fit and healthy" and do well in physical activity/ sports.
Conclusion: Participants were knowledgeable about weight change, including causes, consequences and motivations. Children varied developmentally in their expressed understanding: younger children were less able to articulate reasons for their negative opinion of weight gain. Older children provided numerous examples of weight bias against the larger character, and older girls particularly emphasised a loss of social capital. Children overwhelmingly associated a smaller body size with fitness, health and sports ability. Some children, however, advocated an accepting attitude towards larger body sizes. These findings highlight the clear need to address weight-bias in preadolescent children's health-literacy.

Conflict of Interest: None Disclosed.

Funding: No Funding.

IS14.04

The bidirectional stress-diet-overweight relation: appetite hormones and microbiota

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Background: Psychosocial stress, uncontrolled eating and obesity are three interrelated epidemiological phenomena already present during youth. Cortisol seems the main biological factor from stress towards central adiposity; and diet, physical activity and sleep are the main behavioral pathways. Within stress-diet, the concepts of comfort food and emotional eating are central as cortisol affects reward pathways and appetite brain centers with a role for insulin, leptin, NPY, endocannabinoids, orexin and gastro-intestinal hormones. More recent researched biological underpinnings are microbiota, epigenetic modifications and metabolites. First, gut

microbiota reach the stress-regulating and appetite-regulating brain centers via the gut-brain axis. Second, epigenetic analyses are recommended as diet, obesity, stress and gut microbiota can change gene expression which then affects appetite, energy homeostasis and stress reactivity. Finally, metabolomics would be a good technique to disentangle stress-diet-obesity interactions as multiple biological pathways are involved. Saliva might be an ideal bio-matrix as it allows metagenomic (oral microbiota), epigenomic and metabolomic analyses. In conclusion, stress and diet/obesity research should be combined in interdisciplinary collaborations with implementation of several –omics analyses. Understanding the phenomenology of stress and emotional eating in youth can aid in the prevention of eating disorders and obesity.

Methods: In +-300 Belgian children, stress questionnaire data, diet (food consumption, psychological eating behavior), adiposity and leptin were measured over two years. Cross-sectionally, cortisol levels and fecal samples were collected.

Results: Children with a high stress score reported more sweet food consumption, emotional eating and external eating. High cortisol was associated with an unhealthy diet (especially with the sweet foods) and also with higher leptin levels in girls. Leptin was a moderator i.e. the combination of high leptin and high stress was related to high emotional eating. Diet was a moderator in the stress-adiposity relation. Also gut microbial differences were seen depending on the stress level e.g. more short-chain fatty acid producers and less Firmicutes.

Conclusion: The results support the theory of cortisol–induced comfort food preference and a role of leptin and gut bacteria. We will further elucidate the underlying biological pathways via epigenetics, appetite hormones and metabolomics in this cohort, in an emotion regulation intervention and in three other large international datasets. These results might inspire towards probiotics and new biomarkers in the stress-appetite field.

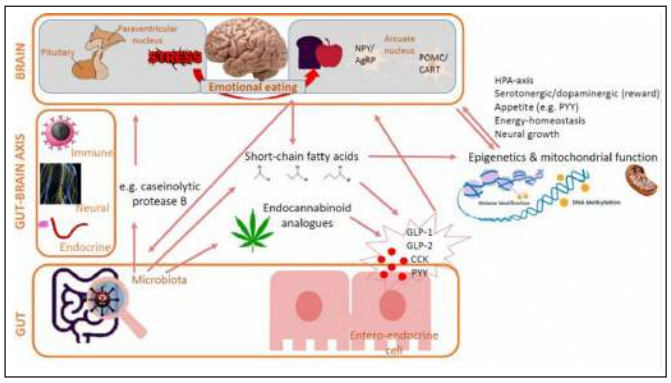

Fig. 1. Some pathways in the microbiota-gut-brain axis from microbiota towards appetite.

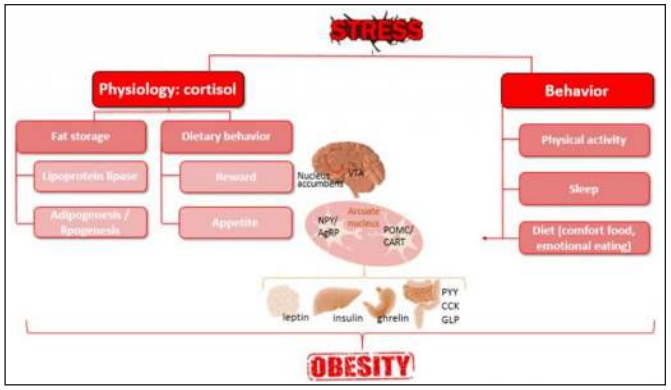

Fig. 2. The classic behavioral and physiological pathways in the stress-obesity relation.

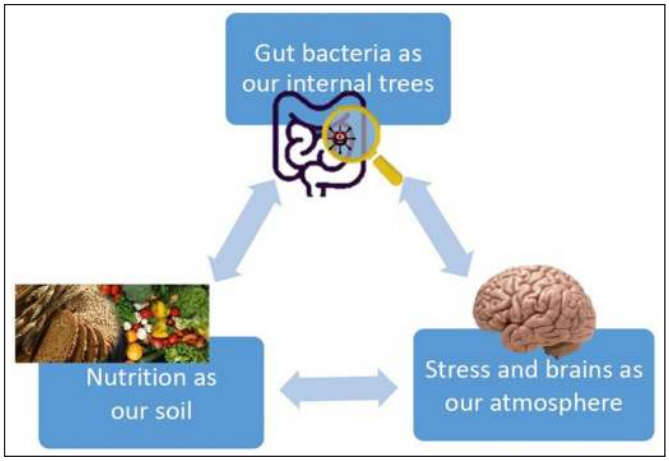

Fig. 3. The stress-bacteria-diet interaction triangle.

IS14.05

Making space for weight bias: the process of including weight bias in Canadian clinical practice guidelines for the management of obesity in adults

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Introduction: The new 2019 Canadian Clinical Practice Guidelines have been developed with a goal of cultivating non-biased, scientifically valid, and trustworthy recommendations on the management of obesity as a chronic disease. These clinical practice guidelines aim to inform clinical decision-making that is patient-centered and support shared decision-making in order to optimize patient care. For the first time in Canada, weight bias is a construct that will feature prominently in the 2019 Clinical Practice Guidelines.

Objective: To share our experiences of integrating weight bias and patient lived experiences into the development of the 2019 Canadian national clinical practice guidelines.

Methods: An Executive Committee and Steering Committee composed of obesity experts, persons living with obesity, and health professionals oversaw and implemented the construction of the clinical practice guidelines. We applied an iterative approach to review existing evidence on weight bias, generate expert consensus, and apply a patient-centered approach to incorporate weight bias in the clinical practice guidelines. The guideline process followed a systematic review process (GRADE framework) and was anchored in key principles such as: (a) shifting the focus to health outcomes and not solely weight targets, and (b) improving patient-centered obesity care in Canada by providing guidance for respectful engagement and care of people living with obesity.

Results: The new Canadian Clinical Practice Guidelines for the treatment and management of obesity will be released in 2019. A weight bias and patient-centered lens was applied to all the chapters. An entire chapter will be dedicated to weight bias in the clinical practice guidelines. Final recommendations were tailored to three target audiences: a) health professionals, b) persons living with obesity, and c) policy makers. Obesity Canada and partners will develop dissemination tools for each target audience.

Conclusion: Recommendations for best practices in the treatment and management of obesity need make meaningful space to address weight bias. More implementation research is needed to assess the impact of these new clinical practice guidelines on individual and population health outcomes as well as on health care practice and policy changes.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Canadian Institutes of Health Research and Obesity Canada.

IS15 – Microbiota - From Mouth to Gut

IS15.01

Gut-brain interaction

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Perhaps this is one of the most complexed relationship between two fundamental organs. The complexity has increased with the addition of the microbiota into this model. The gut-microbiome-brain axis have been linked to many disease states for Parkinson's to obesity. For this review I want to try and explore the role of the gut -microbiome- brain axis in weight gain, the movement from lean to overweight. What is the evidence this relationship plays a role in beginning of weight gain in young adults? It appears that relationship between food sensing and the gastrointestinal track is critically important in the maintenance of appetite tone. The relationship between nutrients, G protein coupled receptor signalling and release of appetite regulating hormones form the gastrointestinal tract little understood. Also, it is becoming evident that nutrients can be transformed into other molecules that then have a role in signalling. The continued push to understand the gut microbiota and the role it plays in energy homeostasis opens new pathways in understanding appetite regulation. The potential influence of molecules produced by the microbiota to signal directly or indirectly offer new insights into appetite regulation. To understand the true physiology, it is important to have an integrated view of the impact the gut-microbiome-brain axis plays in energy homeostasis.

IS15.02

Microbiome dynamics in obesity

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Many modern human diseases, including obesity and diabetes, neurodegenerative diseases, chronic inflammatory diseases and cancer, are strongly shaped by lifestyle and environmental influences. The molecular pathways by which environmental facts shape our propensity for these diseases, however, remain poorly understood. We have recently discovered several mechanisms by which the intestinal microbiome mediates the impact of lifestyle elements on host physiology, with a particular focus on metabolic diseases, such as obesity, diabetes, and other manifestations of metabolic syndrome. Identifying the microbiome-derived molecules that are involved in the control of host physiology and in the molecular etiology of human disease bears great potential for the discovery of new treatment approaches.

IS15.03

Are non-nutritive sweeteners obesogenic by altering the faecal microbiota and their metabolites?

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Introduction: This study explored changes in the faecal microbiota and short-chain fatty acids (SCFA) related to intake of non-nutritive sweeteners (NNS).
Methods: The study included patients aged 18–60 years with morbid obesity (BMI >40 kg/m² or >35 kg/m² with obesity-related complications). The diet was assessed with a validated food frequency questionnaire. One unit NNS was 100 ml beverage with NNS or 2 tablets/teaspoons NNS. The relative abundance of 39 faecal bacteria markers (scores – 3 to 3) was assessed with GA-map® dysbiosis test (Genetic Analysis, Oslo Norway). Acetic, propionic, butyric, iso-butyric, valeric, iso-valeric, caproic, and iso-caproic acids in faeces were analysed with gas chromatography. The associations between NNS and SCFA and the bacteria were analysed with regression analyses with age, gender, starch in the diet and metformin as covariates and reported as the unstandardized coefficients B with 95% CI and p-values.
Results: Data from 14 (16%) men and 75 (84%) women with a mean age of 44.6 years (SD 8.7) and BMI 42 kg/m² (SD 3.6) were analysed. Intake of NNS (mean and median) was 7.5 and 3.2 (SD 10; range 0-43) units respectively. The amounts (median and range) of acetic, propionic, butyric and valeric acids were 16.4 (2.9–67.9), 5.2 (1.3–25.6), 5.6 (1.0–34.5) and 0.8 (0.0–5.1) mmol/kg wet weight respectively. NNS was negatively associated with butyric acid (B: -0.159; 95% CI: -0.280 to -0.037; p = 0.011), valeric acid (B: -0.022; 95% CI: -0.043 to -0.002; p = 0.029) and Faecalibacterium prausnitzii (B: 0.056; 95% CI: -0.103 to -0.009; p = 0.019), and positively associated with Bacteroides fragilis (B: 0.074; 95% CI: 0.025 to 0.122; p = 0.003), Ruminococcus gnavus (B: 0.069; 95% CI: 0.009 to 0.128; p = 0.024) and Streptococcus spp (B: 0.093; 95% CI: 0.036 to 0.150; p = 0.001).
Conclusion: Butyric acid has antiobesogenic effects and obesity has been associated with an increased content of gut Firmicutes. The findings of reduced faecal butyric acid, reduced Faecalibacterium prausnitzii (a butyrate-producing bacteria), and increased Ruminococcus gnavus and Streptococcus spp (both are parts of the Firmicutes phylum) associated with the intake of NNS could indicate an obesogenic effect of NNS.

Conflicts of Interest: None disclosed.

Funding: Innlandet Hospital Trust, Brumunddal, Norway.

IS15.04

Circulating but not fecal SCFA are related to GLP-1 concentrations, systemic lipolysis and insulin sensitivity

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Introduction: Insulin resistance and obesity are associated with human gut microbiota dysbiosis and altered functionality. The microbial-derived short-chain fatty acids (SCFA) acetate, propionate and butyrate may provide an important link between gut microbiota functionality and whole-body energy homeostasis. However, the impact of SCFA on peripheral insulin sensitivity (IS) and energy metabolism in humans remains inconclusive. Fecal SCFA are often used as indicators of microbial-derived SCFA production, which hampers interpretation.
Methods: We investigated the relationship between fasting circulating and fecal SCFA with metabolic parameters in 160 participants (men 64%; Age 20-69 yrs; BMI 20-40 kg/m²) in a cross-sectional analysis. Circulating and fecal SCFA were measured by liquid and gas chromatography-mass spectrometry, respectively. Plasma lipids and glucose were measured with enzymatic assays and total glucagon-like peptide 1 (GLP-1) with immunoassay. Active peptide YY was measured with a radioimmunoassay. Energy expenditure and substrate utilization were measured with indirect calorimetry. Inflammatory markers were measured with ELISA. IS was determined in a subgroup (n = 99) using the gold-standard

hyperinsulinemic-euglycemic clamp. Data were analyzed using multiple linear regression analysis, and adjusted for sex, age and BMI.
Results: Plasma acetate, propionate and butyrate concentrations were positively associated with fasting GLP-1 levels (β 0.187, P = 0.009; β 0.218, P = 0.002; β 0.274, P = 0.001, respectively). Additionally, acetate was associated with whole-body lipolysis (glycerol) (β -0.190, P = 0.023), propionate with triglycerides (β -0.202, P = 0.010) and butyrate with free fatty acids levels (β -0.306, P = 0.001). Plasma acetate was inversely correlated (β -0.294, P<0.001) and propionate positively correlated (β 0.161, P = 0.033) with IS (M-value). Furthermore, butyrate was inversely correlated with fasting glucose concentration (β -0.200, P = 0.009). We found a significant relationship between fecal propionate and plasma propionate (β 0.268, P = 0.001) concentrations, but not between fecal acetate and butyrate and their plasma levels. Finally, no significant correlations were found between fecal SCFA and the assessed metabolic parameters.
Conclusion: Our data show that circulating but not fecal SCFA are linked to circulating GLP-1 concentrations, whole-body lipolysis and peripheral insulin sensitivity in humans. This may indicate that circulating SCFA are a more accurate proxy for in vivo gut-derived SCFA production than fecal SCFA and/or that SCFA need to enter the systemic circulating to elicit effects on metabolic health. Our results demonstrate the need to measure circulating SCFA in human prebiotic/probiotic intervention studies.

IS15.05

Obesity and insulin resistance metabolic markers in relation to concomitant analysis of fat mass and fat free mass changes among adolescents: a school-based intervention program in French Polynesia

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Introduction: Branched-chain amino acids (BCAA) and aromatic amino acids (AAA) are perceived as early metabolic markers of obesity and insulin resistance (IR). No interventional study has examined the changes in these markers in terms of concomitant analysis of fat mass (FM) and fat free mass (FFM). This study aims to assess changes in BCAA, AAA concentrations and IR in adolescents according to changes in FM and FFM after a 5-month school-based intervention.
Methods: During the 5-month school-based intervention "Ressources Alimentaires et Santé aux Australes (RASA)" conducted between February and June 2011, 240 adolescents (aged 10-18 years) from Mataura College (French Polynesia) received a balanced diet based on local agricultural products and fishing. To increase energy expenditure, weekly physical activity was augmented by 2–4 hours of training with Polynesian canoes. Anthropometric parameters were recorded, and blood samples collected at baseline and after 5 months. Four categories of body composition changes (gain: +, loss: -) were created (FM+/FFM-, FM+/FFM+, FM-/FFM-, FM-/FFM+). Co-variance analysis was used to compare changed of BCAA and AAA concentrations, and HOMA-IR2 (homeostasis model assessment of insulin resistance). Models were adjusted for age, sex, initial weight status, and value at baseline of the variable of interest.
Results: Overall overweight/obesity prevalence was 58.85%, with 34.07% of obesity. Both adolescents who experienced weight loss or weight gained had similar change in their BCAA (-4.68 [95%CI: -7.55 to -1.81] vs. -3.86 [-5.81 to -1.91]) and AAA (-2.40 [-3.55 to -1.24] vs. -1.87 [-2.67 to -1.07]) concentrations, and significant change for HOMA-IR2 index (-0.36 [-0.59 to -0.13] vs. 0.15 [0.02 to 0.27]), respectively. However, analysis in terms of body composition gave different results. A significant negative linear trend of BCAA and AAA according the four categories of FM/FFM. Mean BCAA changes was -0.86 for FM+/FFM-, -2.26 for FM+/FFM+, -4,95 for FM-/FFM-, -7,64 for FM-/FFM+ (P trend <.001). Mean AAA changes was -1.13 for FM+/FFM-, -1.48 for FM+/FFM+, -2.51 for FM-/FFM-, -3.38 for FM-/FFM+ (P trend = 0.007). Changes in HOMA-IR2 increased in those who gained FM (0.23 [0.11 to 0.36]), but decreased in those who lost FM (-0.40 [-0.60 to -0.20]). No statistically significant difference was noted for HOMA-IR2 between FFM subgroups in both FM groups.
Conclusion: FM loss was associated with a reduced concentration of obesity and insulin resistance metabolic markers. The decrease of metabolic markers was more consistent if fat mass loss was accompanied with FFM gain. These findings indicate that short term intervention can have a positive impact on obesity metabolic markers even if body weight changes are barely noticeable.

Wednesday, 01 May 2019

IS16 – Immunometabolism

IS16.01

Immunometabolism: importance in CVD and diabetes

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Monocytes and macrophages are key players in the development of atherosclerotic cardiovascular disease, which is currently regarded as a low-grade vascular wall inflammatory disorder. In contrast to the traditional immunological paradigm, monocytes and macrophages can also build a long-term immunological memory, which has been termed trained immunity. Although this ancient mechanism is beneficial in the protection against recurrent infections, we propose that this can contribute to chronic non-infectious inflammatory diseases such as atherosclerosis, diabetes, and rheumatological diseases. Recent animal studies have clearly demonstrated that a Western type diet or hyperglycemia can induce long-term activation of myeloid cells and their bone marrow progenitors by epigenetic and metabolic reprogramming of these cells. Key intracellular mechanism that mediate the development of trained immunity are activation of glycolysis, glutaminolysis, and activation of the mevalonate pathway. This metabolic reprogramming is closely intertwined with profound epigenetic reprogramming at the level of histone modifications. Several proof-of-concept studies have reported that isolated monocytes from patients with atherosclerosis or risk factors for atherosclerosis, have a trained phenotype. Further elucidation of this mechanism might provide novel pharmacological pathways to treat or prevent atherosclerotic cardiovascular disease.

IS16.02

Targeting inflammation in metabolic disease

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The role of chronic inflammation in the pathogenesis of type 2 diabetes mellitus and associated complications is now well established. Therapeutic interventions counteracting metabolic inflammation improve insulin secretion and action, glucose control, and may prevent long-term complications. Thus, a number of anti-inflammatory drugs approved for the treatment of other inflammatory conditions are evaluated in patients with metabolic syndrome. Most advanced are clinical studies with interleukin-1 antagonists showing improved β-cell function, glycaemia, prevention of cardiovascular diseases and heart failure. However, alternative anti-inflammatory treatments, alone or in combinations, may turn out to be more effective, depending on genetic predispositions, duration and manifestation of the disease. Thus, there is a great need for comprehensive and well-designed clinical studies to implement anti-inflammatory drugs in the treatment of patients with metabolic syndrome and its associated conditions.

IS16.03

Pro-inflammatory macrophage-secreted IL-10 suppresses human adipose tissue inflammation: an obesity-induced feedback loop

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Background: Interleukin 10 (IL-10) is a type 2 cytokine produced by a variety of immune cells, including macrophages, dendritic cells, T cells and B cells and classically known for its immunosuppressive role in immunity. Obesity, promotes changes in adipose tissue metabolism and is associated with a low-grade chronic inflammation. Previous studies in human and murine white adipose tissue demonstrate an increased proportion of the pro-inflammatory cells. The role of IL-10 in white adipose tissue (WAT) metabolism and regulation of insulin sensitivity is debated. Some studies have suggested anti-inflammatory effects of IL-10 by promoting M2-adipose tissue macrophage (ATM) polarization. Others have reported that IL-10 ablation in mice did not cause insulin resistance which refutes its important anti-inflammatory role in obesity.
Aim: Based on this, we aimed to characterize the function of IL-10 in human WAT by investigating sources of IL-10 production and its effects on WAT immune cells and adipocytes.
Methods: Stromal vascular fraction cells (SVF) from adipose tissue human biopsies were collected and sorted by FACS for different lineage markers to characterize immune cells which expressed/secreted IL-10 and IL-10 receptor alfa (IL10RA). Secretion of inflammatory cytokines as measured in flow cytometry-sorted human WAT macrophages and leukocytes by luminex analysis. In parallel, adipogenesis, lipolysis and mRNA expression of inflammatory and metabolic genes were measured in two human primary adipocyte systems after 24h IL10 treatment. Clinical correlations between IL-10 mRNA expression and secretion with metabolic parameters were investigated in three different cohorts of non-obese subjects, obese and obese insulin-resistant individuals.
Results: IL-10 was mainly secreted by WAT macrophages and enriched in M1-like CD45+/CD14+/CD11c+/CD163-/ABCA1+ cells. IL 10 had no effect on human adipocyte differentiation, metabolism, browning or inflammatory phenotype due to the absent IL10RA. In WAT macrophages and leukocytes, IL-10 was inducing anti-inflammatory profile. Clinically, IL-10 was found to correlate with BMI and HOMA. It was higher expressed in insulin resistant subcutaneous and visceral human WAT.
Conclusions/interpretation: We show that in human WAT IL-10 is primarily produced by pro-inflammatory macrophages that could explain correlations with obesity and insulin resistance, however IL-10 has anti-inflammatory effect on WAT immune cells and, in contrast to rodents, does not change function of adipocytes. We suggest that IL-10 secretion is stimulated as protective mechanism against obesity-induced WAT chronic inflammation.

IS17 - Endocrine Disruptors and Obesity

IS17.01

Introduction to endocrine disrupting chemicals: is it time to act?

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Endocrine disrupting chemicals (EDCs) are environmental chemicals which can interfere in hormone action. This includes compounds to which the human population is routinely exposed through their use as pesticides, herbicides, industrial chemicals, combustion fuels, household products, plastics, detergents, flame retardants and personal care products. It is now apparent that some of these compounds (termed obesogenic EDCs) can act by interfering in endocrine regulation of energy metabolism and adipose tissue architecture, leading to obesity. Current understanding of their cellular and molecular mechanisms of action will be discussed in this lecture. Evidence will be outlined from animal models and human epidemiological studies suggesting that an especially sensitive time for exposure is in utero or the neonatal period.
In the context of wider issues of human health, it is noteworthy that both obesity and exposure to EDCs have been independently identified as risk factors for diseases such as diabetes, cardiovascular disease and cancer. Since many EDCs are lipophilic, it is plausible that the link of obesity to disease may not relate simply to the deposition of fat, but rather to the increased retention of lipophilic EDCs in the greater volume of fat. Furthermore, the obesogenic activity of some EDCs has the potential to increase capacity for their own retention and also for the retention of other non-obesogenic lipophililic pollutant chemicals with a wide range of adverse activities.

IS17.02

Obesogenic endocrine disruptors and obesity: myths and truths

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Obesogenic endocrine disruptors, also known as obesogens, are chemical compounds potentially involved in weight gain by altering lipid homeostasis and promoting adipogenesis and lipid accumulation. They included compounds to which human population is exposed over daily life such as pesticides/herbicides, industrial and household products, plastics, detergents and personal care products. The window of life during which the exposure happens could lead to different effects. A critical window is during utero and/or neonatal period in which the obesogens could cause subtle changes in gene expression and tissue organization or blunt other levels of biological organization leading to increased susceptibility to diseases in the adulthood. Some of the reasons for this increased sensitivity include the lack of the protective mechanisms that are available in adult such as DNA repair mechanisms, a competent immune system, detoxifying enzymes, liver metabolism and the blood/brain barrier still not fully functional in the fetus or newborn. The mechanisms of action of obesogens lay on their ability to increase the number and/or the size of the adipocytes and to alter appetite, satiety and food preferences. The ability of obesogens to increase fat deposition results in an increased capacity for their own retention due to their lipophilic properties; thus prolonging the exposure and increasing the detrimental metabolic complications.

IS19 - Adipose Tissue Biology

IS19.02

Expanding the role of bitter receptors in extra-oral tissues: functional TAS2R38 in human adipocytes

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Introduction: TASRs were firstly identified in the oral cavity for bitter taste perception. However, taste receptors are also present in many non-gustatory organs suggesting that cells outside the oral cavity may

use TASRs as chemosensors, mediating various extra oral tissue-specific biological functions. The presence of functional TASRs in human adipose tissue is currently unknown. The aim of the present study is to investigate the presence of bitter TAS2R38 variant in human adipose tissue, the relationship with the genetic background and the role in adipocyte biology.
Methods: We collected subcutaneous adipose tissue (SAT) and visceral adipose tissue (VAT) biopsies from 32 obese (20 women, 12 men, age 45.1±10.9 years, BMI 43.1±9.2 Kg/m^2) who underwent bariatric surgery procedures and from 18 lean subjects (11 women, 7 men, mean age 43.5±14.1 years, BMI 24.2 ±2.3 Kg/m^2) submitted to aesthetic plastic surgery. The genotype variants of TAS2R38 were assessed in each collected adipose tissue sample. We examined TAS2R38 gene expression (by RTqPCR) and protein content (by Western Blotting) in whole tissues, in differentiated adipocytes and in stroma-vascular fraction cells (SVF). In primary cultures of human adipocytes the effects on lipid metabolism of bitter agonist (20, 50 and 100μM of Quinine and 1, 10 and 20μM of 6-n-propylthiouracil, PROP for 4 hours) was also investigated. The Ethics Committee of the Istituto Auxologico Italiano-IRCCS approved the study and all subjects gave their written informed consent.
Results: TAS2R38 gene expression was higher in whole SAT and VAT of obese than lean subjects and protein amounts were greater in mature adipocytes than in SVF cells. In SAT and VAT, the expression levels were independent of sex and genotype variants (supertaster PAV/PAV genotype was detected in 24% of subjects, taster PAV/AVI detected in 44% of subjects and non-taster AVI/AVI detected in 26% of subjects). The in vitro treatment with bitter agonists induced a significant intracellular lipolysis. The incubation of SVF cells with 10 μM PROP for 10 days during differentiation, resulted in an inhibition of the lipid accumulation especially in SAT derived cells.
Conclusion: The bitter taste receptor TAS2R38 is present in human adipocytes both at RNA and protein level, independently of genetic background. The demonstration that TAS2R38 bitter taste receptor variant is involved in adipocyte biology opens an exciting new field in the obesity research.

Conflicts of Interests: None.

Funding: Italian Ministry of Health.

IS19.03

Adipose tissue morphology, stemness and microvasculature in the progression from obesity to type 2 diabetes mellitus

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Introduction: Adipose tissue (AT) morphological and functional abnormalities have been indicated as major determinant of metabolic derangement in obesity. Present study analyzes adipocyte cell size, stemness and microvasculature in subcutaneous and visceral AT (SAT, VAT) of normoglycemic (ob N), prediabetic (ob preDM) and type 2 diabetic (ob T2DM) patients with obesity (ob) compared with lean controls.
Methods: We enrolled 177 patients BMI-matched (62 ob N, 58 ob preDM, 57 ob T2DM) and 18 non-diabetic lean subjects who underwent bariatric and abdominal surgery. By immunohistochemistry (IHC), transmission electron microscopy (TEM), multiparametric flow cytometry, gene expression profiling and adipogenic cell cultures analysis we explored AT remodeling.
Results: IHC showed an increase in adipocyte size from lean to patients with obesity at the same extension in SAT and VAT; intriguingly the largest cell size has been achieved yet in the prediabetic condition and not only in the overt diabetic patients. The capillary density was lower in both fat depots in the patients with obesity with respect to the controls, without any differences among the 3 subgroups. Capillary basement membrane thickness was significantly increased only in the ob T2DM patients and positively correlated with fasting plasma glucose and HOMA-IR. The percentage of AT stem cells (ASCs; CD45-/31-/34+) was significantly higher in the ob N (SAT: 40±16%; VAT: 47±8%) with respect to controls (SAT: 21±18%; VAT: 29±10%) in both AT depots. Both SAT- and VAT-ASCs were similarly reduced in ob preDM (SAT: 28±9% VAT: 39±10%) and ob T2DM (SAT: 30±9%; VAT: 41±10%) patients compared with ob N group. The percentage of endothelial progenitors (CD45-/31+/34+) was higher in the SAT of all the patients with obesity with respect to lean subjects. No differences in endothelial mature cell number (CD45-/31+/34-) was observed in AT depots of patients studied. SAT of ob preDM and T2DM displayed a lower in vitro adipogenic potential than SAT of ob N.
Conclusion: Our data suggest that AT remodeling and microenvironment alterations with detrimental effects on stem cells number and differentiation play an important role in the development of glucose metabolism impairment in obesity. Capillary rarefaction characterizes AT of obese patients while AT microangiopathy is a hallmark of diabetic complications. We underline the importance to develop new therapeutic strategies targeting AT to regulate hypertrophy and hyperplasia already in prediabetic obese patients.

Conflict of Interest: None Disclosed.

Funding: This work was supported by Italian Ministries of Health and MIUR (Ricerca Finalizzata 1526404, PRIN 2010 to R.V.).

IS20 – Appetite Regulation, Reward & Control

IS20.01

Hormonal control of reward, cognition and appetite

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The central nervous control of appetite and food reward processing depends on the input of endocrine messengers including the pancreatic hormone insulin and the hypothalamic hormone oxytocin. Insulin is secreted in proportion to body fat stores and acts as an important adiposity signal that curbs food intake and body weight via central nervous mechanisms. Oxytocin, a regulator of parturition and lactation, is best known from experiments in humans and animals for its effects on psychosocial function. More recent studies indicate that oxytocin moreover contributes to the control of food intake and metabolic function.
We have investigated the effects of insulin and oxytocin on food intake control and body weight regulation as well as glucose metabolism in humans. Insulin acts on brain structures that establish homeostatic control of energy intake and on pathways that mediate the rewarding aspects of food intake. When delivered to the brain compartment via the intranasal route in healthy humans, insulin reduces food intake and body weight, and moreover improves cognitive function, benefitting in particular hippocampus-dependent declarative memory. Oxytocin administered via the nose likewise curbs calorie intake; neuroimaging experiments suggest that this effect is at least in part mediated by brain regions that establish cognitive control of eating. Moreover, the peptide enhances glucose homeostasis by increasing beta-cell responsivity and glucose tolerance. While the impact of insulin on appetite-regulation brain networks is reduced in obesity, oxytocin is not only effective in normal-weight, but also overweight subjects, which bodes well for potential clinical applications.
In sum, these results indicate that central nervous insulin and oxytocin are relevant signals in appetite regulation and in the cognitive control of eating. Considering their impact on cognition and psychosocial regulation, the hormones may furthermore link metabolic control and higher

brain function. Research into these psychoneuroendocrine messengers appears of particular relevance when considering epidemiological findings that indicate a link between cognitive dysfunctions and metabolic impairments like obesity and diabetes.

IS20.02

Interactions between metabolic, reward and cognitive processes in appetite control: Implications for novel weight management therapies

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Traditional models of appetite control have emphasised the role of parallel metabolic (homeostatic) and reward (hedonic) systems, but more recently the distinction between independent homeostatic and reward systems has been abandoned in favour of a framework that emphasises the cross talk between the neurochemical substrates of the two systems. In addition, evidence has emerged, that 1) cognitive processes such as learning, memory and attention play an important role in everyday appetite control and that 2) metabolic signals play a role in cognition. In this presentation I will present a model of appetite control that integrates cognitive, metabolic and reward mechanisms. The focus will be on studies that have examined the effects of satiation on fMRI BOLD activity in the human brain and the effects of metabolic signals on eating behaviours and cognition in healthy human volunteers. It will be argued that cognitive processes such as attention and memory underpin everyday eating behaviours and that metabolic signals affect eating behaviours, at least in part, via modulation of such higher cognitive functions. The implications of this model for understanding the factors that may contribute to disordered patterns of eating will be discussed and opportunities for developing more effective treatment approaches for weight management identified.

Supported by the Biotechnology and Biological Sciences Research Council (BBSRC) grant number: BB/N008847/1.

IS20.03

Post-exercise eating behavior profiles of adolescents ranging from overweight to severe obesity

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Introduction: Recent studies in youth with obesity have suggested that there are trait-level differences in eating behavior when compared to healthy weight counterparts. Commonly hypothesized contributors to overeating include disinhibition and/or impulsivity. However, appetitive states and homeostatic needs are also common drivers of feeding. Therefore, understanding the scope of cognitive contributors to food intake in this population is important. Since exercise is thought to sensitize individuals to hunger and satiety signals, we hypothesized that appetitive state would be the strongest predictor of energy intake at a post-exercise test-meal.

Methods: Thirty adolescents (mean age 12.4 ± 1.9 yrs, 50% female) were enrolled distributed across overweight (20%), obesity (43%), and severe obesity (37%) weight categories. Objective energy intake (kcal) was measured at an ad libitum, multi-item dinner test-meal (~3000 kcal provided) one hour following a VO2max test on a stationary bike. Cognitive traits were measured with the Three-Factor Eating Questionnaire (TFEQ-R18v2) and a Go/No-go inhibitory control task with three conditions: neutral, win a favorite snack, win a least favorite snack. We assessed appetitive states with visual analog scales (VAS): hunger, fullness, desire to eat, prospective food consumption, and satisfaction. Wanting for specific foods was also assessed by VAS. Energy intake was adjusted for fat-free mass index (FFMI), determined by DXA and anthropometrics at a screening visit one week prior.

Results: Pre-meal prospective food consumption ($r = 0.50$), pre-meal hunger ($r = 0.39$), and TFEQ uncontrolled eating ($r = 0.40$) were positively associated with energy intake (adj. for FFMI) (all $p < 0.05$). There was a positive trend for pre-meal food wanting and intake ($r = 0.35$, $p = 0.06$). None of the Go/No-go task outcomes (false alarms, error rates) were associated with appetite or energy intake, regardless of whether it was a food-motivated or neutral condition (all $p > 0.10$). In stepwise linear regression, pre-meal prospective food consumption was the strongest and the sole predictor ($\beta = 11.2$) included in the model ($R^2 = 0.22$, $F = 7.47$, $p = 0.01$).

Conclusion: While there may be a role for uncontrolled eating in response to a palatable buffet, our results suggest that food intake at the post-exercise meal was an intentional behavior based on a current appetitive state. In adolescents ranging from overweight to severe obesity, the amount of food participants thought they could eat was positively associated with actual consumption, regardless of differences in body size. Future studies could examine whether post-exercise prospective food consumption is modifiable through cognitive behavioral strategies, with a goal to reduce food intake.

IS20.04

Enhanced sweet taste sensitivity in candidates for bariatric surgery

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Introduction: While taste has been suggested as a potential determinant of feeding behavior in obesity, the supporting evidence, namely of altered sensitivity for sweet taste in obese relative to lean individuals, is inconsistent. Furthermore, such evidence has typically been obtained in studies including only small sample sizes, and with substantial methodological heterogeneity. Importantly, potential associations between taste perception and measures of reward-related feeding behavior remain undetermined.

Methods: A cross-sectional study was conducted to compare 212 patients with severe obesity, on the waiting list for bariatric surgery, and 94 healthy individuals. Psychophysical gustatory parameters, namely intensity and pleasantness ratings of sour, salt, sweet and bitter tastants, and taste thresholds as assessed with electrogustometry, were determined. Reward-related feeding behavior was assessed using self-rated psychometric scales.

Results: In addition to having a higher BMI, bariatric patients were older, more frequently female and had higher self-rated depression scores than their respective controls. Logistic regressions to assess the likelihood of belonging to the bariatric group were thus adjusted for age and gender, in addition to type II diabetes, education level and research center. In these analyses we found that higher taste thresholds and higher sweet intensity ratings were associated with belonging to the bariatric group ($1.03 < OR \leq 1.04$, both $p<0.05$), as were higher ratings for hedonic hunger, food addiction symptom scores, restrained and emotional eating ($1.94 < OR \leq 4.27$, all $p<0.01$), and lower alcohol acceptance ($OR = 0.91$, $p = 0.001$). In final exploratory analyses of potential linear relationships between the variables associated with the obese status, while hedonic hunger, food addiction or emotional eating were strongly inter-related, they were not associated with sweet intensity, that in turn had a closer relationship with restrained eating and alcohol acceptance.

Conclusion: Here we found that subjects with severe obesity report higher sweet taste intensity ratings than healthy study volunteers. Furthermore, while self-report measures of reward-related feeding behavior seem to assess a similar construct, sweet intensity was not associated with these variables, and may represent a separate obesity-related dimension.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by grants from the BIAL Foundation (176/10), and from Fundação para a Ciência e Tecnologia, through a Junior Research and Career Development Award from the Harvard Medical Portugal Program (HMSP/ICJ/0020/2011) to AJOM, and through the Center for Psychology at University of Porto (UID/PSI/00050/2013) to ST.

IS20.05

The impact of energy restriction on daily fluctuations in appetite responses and eating behaviour: An ecological momentary assessment study

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Introduction: The majority of dieting attempts are unsuccessful in both the short and long run; many are unable to achieve and maintain modest weight losses, and the majority of those who do regain this within 3 – 5 years. Appetite regulation involves the interplay between satiety, inhibitory control (IC), and reward processes, which are all compromised during energy restriction (ER) affecting the ability to maintain the diet. Little is known about these relationships in naturalistic settings, and to our knowledge no studies have implemented cognitive tasks to measure IC and attentional bias (AB) during ER in individuals with overweight and obesity outside the lab using ecological momentary assessment (EMA), therefore we aimed to investigate how appetite responses fluctuate and interact over a day to inform eating behaviour, and see how ER impacts these relationships.
Methods: sixty (age 34 ± 13 years, BMI 29 ± 4 kg/m²) individuals with overweight and obesity completed 3 daily random assessments (morning, afternoon, and evening) on smartphone devices during 1 week of an intermittent fasting diet (5:2) under free-living settings. 7-point Likert scales assessed hunger and cravings; a food Stroop task assessed food-related AB, and a colour Stroop assessed IC. A food diary also recorded intake and the approximate time. Statistical analyses were performed using multilevel modelling.
Results: Hunger, craving, and colour Stroop scores displayed a 3-level nested structure (session within day within individual) ($P < 0.001$). ER was included as a day level variable, and significantly increased scores for hunger ($p < 0.001$), intensity ($p < 0.001$) and frequency of craving ($p < 0.001$). Colour Stroop score also significantly decreased due to ER ($p < 0.001$). No significant variance was found for food Stroop scores.
Conclusion: EMA appears feasible for studying the process of restriction-induced changes in appetite responses, and findings validate previous work investigating the impact of ER using retrospective and lab-based approaches. Evidence that supports a fluctuating process model of IC that is negatively impacted by ER was found, whereas no support was found for AB raising further questions of its role in reward processing. IC may be the most promising target for cognitive intervention to aid with weight loss. Significant within subject variance in responses found suggest personalised contextual associates could be used to inform delivery of interventions based on when and where problems are most likely to occur. Interactions between appetite responses and predictive effects on eating behaviour will be explored.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the ESRC North West Doctoral Training Centre.

IS21 - Vulnerable Populations and Childhood Obesity

IS21.01

Migrant populations

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Overweight and obesity during childhood is a challenging problem in western countries as well as in urban regions of developing countries. The prevalence differs in relation to socioeconomic status (SES) and migration background. In the risk population (migration background and/or low SES), the percentage of overweight or obesity is significantly higher throughout all age groups in relation to families without migration background and/or higher SES. Furthermore, metabolic comorbidities (e.g. impaired glucose tolerance and type 2 diabetes mellitus) start to appear significantly earlier in life and at lower degree of obesity. Consequently, diagnostic procedures should decisively account for these familial risk factors.
Access to therapeutic options, especially to multiprofessional life interventions, is often obstructed for those without adequate language skills or/and without family support. Most obesity programs are addressed to motivated participants with family resources. Furthermore, different cultural background can cause divergent views on health believe and self-responsibility of the individual for health, raising the importance of a direct "face-to-face" environment for advocating and educating healthy food, physical activity and stress reduction.
The presentation will illustrate diversity management in diagnostic and treatment of obese children and adolescents based on case examples, considering current guidelines.

IS21.02

The effects of a childhood obesity intervention on mothers' and fathers' feeding practices: A one-year follow-up

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Introduction: Childhood obesity treatment targeting parents is more effective in the preschool years compared to later childhood. Most research, however, has focused on mothers, with fathers' roles largely unexamined. The present study examines the effects of a childhood obesity intervention on mothers' and fathers' feeding practices.
Methods: The More and Less study is a randomized controlled trial conducted in Stockholm County, Sweden. Children with obesity (n = 174, mean BMI z-score 3.0, mean age 5 years, 56% girls) and their parents (60% with foreign background, 40% with a university degree) were randomized to: 1) standard treatment (ST) focusing on lifestyle modifications and 2) a parenting program (PP) seeking to enhance general parenting skills. The Child Feeding Questionnaire (CFQ) captured parental levels of restriction, pressure to eat and monitoring at baseline, 3, 6 and 12 months. Generalized linear mixed effects models along with multiple imputations were used to evaluate changes in feeding practices for mothers and fathers.
Results: In both treatment groups, mothers decreased their pressure to eat and increased their monitoring over the 12-month follow-up period. In contrast, fathers did not exhibit a consistent pattern of change in their feeding practices during the follow-up period. This is reflected in the marginally significant difference in fathers' pressure to eat between the treatment groups ($p = 0.06$). Specifically, fathers in the parenting program slightly increased their pressure to eat at 12 months (by 0.03 points compared to baseline, 95% CI -0.20 to 0.27), while fathers in the standard treatment group significantly decreased their pressure to eat (by 0.27 points compared to baseline, 95% CI -0.50 to -0.04). In addition, fathers

in the parenting program significantly increased their monitoring levels at 12 months (increase by 0.24 points, 95% CI 0.02 to 0.47), whereas fathers in the standard treatment group did not.
Conclusion: Mothers and fathers may benefit from different treatment approaches with respect to feeding practices. The interactions between maternal and paternal feedings practices, as well as fathers' unique contributions to obesity treatment outcomes, call for further investigation.

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Conflict of Interest: None Disclosed.

IS21.03

Body weight misperception: association with socioeconomic, migration and behavioural characteristics in 10-19-year-old French-speaking adolescents (HBSC 2014, Belgium)

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Introduction: Body weight misperception (BWM) may be a risk factor for inappropriate weight management especially during adolescence. Besides, it may vary according to migration status, in relation with cultural norms. Our aims were to describe BWM prevalence and to identify associated characteristics including migration status, within the cross-sectional "Health Behaviour in School-aged Children" (HBSC) survey conducted in French-speaking Belgium.
Methods: A multistage random sampling was used to select adolescents (n = 11,184 included in these analyses). Weight, height, BW status perception ("a little bit/too much thin"; "just proper"; "a little bit/too much fat") and other characteristics were collected through a self-administered questionnaire. Based on the discrepancy between BMI categories (IOTF references) and BW perception, BWM was defined as underestimation, overestimation, and no BWM. Multiple multinomial logistic regressions provided adjusted Relative Risk Ratios (aRRR [95%CI]) used to identify characteristics associated with BWM.
Results: BW overestimation was observed in 27.8% of adolescents and underestimation, in 14.0%. Compared with no BWM, BW overestimation was less likely in 2d-generation (aRRR: 0.70 [0.62-0.82]) and 1st-generation migrants (aRRR: 0.79 [0.65-0.96]) than in natives. Migration was not statistically associated with BW underestimation. Other covariates independently associated with BW overestimation were: gender (aRRR in girls vs. boys: 1.96 [1.75-2.18]), age (aRRR in 15-19y vs. 10-14y: 1.12 [1.01-1.24]), family affluence scale (aRRR in "medium" vs. "high": 0.89 [0.78-1.01]; in "low": 0.78 [0.65-0.93]), Cantril's life satisfaction scale (aRRR in 6-10 pts vs. 0-5 pts: 0.60 [0.51-0.69]), family support (aRRR in "moderate" vs. "high": 1.25 [1.10-1.42]; in "low": 1.21 [0.99-1.46]), breakfast during weekdays (aRRR in "5 days" vs. "<5 days": 0.87 [0.77-0.98]) and sugary beverages intake (aRRR in "≥once a day" vs. "<once a day": 0.79 [0.71-0.89]). Gender (0.67 [0.59-0.77]), age (1.28 [1.12-1.47]), family structure (aRRR in blended vs. two-parent families: 1.24 [1.02-1. 52]) and sugary beverages intake (1.38 [1.18-1.61]) were significantly associated with BW underestimation.
Conclusion: Overall, BW overestimation concerned around one quarter of adolescents but was less frequent in migrants. Independently to the migration status, demographic, socioeconomic, wellbeing and behavioural components may be involved in the BWM occurrence during adolescence. Either as causes or consequences of BWM, they should be further considered in order to prevent potential inappropriate weight management behaviour.

Conflict of Interest: None.

Fundings: Wallonia-Brussels Federation, Birth and Children Office, Walloon Region, Brussels-Capital Region.

IS21.04

Nutrition transition in the post-economic crisis Greece: assessing the nutritional gap of food insecure individuals. A case-control study

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Introduction: Since the beginning of austerity in 2009, there has been a 40% increase in the prevalence of food insecurity across Europe. 1 In Greece, 36% of the population was at risk of poverty or social exclusion in 2015. 2 This is the first study to assess the eating habits of food insecure individuals in Greece and evaluate the effectiveness of the flagship food assistance program, FEAD (Fund for European Aid to the Most Deprived).
Methods: Individuals receiving food assistance under FEAD (n = 499; cases) from five different areas of Greece and an age matched sample of controls from general population (n = 500) were interviewed between Dec 2017- Dec 2019. Participants provided information about demographic characteristics, self-reported anthropometric measures and nutritional intake during the past month via an FFQ. Protein and energy malnutrition was defined as daily intake <1.950 Kcal and ≤0,75gr/kg body-weight accordingly. Intakes of macronutrients and food groups were assessed against national nutrition guidance. Between groups comparison were carried using student's t-test (or the non-parametric equivalent) and chi-square test.
Results: FEAD recipients continued to experience energy and protein malnutrition (52.3% and 18.6% respectively). They had higher rates of unemployment compare to controls (76.4% vs. 48.1%, p = 0.007), less years of education (10.98±8.46 vs. 12.32±3.92, p = 0.004) and were more likely to have 2 or more children (p<0.001). Being food insecure was associated with higher prevalence of overweight and obesity (BMI>25: 68.4% vs. 55.1%; p<0.001) with barely a quarter of the cases having a normal range BMI (28.1%). Overall food insecure individuals had poorer dietary habits compared to controls, with larger numbers failing to meet the recommendations for a number of food groups (% meets recommendation for fruits: 8.9% vs. 24.1%, vegetables: 4.3% vs.18.6%, fish: 38.8% vs. 53.9%; cases vs control p<0.001 for all). They also had larger intakes of both pork and beef (p< 0.001). On the contrary, despite high adherence to the recommendation for intake of pulses in both groups their consumption was still higher among the cases (91.9% vs 85.2% p = 0.003).
Conclusion: The economic crisis has augmented disparities in Greece and the double burden of malnutrition is becoming evident in vulnerable populations. Despite being enrolled in a food assistance program, protein and energy malnutrition remains an issue for those living under food insecurity, suggesting the need for improvements in the national policy and/or its implementation.

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Conflict of Interest: None Disclosed.

Funding: FEAD Greece.

IS21.05

Childhood adverse circumstances increase the risk of developing obesity over the course of adulthood – a follow-up study among ageing Finnish municipal employees

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Introduction: Childhood social circumstances, including a low socioeconomic position (Chaffee et al. 2015) and adversities (Riem et al. 2018), are associated with a higher risk of obesity in adulthood. However, little is known about how these circumstances modify body mass index (BMI) trajectories over the course of adulthood. This study aimed to identify adulthood BMI trajectories and to investigate how childhood social circumstances predict belonging to these trajectories.
Methods: Data from the Helsinki Health Study, a longitudinal cohort study of initially 40–60-year-old employees of the City of Helsinki in Finland, were used. The baseline survey was conducted in 2000–2002 (n = 8960, response rate 67%), and follow-up surveys in 2007, 2012 and 2017. Based on self-reported BMI, participants' BMI trajectories (n = 5278, 83% women) from 2000 to 2017, including BMI at the age of 25, were examined. Data on childhood social circumstances were obtained from the baseline survey, including parental education and seven aspects of childhood adverse circumstances before the participant's age of 16. Group-based trajectory models (traj command in STATA 15) were used to form the BMI trajectories for men and women and to analyse the group membership probabilities for the social circumstance variables.
Results: Four ascending BMI trajectories both for women and men were found: persistent normal weight (trajectory group 1; women 36%, men 26%), normal weight to overweight (trajectory group 2; women 41%, men 47%), normal weight to class I obesity (BMI 30 to <35) (trajectory group 3; women 19%, men 23%) and overweight to class II obesity (BMI≥35) (trajectory group 4; women 5%, men 4%). Compared to BMI trajectory group 1, low parental education and peer bullying were the strongest predictors for belonging to BMI trajectory groups 3 and 4 among women (Figure 1a). Among men, parental alcohol problems were the strongest predictor of belonging to the BMI trajectory group 4 (Figure 1b).
Conclusion: Low parental education as well as peer bullying among women and parental alcohol problems among men may increase the risk of development of class II obesity. Further studies are needed to clarify how gender differences and parental education modify the effect of childhood adversities on adulthood BMI trajectories.

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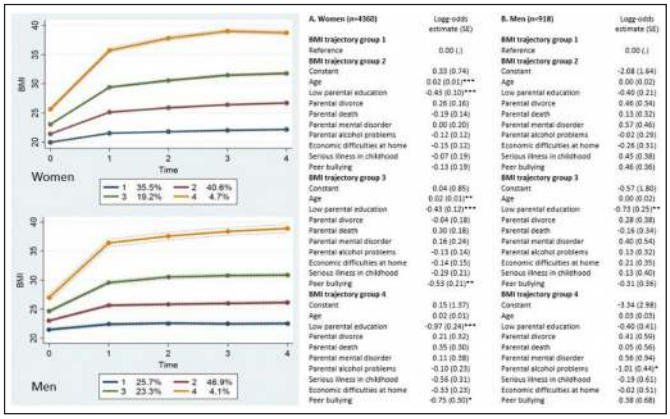

Group-based trajectory models were used for the analyses. Time 0 = self-reported BMI at the age of 25, time 1 = self-reported BMI at 2000–2002, time 2 = self-reported BMI at 2007, time 3 = self-reported BMI at 2012 and time 3 = self-reported BMI at 2017. *P<0.05, **P<0.01. ***P<0.001.

Fig. 1. BMI trajectories for women and men and estimates of childhood social circumstances for belonging to the trajectory groups.

ACCEPTED SYMPOSIUM

Sunday, 28 April 2019

AS1 - Tackling Obesity through Manipulating Energy Intake

AS1.03

Obesity treatment by very low-calorie-ketogenic diet: effect on body composition, energy homeostasis, quality of life and burden disease

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The role of diets and nutrition in the prevention and treatment of obesity is widely accepted. However, this tool is not so well developed as drugs or surgery based treatments. As nowadays there is not consensus on this topic. It is important to elucidate which is the best nutrient distribution and dietary pattern to the nutritional management of obesity. The present symposium target to gain more insight to tackling obesity by discussing the scientific evidences of the effect of high or low protein and carbohydrate with low- or very-low calories as well as, the current dietary pattern with demonstrated healthy properties. Epidemiological studies show controversy on the healthy effect of diets enriched in protein or in relation to the intake of carbohydrates. Moreover, there is still some distrust in the usage of very low-calorie-ketogenic diet (VLCK diets). However, there are several and solid scientific studies that open a door to elucidate the controversy in the energy intake manipulation for tackling obesity.
The following topics will be addressed to review in depth the effect of different dietary patterns and nutrient distribution on the management of obesity and its related diseases:

1. Role of Mediterranean Diet on weight loss and obesity-related diseases treatment

There is a considerable interest in the so called Mediterranean Diet mostly after the reports of its efficacy in prevention of cardiovascular diseases. In the symposium the action of such dieting on obesity and metabolic disorders will be updated.

2. Diets with high or low protein content and glycemic index in weight-loss and long-term weight maintenance

The still debated role of the nutrient composition, i. e., depending on the caloric content, proportion of components as well as glycemic index will be deeply discussed.

3. Obesity treatment by very low-calorie-ketogenic diet: effect on body composition, energy homeostasis, quality of life and burden disease.

Finally, the still under debate on the very low-calorie ketogenic diets as a new tool to combat obesity and the characteristics of this type of dieting will be addressed.

AS2 – NoHoW EU Project

AS2.05

Developing ontologies for personalised behaviour change interventions to enhance self-regulation of eating and physical activity behaviours

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Introduction: Digital systems can deliver complex adaptive and personalised interventions with high fidelity, and improved engagement, consequently leading to more effective and cost-effective approaches. The recent advances in Behaviour Science methods and theories, as well as in Artificial Intelligence based systems and analytical and predictive techniques, allow us to move a step forward from a "one size fits all" approach to a "precise behaviour change" approach to influence energy balance behaviours that are crucial for long-term weight management. In order to achieve this, we need to develop and test innovative standardized classification systems (ontologies) of personalization, tailoring and adaptive features that can enable the development of more effective behaviour change interventions for energy-balance related behaviours.
Methods: Iterative process consisting of: i) scoping review of reports of interventions and existing classification systems, ii) development of the ontology, through international stakeholder review and annotations; iii) testing the ontology through expert-model driven data analytics.
Results: An active multidisciplinary collaboration with leading researchers in digital behaviour change science (e.g. Centre for Behavior Change, UCL), IBM -Research Ireland, and H2020 projects (e.g. NoHoW; ProACT), allow us to examine and test the feasibility of various methodological approaches, as well as testing initial personalisation conceptual models for physical activity and weight management. An initial scoping review showed the limitations in the current knowledge of personalization and tailoring features of digital behavior change interventions, and need to develop an ontology to organise knowledge. To ensure relevance across country, domain and discipline, feedback will be sought from a range of stakeholders previously identified on the ontology's relevance, comprehensiveness and clarity via an online platform.
Conclusion: This work will inform best practices for adopting personalized and tailoring strategies in future deployments of digital health ecosystems, in particular for energy-balance related behaviors that are crucial in long-term weight management. This presentation will provide an overview and discuss the series of studies that are being developed to test how evidence-based behaviour change frameworks can inform data aggregation and analytical approaches to generate a new generation of personalised solutions to longer-term weight management.

Conflict of Interest: The first presenter has received payment from consultancy for weight loss companies.

Funding: Marta Marques is funded by the Marie-Sklodowska-Curie (EDGE) Fellowship programme (grant agreement No. 713567).

Monday, 29 April 2019

AS3 - Total Diet Replacement Programmes for Weight loss - from Research to Practice

AS3.01

Evaluating the clinical effectiveness of TDR

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Low and very-low energy total diet replacement (TDR) weight loss programmes use formula food products (soups shakes or bars) to replace all usual foods for short periods. Results from recent clinical trials including the DiRECT, DROPLET and PREVIEW studies have demonstrated that combined with behavioural support, the use of TDR can induce rapid and substantial weight loss and have clinical benefits on diseases associated with obesity including remission of type 2 diabetes.
As a result, some people have suggested that TDR programmes should be used for the routine management of obesity and type 2 diabetes. However this is a hotly debated and divisive topic, since there remains many unanswered questions, including whether TDR programmes are acceptable to patients, if they are cost-effective, whether the rapid and substantial weight loss can be maintained in the long term, and what effects periods rapid weight loss may have on body composition and metabolic health.
The aim of this symposium is to provide an overview of the current evidence on the effects of TDR programmes and offer the opportunity to discuss future research priorities and the translation of this approach into clinical practice.
This symposium will bring together experts and key opinion leaders in the field, to openly discuss the current evidence and future directions for TDR as a potential treatment for people with obesity. The symposium will attract researchers, dieticians, nutritionists, physicians, surgeons and students who have an interest or curiosity in discussing the evidence on TDR programmes and their potential future clinical use.

AS4 - Socioeconomic Differences in Overweight: Examining Environmental and Psychological Mechanisms

AS4.03

Appetite, weight loss and compensation: a contemporary update

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Introduction: The largest challenge in obesity management remains the maintenance of a reduced body weight in the long-term. Diet-induced weight loss (WL) leads to reduced energy expenditure (EE) and increased drive to eat and these have been suggested, but not proven, to drive weight regain in the long-term. The aim of this presentation will be to investigate the potential effect of speed of WL, intermittent energy restriction and ketosis in modulating the above- mentioned adaptations. Moreover, the predictive role of the metabolic adaptations that occur with WL in determining long-term relapse will be discussed.
Methods: A series of RCTs and longitudinal studies with repeated measurements were used.

Results: Rate of WL and intermittent nature of the diet do not seem to modulate differently either appetite or EE (resting metabolic rate (RMR) and exercise-induced EE (EIEE)) once energy balance is reestablished. Interestingly, the expected increase in ghrelin and hunger in response to WL, do not occur when ketogenic diets are used, even though this beneficial effect disappears as soon as refeeding occurs. We have also shown that the increase in hunger and ghrelin and the reduction in RMR and EIEE, observed with WL, are not associated with weight regain at 1-year follow up. Preliminary data from our group shows that the increase in ghrelin and hunger seen in reduced-obese individuals is no different from that seen in a non-obese control group.
Conclusion: Nature of the diet does not seem to have a significant impact on appetite or EE-related variables, even though ketosis prevents the increase in appetite otherwise seen with WL. The reduction in EE and increase in appetite seen with WL likely reflect a normalization towards a lower and healthier body weight.

AS4.04

Interaction between exercise, appetite and food intake in the young people with obesity

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Introduction: While energy intake and energy expenditure have long been studied independently, the alarming progression of obesity has led to a more integrative approach to energy balance considering their potential interactions. Although the available literature concerned with the effect of chronic and acute exercise on energy intake and appetite control in adults is considerable, these questions remain less explored among children and adolescents.
Methods: We will here review and summarize the available results regarding the effect of physical exercise on energy intake and appetite control in children and adolescents with obesity, trying to identify the physiological and neurocognitive signals and pathways involved.
Results: Actual evidences suggest that acute intensive exercise has the potential to reduced subsequent energy intake in children and adolescents with obesity but not lean ones, through both peripheral (mainly gastro-peptides) and neurocognitive (neural responses to food cues) pathways. The nutritional responses to chronic physical activity remain however less clear and require further considerations, especially in an anti-obesity perspective.
Conclusion: The effects of acute exercise and chronic physical activity have to be considered when implementing weight loss interventions. There is however a need to consider the individual profile of the kids to avoid any compensatory mechanisms that could limit the efficacy of the intervention.

AS5 - Emotion Regulation: Psychological, Behavioural and Biological Pathways to Overweight in Youth

AS5.01

Stressors and emotion regulation as predictors of perceived stress, stress biomarkers and overweight in adolescents

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Purpose: Chronic stress exposure in adolescence can lead to physiological and psychological diseases. Reacting to stress happens by means of emotion regulation (ER). Maladaptive ER with maladaptive behaviours, e.g. emotional eating, can potentially lead to overweight and/or obesity. The current study explored if environmental stressors and ER are associated with perceived stress, stress biomarkers and body mass in adolescents.
Methods: In 218 Belgian adolescents (10-18 years old, 51% boys, 13% underweight and 10% overweight), stress biomarkers, namely hair cortisol and heart rate variability (HRV), were measured. Validated questionnaires assessed a) environmental stressors: negative life events, bullying and parental rejection b) stress-related reports: perceived stress, depressive symptoms and behavioural difficulties and c) adaptive and maladaptive ER strategies. Anthropometric measurements included body weight and height for BMI calculation. The linear regression results, adjusted for age, sex, socioeconomic status and mean heart rate (for HRV parameters) are described below.
Results: Perceived stress and depressive symptoms were positively associated with all stressors, whereas behavioural difficulties only with bullying. The two biomarkers were not interrelated and neither were they related to stress reports. While cortisol reflected higher parental rejection and negative life events from last three months, HRV was not associated with any of the stressors. BMI was only positively related to behavioural difficulties. Maladaptive ER was positively associated with two stressors: parental rejection and bullying; with two stress reports: perceived stress and depressive symptoms; and with HRV. Adaptive ER was negatively associated with depressive symptoms.
Conclusion: The study confirms that environmental stressors and maladaptive ER are associated with perceived stress and stress biomarkers in adolescence. Training in adaptive ER strategies could increase adolescents' resilience to stress and potentially decrease the burden of stress-related negative health consequences. Further research should focus on the possible mediation mechanisms (e.g. via emotional eating) in the ER-BMI relation, which might further explain the lack of associations in the current study. Additionally, longitudinal research could elucidate the directionality of the observed effects, e.g. the relation between BMI and behavioural difficulties.

AS5.02

Salivary metabolomics as a new tool for unravelling stress obesity pathways in adolescents from a clinical public health perspective

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The high prevalence and treatment resistance of obesity urges further exploration in early diagnosis and prevention. This is especially important at young age, when metabolic and psychological development are ongoing. Indeed, also psychological factors like stress can favor obesity, but researchers still struggle with the complex processes towards disease susceptibility. This project aims to elucidate pathways in the bidirectional stress-obesity relation via salivary metabolomics, both targeted and untargeted, in 260 adolescents. Saliva can be non-invasively collected while its metabolic composition parallels that of blood. Hence, the associations between the metabolome from different matrices (plasma, faeces, saliva) in the stress-obesity axis of adolescents is investigated using state-of-the-art ultra-high performance liquid chromatography coupled to quadrupole-orbitrap high resolution mass spectrometry (UHPLC-Q-HRMS). Studying metabolomics-based differences between combinations of subgroups (low to high stress and healthy weight to obese) will on top off elucidating the pathologies as such, aid to reveal why certain

adolescents under high-stress develop obesity and why only a fraction of obese adolescents develops stress. Following the development and validation of a salivary UHPLC-Q-HRMS method, as a proof-of concept, 13 obese adolescents were compared to an equal number of healthy children (age range = 12-16 y). PCA and OPLS-DA models were established, to respectively explore the data in an unsupervised and supervised manner. The constructed OPLS-DA model enabled us to discriminate the adolescents according to BMI z-scores and IOTF cut-offs (healthy weight versus obese), reflected by a promising Q2 of 0.669 and R2 of 0.541, good permutation testing and a CV-ANOVA p-value < 0.001. Subsequently, 6 metabolites with differentiating potential were retained with satisfying VIP-score (≥ 1), jack-knifed confidence interval (not across zero) and S-plot descriptors (|covariance| and |correlation|). Integrative metabolomics data analysis strategies will be applied for the identification of differentiating metabolites, pathway analysis and network mapping. This first model proves the potential of salivary metabolomics as a tool for unravelling mechanistic information and biomarker discovery in obesity. Finally, salivary metabolite markers will be compared with existing clinical biomarkers of underlying pathways like stress physiology (acute and chronic), appetite, energy balance and inflammation.

AS5.03

The bidirectional stress-diet-overweight relation: emotion regulation, appetite hormones and microbiota

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Background: Psychosocial stress, uncontrolled eating and obesity are three interrelated epidemiological phenomena already present during youth. Cortisol seems the main biological factor from stress towards central adiposity; and diet, physical activity and sleep are the main behavioral pathways. Within stress-diet, the concepts of comfort food and emotional eating are central as cortisol affects reward pathways and appetite brain centers with a role for insulin, leptin, NPY, endocannabinoids, orexin and gastro-intestinal hormones. More recent researched biological underpinnings are microbiota, epigenetic modifications and metabolites. First, gut microbiota reach the stress-regulating and appetite-regulating brain centers via the gut-brain axis. Second, epigenetic analyses are recommended as diet, obesity, stress and gut microbiota can change gene expression which then affects appetite, energy homeostasis and stress reactivity. Finally, metabolomics would be a good technique to disentangle stress-diet-obesity interactions as multiple biological pathways are involved. Saliva might be an ideal bio-matrix herein. Ideally, stress and diet/obesity research should be combined in interdisciplinary collaborations with implementation of several –omics analyses.
Methods: In +-300 Belgian children, stress questionnaire data, diet (food consumption, psychological eating behavior), adiposity and leptin were measured over two years. Cross-sectionally, cortisol levels and fecal samples were collected.
Results: Children with a high stress score reported more sweet food consumption, emotional eating and external eating. High cortisol was associated with an unhealthy diet (especially with the sweet foods) and also with higher leptin levels in girls. Leptin was a moderator i.e. the combination of high leptin and high stress was related to high emotional eating. Diet was a moderator in the stress-adiposity relation. Also gut microbial differences were seen depending on the stress level e.g. more short-chain fatty acid producers and less Firmicutes.
Conclusion: The results support the theory of cortisol–induced comfort food preference and a role of leptin and gut bacteria. We will further elucidate the underlying biological pathways via epigenetics, appetite hormones and metabolomics in this cohort and in an emotion regulation intervention. These results might inspire towards probiotics and new biomarkers in the stress-appetite field.

AS5.04

A two-hour emotion regulation workshop in early adolescents with obesity: a feasibility study

Boelens, E.; Debeuf, T.; Verbeken, S.; Volkaert, B.; Braet, C.

Ghent University

Obesity is a widespread and ever-growing problem that has both short and long-term side-effects. Adolescents with obesity do not only experience physical consequences, but also suffer from psychological problems. Psychological mechanisms linked to obesity have been thoroughly investigated. An important mechanism in reducing stress or negative affect, is emotional eating. Emotional eating is defined as 'eating in response to a range of negative emotions' and correlates positively with the Body Mass Index. Recent studies show that emotional eating is associated with the use of maladaptive emotion regulation (ER) strategies and a deficiency in emotional awareness..
This study aims to investigate the feasibility of a short ER training in adolescents (n = 50) with obesity between 9 and 16 years of age (M_age = 12.26, 60.7% girls). At the time of the study, all participants were enrolled in an inpatient treatment program for obesity. Prior to the workshop adolescents filled out online questionnaires measuring ER and emotional awareness. In a two hours workshop, adolescents were randomly assigned to one out of three conditions. In each condition one adaptive ER strategy (distraction, cognitive reappraisal or acceptance) was trained. Before learning the adaptive ER strategy, the workshop also focused on awareness as the participants had to be aware of their feelings and body sensations. At different times during the workshop, adolescents rated their emotions on a visual analogue scale (VAS) scale. After the training, participants were presented a sad mood induction after which they had to use the learned ER strategy to reduce negative affect. Feasibility will be evaluated and reported for both the workshop and each of the strategies based on different parameters of multiple informants. Results of this study were used to establish a randomized controlled trial in which the effect of a 10-session ER training will be investigated.

AS6 - The ToyBox Kindergarten/Nursery Intervention to Prevent Obesity in Pre-School Children: Impact, Experiences & Outcomes, and Translation across Europe, Malaysia and Scotland

AS6.02

Transferring the ToyBox Study from Europe to Malaysia: Funding and Development of the ToyBox Malaysia Feasibility Study

Gibson, E. L.[1]; Poh, B. K.[2]; Essau, C. A.[1]; Cheah, W. L.[3]; Ruzita, A. T.[2]; Lee, J. A.[3]; Koh, D. C.[2]; Reeves, S.[1]; Summerbell, C.[4]; Androutsos, O.[5]; Manios, Y.[5]

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Introduction: In 2016, UK MRC-Akademi Sains Malaysia Newton-Ungku Omar Fund announced a call for collaborative research in Malaysia, related to non-communicable diseases. One theme of interest was obesity, known to be a public health concern in Malaysia, including in children. The University of Roehampton, in collaboration with Durham University, included four staff well positioned to respond positively to this call: ELG, an expert in the psychology of eating behaviour, and CS, an expert in childhood obesity, had worked on development of the European kindergarten-based obesity-related intervention, the ToyBox-Study (www.toybox-study.eu); CAE, an expert in child psychopathology and Theory of Change, was originally from Malaysia (Sarawak); SR is a nutritionist with previous collaborative experience in Malaysia. This presentation describes

the process that led to the successful grant award, and establishment of the resulting feasibility study.
Methods: A rapid decision was made to conduct a feasibility study applying the EU ToyBox-Study intervention in Malaysian kindergartens, thus addressing the obesity (and associated non-communicable diseases) theme of the call. This was supported by the PI and Project Manager of ToyBox-Study (YM, OA), as non-funded partners. A network of Malaysian collaborators with appropriate expertise in nutrition, education and children was quickly established via existing contacts (BKP, CWL), who in turn invited further staff (ATR, DCLK, JACL) to join, to increase the breadth of expertise and ensure the Malaysian team had sufficient capacity.
Results: The grant application, "Improving healthy energy balance- and obesity-related behaviours among preschoolers in Malaysia: feasibility of adapting the ToyBox-Study", was successfully awarded in Oct. 2016, for a planned project start in Jan. 2017. The project was implemented in 3 stages; 1. Use of Theory of Change framework for developing the intervention, including focus groups with key stakeholders (parents, kindergarten teachers); 2. To adapt ToyBox material to a Malaysian sociocultural milieu; 3. To conduct a feasibility study testing the effectiveness of ToyBox relative to usual practice, targeting healthy drinking and snacking, increased physical activity and reduced sedentary behaviour. A total of 48 kindergartens were recruited around Kuala Lumpur and in Sarawak (Borneo) of which 22 were intervention sites.
Conclusion: Use of existing networks with multidisciplinary expertise, together with knowledge of a pre-existing intervention, allowed for rapid development and funding of this feasibility study project in Malaysia.

Conflict of Interest: None Disclosed.

Funding: UK Medical Research Council and Newton-Ungku Omar Fund (Project Code: MR/P013805/1).

AS6.03

Implementation and Challenges of An Obesity Prevention Intervention for Preschool Children in Kuala Lumpur Metropolitan: The ToyBox Study Malaysia

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Introduction: Malaysia has been identified as having the highest prevalence of obesity in Asia. Health promotion programmes aimed at preventing obesity have thus far targeted school-going, adolescent and adult age groups. As early life intervention is known to prevent later life health complications, the ToyBox Study Malaysia was initiated with the aim of preventing overweight and obesity starting from a younger age, namely preschoolers.
Methods: The ToyBox Study Malaysia is a pilot randomised control trial comparing the ToyBox intervention programme with usual practice over one year (2018). The intervention focuses on four key energy-balance related behaviours: drinking water, choosing healthy food and snacks, increasing physical activity, and reducing sedentary behaviour. The study was conducted in kindergartens in urban areas of Kuala Lumpur metropolitan and rural areas in Sarawak. This presentation will only focus on the implementation strategies used, and challenges faced, by the intervention group kindergartens in Kuala Lumpur metropolitan.
Results: The intervention programme was implemented in 15 kindergartens in Kuala Lumpur and its suburbs in Selangor. The key behaviours were presented in four separate modules. Kindergarten teachers attended three sessions of training – once prior to, and twice during the implementation period. Each module was conducted for a period of four weeks on a rotation basis, and repeated for two weeks in a similar sequence. Parents received newsletters and tip cards on a regular basis in line with the respective modules their children were learning in kindergarten. Baseline and post-intervention assessments included anthropometry, physical activity, dietary intake and behaviour. Various challenges encountered include convening the kindergarten teachers for subsequent trainings, loss of accelerometers, arrangement of field trips, and children absent during data collection. Suitable approaches were devised to handle the challenges that arose.
Conclusion: The ToyBox Study Malaysia programme was successfully implemented at selected kindergartens in Kuala Lumpur metropolitan. Although there were challenges faced during implementation, they were dealt with promptly. We expect the preschoolers and their families to benefit from the programme in terms of incorporating healthier lifestyle behaviours, and are hopeful that the trained teachers will continue to implement the programme over the years.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by UK Medical Research Council under the Newton-Ungku Omar Fund (Project Code: MR/P013805/1; UKM Code: NN-2017-082).

AS6.04

Implementation of an obesity prevention intervention to pre-school children in Borneo, Malaysia: the ToyBox Malaysia study

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Introduction: The prevalence of childhood obesity in Malaysia is relatively high compared with neighboring countries. The ToyBox Malaysia study aimed to promote healthy weight in children attending kindergartens in Malaysia.
Methods: The ToyBox Malaysia study is a pilot RCT comparing the ToyBox intervention with usual practice over one year (2018). The intervention focuses on four energy-balance related behaviours: drinking water, choosing healthy food and snacks, increasing physical activity, and reducing sedentary. It was adapted from the intervention used in the ToyBox EU study with input from focus group discussion and a Theory of Change workshop, taking into consideration the ethnic diversity of Borneo, particularly in food diversity. It was implemented with the help of teachers who have undergone the study's train-the-trainers programme. The study was conducted in kindergartens in urban areas of Kuala Lumpur metropolitan and rural areas in Sarawak; this presentation will only focus on the implementation strategies used, and challenges faced, by the intervention group kindergartens in rural areas in Borneo, Malaysia.
Results: A total of 15 kindergartens and randomised to 7 intervention schools (n = 178 children) and 8 control schools (n = 162 children). Pre- and post-intervention data was collected including socio-demographic data; drinking, snacking, physical activity and sedentary behaviours; anthropometric measurement; medical history, cognitive functioning skill (Raven's Color Progressive Matrices), gross motor development (Test for Gross Motor Development) and objectively-measured physical activity (Actigraph). Process evaluation was carried out using multiple methods and tools (checklist, logbooks, survey, interview and focus group discussion) to assess adherence, exposure, quality of delivery, participant responsiveness, context, and programme differentiation. Due to the complexity of the methods and data, challenges such as response bias, incompleteness of data, logistics issues, recall errors and the additional burden on the teachers were encountered.
Conclusion: This paper described the experience in implementing the ToyBox Malaysia programme in Borneo where the findings indicate the importance of implementing an intervention project based on the local setting. The positive feedbacks received from all participants including teachers and parents had indicated the potential benefit of Toybox in improving their lifestyle and the hoping the programme will be implemented in the future.

Conflict of Interest: None.

Funding: UK MRC Newton Ungku Omar Fund research grant (MR/P013805/1).

AS6.05

Translating the ToyBox obesity prevention intervention to the Scottish preschool setting: Adaptation processes and implementation challenges

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Introduction: Childhood obesity rates in Scotland are amongst the highest in Europe, with a reported 23% of 4-5 year olds being overweight or obese in 2016/2017. Interventions which have been effective at improving key obesogenic behaviours in the early years may merit further implementation in Scotland. Therefore, adaptations were made to the ToyBox intervention in order to test its' feasibility in the Scottish preschool setting.
Methods: The ToyBox-Scotland study is a feasibility cluster randomised controlled trial which compared the adapted ToyBox-Scotland intervention (3 preschools) with the usual Scottish preschool curriculum (3 preschools) in Glasgow over an 18 week period from March-June 2018. A number of adaptations to the structure, content and delivery of the original intervention were made to align with the policies and practices of preschools in Scotland. A process evaluation was conducted alongside the cRCT in order to evaluate fidelity and acceptability of the intervention. This presentation will only focus on the adaptation process undertaken, and the implementation challenges identified through process evaluation.
RESULTS: We involved stakeholders in the adaptation and development of the ToyBox-Scotland intervention. Meetings were held with preschool head teachers. A workshop was conducted with pre-school practitioners, and an experienced pre-school educator trailed out each ToyBox activity with children and collaborated with researchers adapt the intervention. Resulting adaptations to the intervention included: Language changes to the intervention materials, removal of the eating/snacking and water consumption components from the pre-school setting, removal or adaptation of more complex physical activity sessions, and the addition of interactive rather than passive materials to encourage parental involvement. Process evaluation concluded that the intervention was implemented with high fidelity in the preschool setting and was well-received by practitioners. Challenges identified included low study recruitment rates, loss of accelerometers, and poor compliance with outcome measures (BIA, parental questionnaires and accelrometry).
Conclusion: The original ToyBox intervention was considerably adapted to suit the context-specific aspects of Scottish preschools, which appears to have aided successful implementation of the intervention. The challenges identified will be considered and addressed before progression to effectiveness testing of the intervention.
Keywords: Obesity, preschool, children, implementation, intervention.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Cunningham Trust.

Tuesday, 30 April 2019

AS8 - Exercise, Appetite Control and Energy Balance: Contemporary Issues

AS8.02

Socioeconomic differences in the susceptibility to overeat from excessive portions of unhealthy food

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The association of socioeconomic status with overweight and obesity has been well established. Less is known, however, about the environmental and psychological processes underlying this relationship. This symposium will present recent experimental, correlational, and systematic review evidence on the psychological and environmental factors that may underlie socioeconomic differences in overweight. This will inform both intervention development and policy making.
The session will feature four presentations on recent findings from health psychology and public health research. First, Claassen will present a systematic review of 22 studies examining psychosocial mediators of the association between SES and BMI. The findings show that both environmental factors such as neighbourhood quality and social support, and psychological factors such as stress and self-regulation processes, play a role in the relationship of SES and BMI, often interactively. Papies will then present experimental data showing that participants with a lower socioeconomic status (i.e., lower levels of income, education, and perceived wealth) reported stronger intentions to overeat from larger, compared to smaller, portions of unhealthy food. These effects were mediated by trait impulsivity, and by perceptions of how much is appropriate to eat. These findings add to our insights into the psychological processes underlying the SES-BMI relationship. Next, Hardman will present new data from a cross-sectional study which indicates that lower socio-economic status is associated with higher body weight via psychological distress and subsequent emotional eating. Targeting these maladaptive coping behaviours may be one strategy to reduce obesity in lower income populations. Finally, Robinson will outline a large European project that is being conducted to understand how different intervention approaches can serve to narrow or widen SES inequalities in overweight and obesity. The project will use virtual reality methodologies, real-world field studies and epidemiological modelling to inform policy options in the UK and Europe. Initial findings will be presented, alongside discussion of why different policy options may affect the rich and the poor differently. Together, these presentations will provide novel insights into the psychological processes that could translate socioeconomic differences into differences in obesity, and may help to stimulate new perspectives on interventions and policies to address health inequalities.

Wednesday, 01 May 2019

AS9 - Improving Conversations about Weight Management in Primary Care

AS9.01

Improving access to adult weight management services: evidence from a realist synthesis and mixed methods case study

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Primary care practitioners are well placed to identify individuals with obesity and weight-related co-morbidities and to signpost or refer them to weight management services when appropriate, but this does not often happen in practice. Findings from a realist review of previous interventions to improve identification and referral of adults with obesity in primary care will be presented alongside a mixed methods case study of GP referrals to a large NHS adult weight management service.
The realist review involved a systematic search of six databases to identify relevant intervention studies. The final sample consisted of 30 papers (5 RCTs, 5 non-randomised controlled trials, 6 quality improvement studies, 11 pre-post test designs, 2 mixed methods studies, and 1 qualitative process evaluation). Most studies used multiple intervention strategies which could be divided into: 1) Training, 2) Tools to improve identification, 3) Tools to improve ease of referral, 4) Audit/feedback, 5) Working in networks/quality circles, and 6) Other. The synthesis produced 12 different

***Please note:** *By default, authors did not disclose any conflicts of interest unless explicitly stated in the abstract.*

mechanisms that help us to understand why some interventions were more successful than others. We also offer hypotheses about how these mechanisms might play out differently in different contexts to account for different outcomes.
The mixed methods case study of GP referrals to weight management involved: a) multilevel binary logistic regression analysis of cross-sectional GP referral data, including individual patient and practice characteristics, and b) semi-structured interviews with 20 patients and 17 practitioners. Predictors of attendance will be presented alongside qualitative data that helps us to understand barriers and facilitators to referral and attendance.

AS9.02

A taboo topic? How general practitioners talk about overweight and obesity in New Zealand

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University Of Otago, Wellington/Massey University, Primary Health Care & General Practice/JCDR, Wellington, New Zealand

Levels of overweight and obesity are high in New Zealand. Primary care health professionals do have a role in weight management however time in consultations is limited and focused on the presenting condition. The TabOO study (Talking about Overweight and Obesity) analysed video-recordings of naturally occurring consultations involving weight discussion to determine communication strategies used by General Practitioners (GPs) and their patients in routine consultations.
Following examination of 205 video recordings of actual clinical consultation, secondary analysis was conducted on 36 recordings of GP consultations. Content and interactional analysis were employed. This shows that GPs and patients have a range of strategies, but such discussions are interactionally delicate with GPs not wishing to offend their patient or create imbalance in the clinical relationship. The analysis informed the development of a brief intervention approach for use in routine consultations. Highlights from the analysis were included in a training session for General Practice staff exploring interactional delicacy, conversational strategies and weight stigma in healthcare prior to trialling the introduction of the TabOO toolkit.
Five General Practices from one primary health organisation utilised the TabOO approach with 830 enrolled patients over a period of 4 months in 'business as usual' conditions in a Ministry of Health funded trial. Results from this stage of the research will be shared and interactional analysis of some of those consultations will be discussed.

AS9.03

Personalizing obesity assessment and care planning in primary care: patient experience and outcomes in everyday life and health

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Primary care is an ideal setting for discussions with people about weight to support their health over the life cycle. However, raising the subject and having effective conversations is fraught with difficulty. These consultations must integrate a shared understanding of the biopsychosocial processes that affect weight and result in action that makes sense to people medically, emotionally, and practically. Recognizing prevalent weight bias and stigma, which is frequently internalized by people, the action planning must support the individual in leveraging their strengths and resiliency to make change. The 5As Team Program is dedicated to improving primary care obesity prevention and management. The 5AsT Collaborative Deliberation project focused on understanding how to structure personalized obesity assessments and care planning in primary care.
Our in depth qualitative study examined interpersonal processes during clinical consultations, their impacts and outcomes. This resulted in understanding the elements of the personalized obesity assessment and care planning that foster patient activation, sustainable actions, and perceived benefits in function, mental, physical and social health. This resulted in an extension of the collaborative deliberation model to address obesity as a complex chronic disease. Our enhanced collaborative model helps understanding the interpersonal work in the consultation that leads to shared decision-making and meaningful support for people in their daily life. Based on our results we developed a clinical framework person-centered primary care obesity consultations, and a suite of tools to support the clinical conversation and provider training.

AS9.04

Small talk big difference: results of a randomised controlled trial of an online educational intervention to improve the quality and rate of primary-care referrals to weight management programmes for patients with type 2 diabetes and obesity

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Despite strong evidence that weight management improves outcomes for patients with type 2 diabetes, many clinicians in primary care do not raise the issue of weight during consultations. Reasons for this include a lack of knowledge of available programmes, a lack of confidence in raising the issue and a belief that it would take too long within an already busy consultation.
The Small Talk Big Difference intervention was developed using the Behaviour Change Wheel; it consists of a 1 hour online e-learning package for primary care clinicians (including the benefits of weight management, weight management interventions, communication skills for raising the issue and motivational interviewing), a patient leaflet, consultation guide and implementation checklist. Primary care practices in NHS Greater Glasgow and Clyde, Glasgow, UK, were offered the intervention via routine health board newsletter, then randomised to receive it immediately or after a 4 month delay. Referral rates to weight management services were assessed 3 months before and after the intervention. The development of the intervention and results from this effectiveness trial will be presented.

ABSTRACT SESSIONS

Sunday, 28 April 2019

OS1-Adipose Tissue Biology

OS1.01

A combined index of 1,25-dihydroxyvitamin D3 and 24,25-dihydroxyvitamin D3 and its association with metabolic function

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Introduction: The association between low vitamin D status and the development of T2DM is well established; however vitamin D supplementation

trials have yielded mixed outcomes. Recent evidence suggest vitamin D repletion may be better reflected by 1α,25-dihydroxyvitamin D3 and 24R,25-dihydroxyvitamin D3, as these metabolites are directly related to vitamin D receptor activation. Here we test the hypothesis that the VDM index, a combined index derived from serum concentration values of 1α,25-dihydroxyvitamin D3 and 24R,25-dihydroxyvitamin D3, predicts metabolic health outcomes.

Methods: Body composition, including subcutaneous (SAT) and visceral (VAT) adipose tissue and intrahepatic triglyceride (IHTG) content, were determined in 76 adults. Maximal oxygen uptake (VO2max) was determined by cycle ergometry. Insulin sensitivity and insulin secretion were determined by 4-h hyperinsulinaemic-euglycaemic clamp and 3-h meal tolerance test with mathematical modelling, respectively, and the disposition index was calculated. Vitamin D metabolites were measured by mass spectrometry. C-peptide, insulin and lipids were measured by clinical chemistry. Subjects in the lowest quartile for VDM index were matched for age and sex to subjects with high VDM index.

Results: Low VDM index subjects had higher BMI, waist circumference, fat mass, SAT, VAT and IHTG compared to high VDM subjects (all $P<0.05$). Low VDM index was also associated with lower HDL-cholesterol and VO2max (both $P<0.05$). Low VDM index subjects had lower peripheral insulin sensitivity and beta-cell function (both total and static-phase) compared to high VDM index subjects (all $P<0.01$).

Conclusion: The results suggest that the VDM index is a novel indicator of metabolic obesity and diabetes risk. Enhancing vitamin D action in tissues is likely to be associated with improvements in metabolic function. Larger scale studies will be required to ascertain the findings.

OS1.02

Supplementation of human adipocytes with vitamin C reduces hypoxia, inflammation and ER stress and enhances adiponectin secretion. Does obesity reduce vitamin C uptake into adipocytes?

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Introduction: Healthy adipocytes produce a range of adipokines that regulate metabolism and physiology at multiple levels. Adiponectin is a key adipokine with anti-inflammatory, anti-diabetic and cardioprotective properties. In obesity, adipocytes typically become dysfunctional resulting in altered adipokine production and compromised adiponectin secretion. We previously reported that vitamin C is required for efficient secretion of the most metabolically active, high molecular weight (HMW) form of adiponectin from human SGBS adipocytes (1). The aim of this study was to extend these observations using complementary approaches.

Methods: (i) Primary human adipocytes (from lean □, n = 3) were incubated in the absence or presence of vitamin C in the absence or presence of a mixture of TNFα/palmitate (TNF/P) for 48 h. Effects on induction of markers of hypoxia, and inflammatory and ER stress and adiponectin expression and secretion (of both total and HMW) were determined by qRT-PCR and ELISA.

(ii) Circulating levels of vitamin C and HMW adiponectin were determined in human plasma.

(iii) Gulo-/- mice (which are dependent on dietary vitamin C) were supplemented with maintenance dose vitamin C (330 mg/ml) or high dose vitamin C (3300 mg/ml). Circulating levels of total and HMW adiponectin were measured by ELISA.

Results: (i) Vitamin C ameliorated TNF/P induced hypoxia, inflammation and ER stress (all $p<0.05$) and increased HMW adiponectin secretion from control and TNF/P treated adipocytes (≥ 5-fold; all $p<0.01$).

(ii) Levels of vitamin C and HMW adiponectin correlated positively ($n = 105$, $rs = 0.3485$, $p<0.0001$).

(iii) Gulo-/- mice supplemented with maintenance dose vitamin C had lower levels of HMW adiponectin than wild-type littermates. Three week supplementation with high dose vitamin C increased HMW adiponectin 2-fold ($p<0.001$) and this returned to baseline one week after reversal to low dose vitamin C.

The relationship between vitamin C and HMW adiponectin was lost in obesity in (ii) and (iii).

Conclusion: Our data provide evidence that vitamin C has pleiotropic beneficial effects on adipocyte homeostasis and HMW adiponectin and this appears to be compromised in obesity. Future studies are aimed at defining the transporters that mediate vitamin C uptake into adipocytes and whether reduced defects at this level contribute to the metabolic complications of obesity.

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Funding: This work was funded by Diabetes Australia, the Australian Heart Foundation and the University of Lincoln.

OS1.03

Characterization of α-MSH browning effect in the distinct fat depots from obese and lean mice

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Introduction: Browning of white adipose tissue (WAT) is considered a promising approach for obesity treatment. Recently, we demonstrated that α-MSH, a neuropeptide involved in the control of food intake, promotes browning of the subcutaneous WAT of obese C57BL/6 mice, accompanied by weight loss and amelioration of the metabolic profile. Considering this, the aim of this study relies on the characterization of the browning effect promoted by α-MSH in the additional fat depots: mesenteric (mWAT), epididymal (eWAT), retroperitoneal (rpWAT) and brown adipose tissue (BAT) of obese and lean mice. In parallel, it was also evaluated the effect of obesity on the expression of beige/brown-related genes.

Methods: Lean (standard diet) and obese (high-fat diet, 10 weeks) C57BL/6 mice, were intraperitoneally injected with α-MSH (150μg/kg), saline and CL-316,243 (1mg/kg, a β3-adrenoceptor agonist) for 14 days. After euthanasia, adipose tissue depots were collected for qPCR analysis (expression of beige/brown-related genes) and processed for functional (mitochondrial respiration rate) and morphological studies.

Results: Compared with lean mice, fat depots of obese mice presented a downregulation in almost all brown/beige-related genes, except for Ucp1. In fact, in rpWAT Ucp1 levels were 60-fold higher in obese compared to lean mice. In obese mice, α-MSH treatment upregulated 2-fold the Ucp1 mRNA levels in both mWAT and eWAT and 1.6-fold in BAT, having no effect in rpWAT. In eWAT, α-MSH also promoted an increase in 2.5-fold in Cited1, an additional brown/beige-related gene. Accordingly, the adipocyte area in this depot was significantly reduced. Treatment with CL-316,243 induced a pronounced browning effect on eWAT and mWAT of obese mice upregulating the levels of the evaluated brown/beige-associated genes in these depots and promoting a significant improvement in basal and uncoupled respiratory rates in mWAT depot. Interestingly, in lean mice, α-MSH have a different role as it decreases the expression of

several beige/brown-related genes, most significantly in rpWAT and without affecting mWAT.
Conclusion: Obesity downregulates the expression of several browning markers. α-MSH has a dissimilar browning effect in the different adipose tissue depots among obese and non-obese animals. CL-316,243 seemed to act differently from α-MSH having a broader effect among the adipose tissue.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by FCT/MEC (PIDDAC) and FEDER–Fundo Europeu de Desenvolvimento Regional, COMPETE 2020–Programa Operacional Competitividade e Internacionalização (PTDC/BIM-MET/2123/2014); Adriana Rodrigues is supported by FCT (SFRH/BPD/92868/2013).

OS1.04

The melanocortins against obesity-induced adipose tissue dysfunction: role in inflammation, fibrosis and stress response mechanisms

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Introduction: Metabolic dysfunction in obesity is mainly related to the inability of adipose tissue (AT) to store excess lipids and properly expand. Obesity-associated AT inflammation and fibrosis elicit stress response pathways, reduce tissue flexibility and ultimately lead to its pathological expansion. We recently reported that the melanocortin alpha-MSH ameliorates the metabolic profile of obese mice through stimulation of browning of inguinal AT. Given their long-recognized anti-inflammatory properties, we therefore aimed to investigate if alpha-MSH also improve AT remodeling by playing part on inflammatory, fibrotic and stress responses.
Methods: Alpha-MSH (150μg/kg) or saline were injected intraperitoneally in C57BL/6 lean mice (standard diet) and obese mice (high-fat diet, 10 weeks) throughout 14 days. Afterwards, inguinal AT depot was collected for qPCR, western-blotting and immunohistoquemistry experiments. Genes and proteins related to inflammation, fibrosis, oxidative stress, endoplasmic reticulum (ER) stress and autophagy/lipophagy were analyzed.
Results: Treatment with alpha-MSH was able to differentially modulate the expression profile of inflammatory cytokines in lean and obese animals. Overall, it enhanced TGFb expression in lean mice and increased IL-10 levels in obese animals. Similarly, the expression levels of Marco, a pro-inflammatory marker, was significantly decreased only in obese animals treated with alpha-MSH. By contrast, expression of galectin-3, an indicator of macrophage-rich areas, was found augmented in melanocortin-treated obese-animals. Expression of Col6a3 and Mmp3 genes, both related to AT fibrosis, were significantly reduced with alpha-MSH treatment. Regarding ER stress response, both PERK expression and spliced Xbp1 levels increased in inguinal AT of obese animals but dropped significantly after treatment with alpha-MSH. In parallel, alpha-MSH also reduced the levels of the anti-oxidant enzyme SOD2. Concerning autophagy/lipophagy mechanisms, the melanocortin negatively regulated the expression of lamp-2, p62 and Lpl, but only in obese animals.
Conclusion: Our results show clear evidence of the potential of melanocortins as a future obesity therapy by improving the inflammatory, fibrotic and oxidative profile of the inguinal adipose tissue of obese mice and by changing cell response mechanisms like ER stress and autophagy.

Conflict of Interest: None to Disclose.

Funding: FCT/MEC (PIDDAC) and FEDER–Fundo Europeu de Desenvolvimento Regional, COMPETE 2020–Programa Operacional Competitividade e Internacionalização (PTDC/BIM-MET/2123/2014); Adriana Rodrigues is supported by FCT (SFRH/BPD/92868/2013).

OS1.05

Secretin triggers a novel endocrine gut-brown fat–brain-axis in the control of food intake

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Introduction: Brown fat is a major source of non-shivering thermogenesis activated in the cold and in response to food intake. Mitochondria in brown adipocytes, equipped with the Uncoupling Protein 1 (UCP1), exhibit maximal respiration rates without ATP synthesis. Thereby, the chemical energy of glucose and fatty acids is directly dissipated as heat. In the cold, norepinephrine released from the sympathetic innervation of brown fat activates this unique thermogenic mechanism, serving in the defense of body temperature. Pertaining to meal-associated thermogenesis, the mediator and physiological significance for energy balance remain less clear. Previous studies had demonstrated that brown fat promotes satiation and meal-termination. We investigated the molecular mechanism and physiological implication of meal-associated thermogenesis in brown fat in mice [1].
Methods-Results: After overnight fast, refeeding induced an increase in temperature of interscapular brown fat by >2°C within 30 min [1]. Blockade of beta-adrenergic receptors with propranolol (10 mg/kg) did not attenuate this meal-induced rise in brown fat temperature. We therefore searched for non-sympathetic mediators of brown fat thermogenesis [2]. Transcriptome analysis (RNA-Seq) revealed high expression of the secretin receptor in brown fat. Fasting and refeeding largely decreased and increased serum levels of the gut hormone secretin, respectively. In microplate respirometry assays, secretin treatment of primary brown adipocytes induced UCP1-mediated thermogenesis, dependent on secretin receptor expression, to a comparable level as the beta-adrenergic agonist isoproterenol [1,2]. In vivo, we found that secretin treatment increased heat production in brown fat, but also inhibited food intake. To test the impact of endogenous secretin release, we blocked the biological activity of secretin by treatment of mice with a secretin antibody. This intervention attenuated the meal-induced rise in brown fat temperature and increased food intake during refeeding. In Ucp1-knockout mice, secretin did not alter thermogenesis, food intake, and expression of anorexigenic neuropeptides in the hypothalamus [1].
Conclusion: Our results reveal a novel endocrine gut-brown fat-brain-axis in the control of satiation [1]. Pertaining to the role of brown fat as a heater organ in mammalian energy balance, the physiological role of this endocrine axis in the control of energy intake deserves more attention.

1. Conflict of Interest: TUM has filed a patent for these findings.

2. DFG grants to MK (KL973/11&12 and RTG1482 and Else Kröner-Fresenius-Stiftung

[1] Li Y, Schnabl K, et al. Cell 2018 Nov 29;175(6):1561–1574
[2] Schnabl K, et al. Front Physiol 2019; in press: DOI: 10.3389/fphys.2018.01931

OS1.06

Association of circulating branched-chain amino acids (BCAAs) with fuel selection and visceral adipose tissue in adults with obesity

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Introduction: In recent years mounting interest has been directed to the potential role of branched-chain amino acids (BCAAs) in insulin resistance and type 2 diabetes, given their involvement in several metabolic signaling pathways. The interference of BCAAs on obesity-related metabolic features has not been thoroughly clarified. The aim of our study was to explore the relationship between BCAAs, fuel selection and visceral fat in adult subjects with obesity.
Methods: Participants were enrolled among subjects referring to the High Specialization Center for the Care of Obesity (CASCO) at the "Policlinico Umberto I" University Hospital, Sapienza University, Rome, Italy. Inclusion criteria were Body Mass Index (BMI) ≥ 30 kg/m^2, and age: 18-65 years. Body composition was evaluated by DXA; indirect calorimetry was performed (QuarkRMR, COSMED, Italy), and respiratory quotient (RQ) was calculated based on respiratory gas exchanges (VCO_2/VO_2). Substrate oxidation was calculated according with equations by Frayn. Visceral adipose tissue (VAT) was quantitatively assessed through magnetic resonance (MR) imaging. Circulating BCAAs were measured. HOMA-IR was calculated. The International Physical Activity Questionnaire (IPAQ) was administered.
Results: 80 participants were included (15 men and 65 women), age: 48.3 ± 12.6 years, BMI: 37.7 ± 4.9 kg/m^2. Plasma BCAAs were negatively correlated with fat oxidation (r = -0.48, p<0.001) and positively correlated with carbohydrate oxidation (r = 0.58, p<0.001). Multiple regression analyses revealed a positive association between circulating BCAA levels and RQ (beta:1.03, SE:0.25, p<0.001), and between BCAA levels and visceral fat (VAT, beta:18957.7, SE:9030.9, p = 0.04), independent of age, sex, HOMA-IR, physical activity level.
Conclusion: BCAAs levels were positively associated with RQ, carbohydrate oxidation, and visceral fat depots, and inversely associated with fat oxidation regardless of insulin resistance and physical activity level. The role of BCAAs in carbohydrate and lipid metabolism, with emphasis on lipid partitioning, needs to be further elucidated in subjects with obesity.

Monday, 29 April 2019

OS2 - Consequences of Overweight in Children and Adolescents

OS2.01

Associations between childhood body size and risk of renal cell carcinoma in adulthood

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Introduction: Adult overweight is positively associated with renal cell carcinoma (RCC), however, factors early in life may also affect the RCC susceptibility. This study examined whether child body mass index (BMI, kg/m^2) and height were associated with adult RCC.
Methods: This study includes 301,422 individuals (152,573 men) from the Copenhagen School Health Records Register, who were born 1930-1985. Weights and heights were measured at annual school health examinations at the ages 7-13 years. Using BMI, children were categorized as normal-weight or overweight based on age- and sex- specific cut-offs suggested by the International Obesity Task Force. Cases of RCC were identified by linkage to the Danish Cancer Registry. Cox proportional hazards regressions were used to estimate hazard ratios (HR) and 95% confidence intervals (CI).
Results: During a median of 31.8 years of observation, 1,010 individuals (680 men) were diagnosed with RCC. Among men and women significant and positive associations were observed between childhood BMI and height and RCC (at age 13 years BMI; HR: 1.14, 95%CI: 1.06-1.23 and height; HR: 1.12, 95%CI: 1.05-1.20 per z-score). Generally, the associations with childhood BMI and height were weaker in women than in men, although not significantly different.
Compared to children with a normal-weight at 7 and 13 years, children with overweight at both ages did not have increased risks of RCC, whereas children with normal-weight at 7 years and overweight at 13 years did (HR: 1.67; 95% CI: 1.24- 2.26).
Compared to children with an average height at 7 and 13 years, children who were persistently taller than average (a z-score of 0.5 at both ages; HR: 1.06; 95% CI: 1.03-1.10) and children who grew from average to above average height (a z-score of 0 at 7 years and 0.5 at 13 years; HR: 1.08, 95% CI: 1.01-1.15) had increased risks of RCC.
Conclusion: The results suggest that heavier and taller children have increased risks of RCC and opens new areas of exploration for understanding the etiology of this cancer form.

Conflicts of Interest: None. At present, KDM works at Pfizer ApS (Denmark), however, her work in relation to this review was conducted while KDM worked at the Center for Clinical Research and Prevention.

Funding: European Research Council Grant Agreement no. 281419, Dr. Sofus Carl Emil Friis and wife Olga Doris' Fund.

OS2.02

Anxiety- and depressive disorders in children and adolescents with obesity – a nationwide study in Sweden

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Introduction: Anxiety and depression are more common in children with obesity than in children of normal weight. However, it is unclear whether obesity is a risk factor for anxiety and depression independently of other known risk factors. Previous studies are limited by small sample sizes and methodological short-comings including self-reported assessment of weight status, anxiety, and depression. The present study aimed to investigate if obesity is an independent risk factor for anxiety or depression in a cohort of young individuals using robust measures of exposure and outcome.
Methods: Children aged 6-17 in the Swedish Childhood Obesity Treatment Register (2005-2015) and 18 years or younger at follow-up were included (n = 9 236) and compared with a matched (sex, year of birth and living area) group from the general population (n = 44 484). The main outcome was diagnosis of anxiety- and/or depression identified through ICD codes (10th version) or dispensed prescription drugs. Hazard ratios (HR) with 95% confidence intervals (CI) from Cox regression analyses were adjusted for several known confounders. Sensitivity analyses were performed, estimating risks after excluding children with neuropsychiatric disorders or heredity for anxiety/depression.
Results: Obesity was an independent risk factor for anxiety and depression in children and adolescents in both girls and boys after adjusting for migration background, neuropsychiatric disorders, parental psychiatric illness and socioeconomic status. Girls in the obesity cohort had 45% higher risk for anxiety and depression compared to girls in the general population (adjusted HR 1.45, 95% CI 1.30-1.61; p<0.0001). The risk among boys with obesity was similar (adjusted HR 1.39, 95% CI 1.23-1.57; p<0.0001). In sensitivity analyses, risks of anxiety and depression

remained essentially unchanged in girls (adjusted HR 1.41, 95% CI 1.12-1.78; p<0.01) and were even slightly higher in boys compared with results from the main analyses (adjusted HR 2.06, 95% CI 1.56-2.72; p<0.0001).
Conclusion: After taking important confounders into account, children with obesity have higher risks of anxiety- and/or depressive disorders compared with a matched group from the general population. This suggests that obesity is independently associated with risk for anxiety and depression in children and adolescents.

OS2.03

Waist circumference, cardiorespiratory fitness and physical activity as predictors of health-related quality of life (HRQoL) in children: a prospective cohort study

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Background: Health-related quality of life (HRQoL) is an important outcome in its own right, representing the ultimate goal of all health interventions. Thus, studies on predictors of HRQoL in children and adolescents from the general population have received increased attention. However, the literature is hampered by a paucity of prospective studies. Thus, our aim was to examine the predictive value of waist circumference, cardiorespiratory fitness, and physical activity on future self-reported HRQoL in children.
Methods: We conducted a prospective cohort study over 7 months that included 1129 school children (average age, 10.2 years) from Sogn and Fjordane County, Norway. HRQoL was assed using the validated Kidscreen-27 questionnaire. The physical and psychological post scores of the questionnaire were the dependent variables. The independent variables were pre-scores of waist circumference (cm), cardiorespiratory fitness assessed by the Andersen intermittent field running test (meters) and moderate to vigorous physical activity using an accelerometer (minutes). Age and gender were included as covariates. No interaction effects were seen between gender and the independent variables (data not shown), therefore girls and boys were included in the same analyses. We conducted multiple linear regression analysis, and report standardised coefficients (β) and P-values.
Results: Waist circumference (β = -0.10; P = 0.004), cardiorespiratory fitness (β = 0.20; P<0.001) and moderate to vigorous physical activity (β = 0.10; P = 0.003) independently predicted future physical HRQoL. Only cardiorespiratory fitness predicted future psychological HRQoL (β = 0.12; P = 0.003).
Conclusion: Higher waist circumference predicted lower physical HRQoL, while higher moderate to vigorous physical activity predicted higher physical HRQoL. Higher cardiorespiratory fitness predicted both higher physical and psychological HRQoL. Although the demonstrated effect sizes are small, our results suggest targets for interventions that may positively influence HRQoL in children.

Conflict of Interest: None.

Funding: This study was funded by the Research Council of Norway (ID number 221047/F40) and by Western Norway University of Applied Sciences.

OS2.04

Ten-session family-based treatment for teenagers with obesity and psychiatric disorders with six-months follow-up

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Introduction: Obesity in childhood and adolescence is associated with raised likelihood of psychosocial and medical consequences and increased mortality rates, constituting a major treatment challenge in adulthood. Effective treatment options are needed, as some studies have indicated that psychiatric disorders in adolescents with obesity can be negatively related to weight loss during treatment.
Methods: Twenty-five children (48% male) aged 12.0 to 16.3 years (mean 13.4; sd 1.4) of 30 that were referred for family-based behavioural treatment at the Children's Medical Centre in Iceland in 2017–2018 participated. The clinic has no exclusion criteria. The ten-session treatment model was as follows: 1) One initial appointment with physician and nurse; 2) three seminars provided by a multidisciplinary team including a psychologist, a physician, a nutritionist and a sport-scientist. Teenagers and parents attended all sessions together. The topics were as follows: Positive body image, appetite-awareness training, sleep hygiene, nutrition and exercise options; 3) Three individual goal setting sessions with a psychologist using motivational interviewing techniques, and an additional session with a nutritionist if required and 4) three follow-up appointments with a psychologist at one, six and 12 months. The outcome measure was change in BMI SDS after minimum of six-months follow-up, comparing teenagers with psychiatric disorders to those without.
Results: Mean BMI SDS (Body Mass Index Standard Deviation Score) at treatment onset was 3.26 (sd 0.59) and mean duration 9.0 months (sd 3.2). The average change in BMI SDS after treatment was -0.03 (sd 0.28; range -0.51–0.65). Sixty-four percent of participants lost weight during treatment, of which 8% lost more than 0.5 BMI SDS. Nearly a third (32%) of the participants gained less than 0.5 BMI SDS. Over two-thirds (68.0%) had at least one psychiatric disorder of which 20% had four disorders or more. Anxiety was the most prevalent disorder (40%) followed by Attention- Deficit/Hyperactivity Disorder (36%). A further 16% had depression and 12% had Autism Spectrum Disorder. No differences were detected in the initial BMI SDS or mean change in BMI SDS during treatment, between teenagers with and without disorders.
Conclusion: The ten-session family-based treatment for teenagers with obesity and psychiatric disorders offers promising results in a general outpatient paediatric obesity centre. Although the weight loss was not substantial, a plateau was reached in BMI SDS in a group of participants who in other studies have been shown to be prone to gain weight. Further follow-up is needed to investigate long-term effectiveness.

OS3 - Infant, Child and Adolescent Obesity

OS3.01

Primary prevention of fat and weight gain among obesity susceptible healthy weight preschool children. Main results from the "Healthy Start" randomized controlled intervention

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Introduction: Successful treatment of obesity is well documented among overweight and obese children, but the real public health challenge lies in understanding the primary drivers behind excessive weight gain before overweight is manifest. The objective of this primary prevention RCT was therefore to examine if excessive weight and fat gain can be prevented among still healthy weight, but obesity susceptible, young children aged 2-6 years.
Methods: Eligible children were identified based on information from national registries on either a high birth weight, maternal pre-pregnancy obesity, or maternal low educational level, and were randomized into intervention- or control group. Trained project staff took anthropometric measurements at baseline and after 15 months of follow-up. All children, overweight at baseline, were excluded from subsequent analysis (n = 92),

while all normal weight children were included (n = 543). The intervention delivered improvement in diet and physical activity habits, optimization of sleep quantity and quality and reduction of stress in the family.
Results: Intention-to-treat analyses showed a higher gain in fat free mass (β = 0.35 (95%CI 0.01;0.69, p = 0.05)) and a lower gain in
%-fat mass (β = -1.96 (95%CI -3.69;-0.23, p = 0.03)) in the intervention group compared to the control group, but no overall differences in BMI z-score gains (p = 0.29).
Children aged <4 years had lower gain in %-fat mass (β = -2.75 (95%CI -5.00;-0.50, p = 0.02) vs. β = 1.26 (95%CI -3.24;0.72, p = 0.21)), and a higher gain in fat free mass (β = 0.44 (95% CI -0.09;0.97, p = 0.10) vs. β = 0.24 (95% CI -0.23;0.72, p = 0.31)) than children ≥ 4 years.
Conclusion: This primary obesity prevention intervention conducted over 15 months among still healthy weight young children susceptible to future obesity, prevented excessive gain in body fat, and increased gain in lean mass. Thus, the intervention improved growth and body composition. Intervention effects seemed to be strongest among children aged less than 4 years, suggesting that primary obesity prevention should start already among toddlers. This intervention is among the first to focus on the primary drivers of weight and fat gain among healthy weight children, and thus more primary obesity prevention interventions are urgently needed.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by funded by TrygFonden (grant: 7984-07, 7106-09, and 7-10-0330), the Danish Medical Research Council (grant: 271-07-0281), and Helsefonden (grant: 2008B101).

OS3.02

Influence of child emotional and behavioral problems on weight status: a randomized controlled trial of obesity treatment in preschoolers

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Introduction: Few studies have explored associations between child behavioral problems and obesity in preschoolers. The aim of this study is to assess emotional and behavioral problems before and after an obesity intervention for young children, and to examine the relationship between changes in child behavior and changes in weight status.
Method: The study includes 77 children (4-6 years, 53% girls, mean Body Mass Index (BMI) z-score 3.0 (SD 0.6)) who participated in the More and Less Study, a family-based randomized controlled trial (RCT) intervention. Families were randomized either to a parent-only treatment focusing on evidence-based parenting practices or to standard treatment focusing on lifestyle changes. The children's heights and weights were measured by healthcare professionals at baseline and 12 months post-baseline. The parents (mean age 38.1 years, mean BMI 29.3, 43% with university education) rated their children's behaviors on the Child Behavior Checklist (CBCL) for ages 1.5-5 years, a validated questionnaire that measures psychosocial health and functioning, encompassing emotional and behavioral problems. Changes in child behavior during treatment were examined through paired samples t-tests; the influence of child behavior on treatment effects was examined through linear regressions.
Results: Child emotional and behavioral problems were significantly improved after obesity treatment for the total sample and for the standard group. Lower scores were found for Emotional Reactivity, Sleep Problems, Affective Problems, Aggressive Behavior, Externalizing Behaviors, Oppositional Defiant Problems, and Total Problems. Child behavior significantly affected obesity treatment results: Attention Problems and ADHD at baseline contributed to increasing BMI z-scores while Oppositional Defiant Problems, Externalizing Behaviors and a higher number of behavioral problems predicted decreasing BMI z-scores. Reductions in Depression and Anxiety symptoms were associated with increasing BMI z-scores.
Conclusion: This study is unique in assessing how preschool-age children's behavior develops during obesity treatment, and in identifying associations between behavioral patterns and obesity treatment effects. Child emotional and behavioral problems were improved post-treatment and child behaviors influenced treatment results. The results suggest that family-based obesity interventions may help in reducing emotional distress and obesity rates among young children. Future studies should examine how parents influence child behavior during and after obesity treatment.

OS3.03

The relationship between mother and child eating behaviours and child weight at five years of age: Findings from the ROLO Kids Study

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Introduction: Childhood obesity is an ongoing global epidemic and there are many factors influencing the onset of this disease in childhood. Such factors include genetics, lifestyle habits, and feeding practices. However, there is a paucity of data examining the relationship between maternal and child eating behaviours in the literature surrounding childhood obesity. The aim of our investigations was to determine if a relationship exists between childhood overweight and obesity, maternal eating behaviours, and child eating behaviours at 5 years of age.
Methods: Two-hundred and sixty-eight mother-child dyads were recruited from the ROLO Kids study, a longitudinal birth cohort study following up participants born into the ROLO study in the National Maternity Hospital, Dublin, Ireland. Anthropometric measurements of height, weight, and skinfold measurements were collected, and BMI centiles were calculated. Eating behaviours were measured using the Three Factor Eating Questionnaire for the mothers and the Child Eating Behaviour Questionnaire for the child. Both questionnaires were completed by the mother when the child turned 5 years of age. Associations were investigated using Mann-Whitney U tests and linear regression to adjust for confounders.
Results: In this cohort, 14.5% of 5 year olds had overweight and 8.6% had obesity. Maternal emotional eating and uncontrolled eating were positively associated with child emotional eating and food responsiveness (P<0.05). Child food responsiveness was positively associated with child adiposity and BMI (P<0.05) and emotional over eating was positively associated with child adiposity (P<0.01) while slow eating and emotional under eating were both negatively associated with BMI (P<0.01 and 0.05 respectively). Comparing children with overweight or obesity to normal weight, maternal uncontrolled eating scores were higher and child emotional over eating and enjoyment of food were higher (P<0.05).
Conclusion: Maternal eating behaviours influence that of her child and we identified differences in eating behaviours in 5 year olds with overweight and obesity. These novel findings are important in the prevention and treatment of childhood obesity. Clinicians should pay attention to both maternal and child eating behaviours in order to develop interventions to reduce the incidence of childhood overweight and obesity.

OS3.04

A core outcome set for infant feeding interventions to prevent childhood obesity

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Introduction: Parent's infant feeding behaviours are implicated in the aetiology of childhood obesity. Lack of outcome standardisation in trials of infant feeding interventions limits examination of intervention effects and mechanisms of change. Core outcome sets represent an agreed-upon minimum outcomes to be measured in trials of a specific health condition. The aim of this research is to develop a core outcome set for infant feeding interventions to prevent childhood obesity.
Methods: Core outcome set development was conducted in four stages: (1) systematic review of 126 papers to identify all infant feeding outcomes in the extant literature, (2) group meeting with 12 stakeholders to clarify and discuss outcomes identified, (3) prioritisation of outcomes using the e-Delphi technique with an international panel of 179 stakeholders, (4) consensus meeting with 7 stakeholders to reach consensus on the final core outcome set. Stakeholders were: Researchers, Healthcare Professionals, Parents, and Childcare Professionals.
Results: Twenty-six outcomes were identified for inclusion in the core outcome set. These were categorised into the following 9 outcome domains: 'breast and formula feeding', 'introduction of solids', 'parent feeding practices and styles', 'parent knowledge and beliefs', 'practical feeding', 'food environment', 'dietary intake', 'perceptions of infant behaviour and preferences', and 'child weight outcomes'.
Conclusion: This core outcome set represents the minimum outcomes that should be measured and reported in all future trials of infant feeding interventions to prevent childhood obesity. Development and use of this core outcome set with improve evidence of syntheses and development of future infant feeding interventions to prevent childhood obesity.

Conflict of Interest: The authors have no conflicts of interest to disclose.

Funding: Research relating to this abstract was funded by a Health Research Board Interdisciplinary Capacity Enhancement Award (HRB ICE 2015-1026), an Irish Research Council New Foundations Award, and a Health Research Board Trials Methodology Research Network Summer Studentship.

OS3.05

Body mass index and internalising symptoms from early childhood to mid-adolescence: co-morbidity, co-development and temporal precedence

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Introduction: Obesity and internalising mental illness are childhood-onset, have common risk factors and are leading causes of disease burden. This study examined co-morbidity, co-development and temporal precedence in body mass index (BMI) and internalising symptoms longitudinally from early childhood through to mid-adolescence. Sex differences and socio-economic confounding were also investigated.
Methods: Data were from the Millennium Cohort Study, a nationally representative prospective birth cohort study in the UK consisting of individuals born in 2000-02. BMI was estimated from objectively measured height and weight and internalising symptoms were assessed using parental reports. Parent education, occupational status and equivalised family income were used as indicators of socio-economic position. 17,215 participants were included in the analyses (48.76% female) using data from assessments at ages 3, 5, 7, 11 and 14 years.
Results: Obesity and internalising problems were more likely to co-occur at ages 11 and 14 (age 11 OR = 1.68 [1.38, 2.05]; age 14 OR = 1.49 [1.22,1.83]) but there was no evidence of co-occurrence in early childhood (age 3 OR = 1.02 [.69, 1.5]). Piecewise latent growth models indicated no co-development of BMI and internalising symptoms from 3 to 7 years (r = .01), whereas their slopes were associated between 7 and 14 years (r = .23). Regarding temporal precedence, cross-lagged models indicated no cross-domain pathways before age 7 with some cross-domain pathways emerging between ages 7 and 14 years. Socio-economic position attenuated some of these associations, leaving a BMI to internalising pathway in later childhood (i.e., from 7 to 11 years) and an internalising to BMI pathway in early adolescence (from 11 to 14 years). There were no sex differences in the co-occurrence, co-development or temporal precedence estimates.
Conclusion: BMI and internalising symptoms become more associated and reciprocal as children get older. While some of their temporal associations can be attributed to socio-economic factors, cross-domain temporal pathways were found in later childhood and early adolescence even after controlling for socio-economic position suggesting that social, physiological and psychological processes begin to play an increasingly important role in these associations. Prevention and early intervention efforts could benefit from targeting both obesity and internalising mental health outcomes in childhood.

OS4 - Brain/Gut in Obesity

OS4.01

Hypothalamic ATP is a potential target for the treatment of leptin resistance

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Leptin is an adipocyte-derived hormone involved in the regulation of food intake and energy expenditure. Obese subjects generally have leptin resistance and leptin sensitizers are expected as anti-obesity drugs. It has been reported that endoplasmic reticulum (ER) stress in the hypothalamus plays a key role in the pathogenesis of leptin resistance. Recently, two natural compounds, celastrol and withaferin A were reported to alleviate hypothalamic ER stress and restore the sensitivity to leptin (Cell 2015, Nat Med 2016). However, the molecular mechanism remains completely unknown. Under ER stress, cells require appreciable amounts of ATP for unfolded protein response. ATP-deficient cells are vulnerable to ER stress and treatment of ATP protects cells against ER stress. For these reasons, we investigated the role of ATP in the development of hypothalamic ER stress and leptin resistance. High fat diet induces ER stress and leptin resistance in the hypothalamus. We measured ATP concentrations in the hypothalamus of mice under high fat diet with or without celastrol and withaferin A treatment. Hypothalamic ATP concentrations were measured by luciferase activities. High fat diet decreased hypothalamic ATP concentrations. Celastrol and withaferin A suppressed body weight gain and food intake and increased hypothalamic ATP concentrations under high fat diet. Under standard diet, celastrol and withaferin A had no effect not only on body weight and food intake but also on hypothalamic ATP concentrations. In ob/ob mice, celastrol and withaferin A increased hypothalamic ATP concentrations but showed only minimal effect on body weight and food intake, suggesting that increase of hypothalamic ATP

concentrations by celastrol and withaferin A is not the secondary effect of metabolic improvement. Taken together, it is suggested that celastrol and withaferin A maintain leptin sensitivity by up-regulating hypothalamic ATP concentrations under high fat diet. Hypothalamic ATP has a crucial role in the pathogenesis of leptin resistance.

OS4.02

AMPK activation in POMC neurons increases energy expenditure in vivo

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The arcuate nucleus (ARC) of the hypothalamus plays a key role in the regulation of energy balance, in response to peripheral signals such as hormones and nutrients. Recent studies have revealed the complexity of the ARC, with 34 distinct neuronal populations being identified (1). Neurons that express Proopiomelanocortin (POMC) lead to a negative energy balance (2). AMP-activated protein kinase (AMPK) acts as a master energy sensor and has been shown to regulate both food intake and energy expenditure (3,4), and deletion of the α2 subunit of AMPK in POMC neurons results in a reduction of energy expenditure and development of obesity (5).

In order to examine further the role of AMPK in the ARC, we investigated the effect of AMPK activation in POMC expressing neurons on energy homeostasis. We used a mouse model expressing a gain-of-function mutation in the γ1 subunit of AMPK and crossed this with mice harbouring Cre-recombinase under the control of the POMC promoter (generating D316A-TgPOMC-Cre mice).

Our results show that D316A-TgPOMC-cre mice fed a standard chow diet are lighter than control mice and have reduced subcutaneous and gonadal fat mass. Moreover, gain-of-function AMPK mice have increased oxygen consumption, indicating increased energy expenditure. This was accompanied by an increase in the protein level of UCP1 in brown adipose tissue (BAT) and by an increase of the expression of Ucp1 and β3-adrenergic receptor in subcutaneous white adipose tissue (WATsc). Histological analysis revealed that D316A-TgPOMC-cre mice have smaller adipocytes in both BAT and WATsc. Interestingly, D316A-TgPOMC-cre mice housed at 30˚C had a lower bodyweight relative to control mice, suggesting that AMPK activation in POMC neurons increases energy expenditure under thermoneutral conditions.

These results raise the possibility for the development of drugs that could target AMPK specifically in the POMC neurons and combat obesity.

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Conflicts of Interest: None declared.

Funding: This work was funded by the Medical Research Council UK.

OS4.03

Acetate is associated with insulin secretion independently from the level of overweight and insulin resistance in obese children

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Introduction: Alterations in gut microbiota structure and function have been associated with obesity. Many metabolic functions of gut microbiota are modulated by the action of short-chain fatty acids (SCFAs: acetate, propionate, butyrate), end products of colonic fermentation of dietary fiber by the bacteria living in the gut. In particular, acetate was proposed to affect also glucose metabolism. The aim of this study was to explore the association between SCFAs measured in post-absorptive condition (12 hours fasting) and insulin secretion and sensitivity in a population of obese children.

Methods: 52 obese children [boys:29, age:12.5 (2.1) years, z-BMI: 2.78(0.88)], underwent a prolonged OGTT lasting 180', used to estimate β-cell function and insulin clearance by modeling (1) and several OGTT-derived indices of glucose metabolism. Serum SCFAs were measured by HPLC-MS.

Results: Significant associations between acetate and indices of insulin secretion [Insulinogenic Index (IGI: r = -0.432, P = 0.002), Proportional control (r = -0.33, P = 0.018), Derivative control (r = -0.76,P = 0.007)], indices of insulin sensitivity [Matzuda Index (r = 0.355, P = 0.011)] and insulin resistance [HOMA-IR Index: r = -0.37,P = 0.006)] as well as Insulin Clearance (r = 0.366, P = 0.009) were found. No association between acetate and Disposition Index (DI: r = -0.17, P = 0.24) as well as between propionate or butyrate and all the OGTT-derived indices were found. IGI and HOMA-IR were significantly associated (r = 0.52, P<0.001). Generalized linear regression analysis showed that acetate was able to explain IGI inter-individual variability (B: -8.3, P = 0.04) while age, BMI, and HOMA-IR (covariates) as well as gender and puberty (fixed factors) were all not significant (model R2 = 0.43, P = 0.03).

Conclusion: A negative association between acetate and insulin secretion, adjusted for confounders, was observed in obese children. Further studies will allow to assess if increased circulating acetate promoted by diet manipulation or direct intake, may affect insulin resistance contributing to reduce compensatory insulin secretion in obese children, favoring an improved metabolic condition.

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Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Department of Surgical Sciences, Dentistry, Paediatrics and Gynaecology of the University of Verona (Italy).

OS4.04

Gut microbiota play a key role in the induction of beneficial effects of butyrate on host energy metabolism

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Introduction: We recently showed that dietary butyrate reduces food intake and improves energy expenditure by activating brown adipose tissue (BAT) as dependent on vagus nerve signaling and related to the change

of composition and diversity of gut microbiota. Since gut microbiota can induce vagus nerve activity, in the present study we aimed to investigate the role of gut microbiota in the beneficial effects of butyrate on energy metabolism.
Methods: Conventional or gut microbiota depleted APOE*3-Leiden. CETP mice, a well-established translational model for developing diet-induced human-like metabolic syndrome, were fed a high-fat diet (HFD) with or without sodium butyrate for 7 weeks. In addition, the metabolic benefits of gut microbiota mediated by oral butyrate was investigated in gut microbiota depleted APOE*3-Leiden.CETP mice which received fecal microbiota transplantation and were treated with HFD for 7 weeks.
Results: In conventional mice, butyrate reduced food intake and completely prevented the HFD-induced increase in body weight gain. In addition, butyrate accelerated the clearance of glycerol tri[3H]oleate from plasma, accompanied by increased uptake specifically by BAT, confirming that butyrate enhances plasma triglyceride clearance by activating BAT. In contrast, depletion of gut microbiota by antibiotics completely abolished the butyrate induced food intake reduction and increased uptake of TG by BAT. Moreover, fecal microbiota transplantation from butyrate-fed donor mice reduced food intake and prevented the HFD-induced obesity.
Conclusion: Gut microbiota play a key role in the beneficial effects of butyrate on host energy metabolism with respect to reducing appetite and preventing HFD-induced obesity.

OS5 - Maternal Obesity

OS5.01

Childhood body mass index and risk of hypertensive disorders during pregnancy

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Introduction: Women with overweight or obesity are at greater risks of hypertensive disorders in pregnancy than women with normal-weight. As excess adiposity takes time to develop, we investigated if body mass index (BMI; kg/m^2) in childhood was associated with risks of developing hypertensive disorders during pregnancy.
Methods: We used data on 162,559 girls from the Copenhagen School Health Records Register, who were born from 1930-1989 and had annual height and weight measurements from ages 7-13 years. Overweight (including obesity) at age 13 years was defined according to the International (International Obesity Task Force; IOTF) body mass index cut offs (BMI ≥22.49 kg/m^2). Through national registers we identified girls who later became pregnant, and those who developed gestational hypertension, preeclampsia or eclampsia from 1978-2017. Women were included in the study if they were in the age-range of 18-45 years, nulliparous and gave birth to a singleton in their first recorded birth. Odds ratios (OR) for the associations were estimated by multivariate logistic regression.
Results: Among the 48,029 women who were eligible for this study, 1.39% developed gestational hypertension, 3.64% developed preeclampsia and 0.06% developed eclampsia. BMI at ages 7 and 13 years was significantly associated with gestational hypertension (OR: 1.21, 95% CI: 1.12-1.30 and OR: 1.27, 95% CI: 1.16-1.39 per unit of BMI z-score, respectively) and preeclampsia (OR: 1.19, 95% CI: 1.14-1.25 and OR: 1.36, 95% CI: 1.29-1.43 per unit of BMI z-score, respectively) when adjusted for maternal age at delivery and maternal birth cohort (all p-values <0.001). Girls with overweight (including obesity) at age 13 years were more likely to develop gestational hypertension and preeclampsia during pregnancy (OR: 1.92, 95% CI: 1.48-2.48 and OR: 2.22, 95% CI: 1.91-2.59, respectively, all p-values<0.001) than normal-weight girls. No associations with eclampsia were observed.
Conclusion: A higher childhood BMI at ages 7 and 13 years in girls was significantly associated with the later risk of developing gestational hypertension and preeclampsia during pregnancy.

Conflict of Interest: None.

Funding: Independent Research Fund Denmark, Medical Science, no. DFF-7016-00390.

OS5.02

A systematic review and meta-analysis of intervention characteristics in postpartum weight management using the TIDieR framework: a summary of evidence to implementation

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Introduction: Postpartum weight retention is a significant contributor to obesity in reproductive-aged women but the key implementation characteristics of postpartum weight management interventions have not been systematically identified to inform policy and practice. This study aimed to evaluate the intervention characteristics associated with weight loss in postpartum.
Methods: We searched MEDLINE, CINAHL, EMBASE, PSYCINFO, and EBM databases to identify lifestyle intervention RCTs in postpartum women (within 2 years after birth) published up to January 2018. Program elements were extracted according to the Template for Intervention Description and Replication (TIDieR) checklist.
Results: From 4512 studies, 33 studies were included in the systematic review and meta-analysis (n = 4960 women). Health professional-delivered interventions had significantly greater weight loss than those delivered by non-health professionals (mean difference, 95% confidence interval: -3.22 kg [-4.83, -1.60] vs -0.76 kg [-1.41, -0.12], P = 0.006 for subgroup differences). Studies with self-monitoring had significantly greater weight loss (-3.03 kg, [-4.18, -1.88] vs -0.84 [-1.61, -0.06]) than those without. Diet and physical activity combined had significantly greater weight loss (-3.29 kg [-4.51, -2.06] vs -0.53 [-1.52, 0.46]) compared with physical activity-only interventions. The extent of weight loss was not influenced by intervention intensity (duration, number of sessions) and setting (individual or group).
Conclusion: The findings suggest lifestyle interventions should include self-monitoring, diet and physical activity, and delivery by health professionals as core intervention components. To this end, increasing the capacity of health professionals to provide weight management support to postpartum women is important. Future research should focus on models of care to implement these interventions using these core components in a real world setting.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Australian National Health and Medical Research Council and National Heart Foundation fellowships.

OS5.03

Use of an active control in weight management research - the Supporting MumS Study

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Purpose/Aim: It is challenging to retain participants in the usual care groups of RCTs that test weight management interventions because of dissatisfaction with randomisation, particularly postpartum women1. Retention is a key trial design consideration as differential attrition between study groups will compromise the internal validity of the study. To try to avoid differential attrition, an active control group was employed in the Supporting MumS Study (SMS Study), a pilot RCT designed to examine the feasibility of a text message delivered lifestyle intervention for weight loss and maintenance of weight loss in the postpartum period. Usefulness of the active control was examined based on satisfaction with randomisation and group specific retention rates.
Methods: 100 women, up to 2 years postpartum, with BMI ≥25 kg/m^2 were recruited and randomised to the active control group, who received messages on child health and development (n = 49), or the intervention group who received messages on weight management. Acceptability of the active control was measured by exploring preference for group randomisation (in semi-structured interviews at 3 months), satisfaction with messages (single item rating at 12 months) and group-specific retention rates at 12 months.
Results: At 3 month interviews, 37% of the control group stated they had a preference for the other group compared to only 11% of the intervention group. Despite a high preference for the other group, women reported being satisfied with their allocation in interviews, e.g. "I think at the start I would've preferred probably to be on the diet and physical activity, but now I suppose I'm quite happy that I was on the other one", in the satisfaction rating: of those completing follow-up at 12 months, mean text message satisfaction score was 96.9% very/mostly satisfied in the active control and 91.7% very/mostly satisfied in the intervention group. Fifteen women became pregnant during the follow-up and had to withdraw for that reason. Excluding pregnancies, 36/ 42 (85.7%) women in the intervention group and 39/ 43 (90.7%) women in the control group completed the 12 month follow-up.
Conclusion: The use of an active control was acceptable to postpartum women participating in a text-message based weight management study and is likely to have contributed to the high retention rates in the control group in this pilot trial.

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Conflict of Interest: None Disclosed.

Funding acknowledgement: NIHR PHR (14/67/20) and Harold McAuley Research Scholarship.

OS5.04

Quality study of a multidisciplinary intervention during pregnancy: Contrepoids® Maternity

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Introduction: In the maternity department of the Geneva University Hospitals, 10% of pregnant women suffer from obesity. Pre-conceptional obesity is known as a risk factor for obstetrical complications. Since July 2016, our department have set up a multidisciplinary program with a doctor specialized in therapeutic education, a dietitian, a psychologist, a physiotherapist, an obstetrician and a midwife, which come together to consult patients. The common goal is to educate couples to a healthier lifestyle, help women to manage weight gain during pregnancy and help them to lose weight after giving birth. After 2 years of activity, this study seeks to measure the impact of the communication around the program, the quality of the exchanges during the appointments and to know the reasons to stop postpartum management.
Method: A satisfaction questionnaire was sent by letter or e-mail to patients followed by the program. A reminder was sent by email 3 weeks later. If there were no response by email or by post, patients were contacted by phone and the questionnaire was filled during the interview.
Results: Between July 2016 and May 2018, the team met with 214 women. Following the sending of the questionnaire by post or e-mail then telephone interviews, the participation rate was 35%. 90% of patients interviewed were advertised the program by the midwives in consultations, 4% after hearing it in the media and 3% send by their gynaecologists. There are few spontaneous contact even though more than 70% of patients knew that obesity is a risk factor during pregnancy. More than 50% did not know that a lifestyle intervention was possible during pregnancy. Concerning the care received, 97% of patients were satisfied. 80% felt involved in their care, with realistic goals for 67%. Only 21% continued postpartum follow-up, 25% stopped it for lack of time with a new born, 14% for financial reasons.
Discussion: Contrepoids Maternity program offers multidisciplinary and longitudinal monitoring of the mother-child relationship in order to educate on dietary rules and prevent family obesity. A systematic reminder in 1 month postpartum is necessary to re-motivate them to follow the program for postpartum weight loss assistance. The financial constraint is a frequent reason for stopping postpartum follow-up, so it would be a progress for patient if the care could be taken care of by the insurance like the care during pregnancy during 1 year post partum.
Conclusion: Contrepoids Maternity program was considered very satisfaying by the women who followed it. The development of a local network with a better collaboration of the local practitioners could strengthen participation in postpartum care of the mother and child couple.

OS6 - Lifestyle and Health

OS6.01

The association of body composition with fatal and non-fatal cardiovascular outcomes from hospital records in the UK Biobank

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Introduction: Obesity, usually assessed as the body mass index (BMI) is a risk factor for cardiovascular disease (CVD), but raised BMI does not differentiate between muscle and fat tissue. There is uncertainty about the

relative contribution of skeletal muscle mass (SMM) and fat mass (FM) to CVD outcomes.

Methods: We included 367,168 participants from the UK Biobank study, recruited in 2006/10 with measures of weight, height and body composition by bioelectrical impedance. All were of white ethnicity, with no prior disease likely to affect body composition. Appendicular SMM index (ASMI, SMM in limbs divided by height2) and FM index (FMI, whole-body FM divided by height2) were calculated. Participants were followed via record linkage with NHS hospital episode statistics to ascertain fatal and non-fatal CVD outcomes including coronary heart disease, congestive heart failure and stroke.

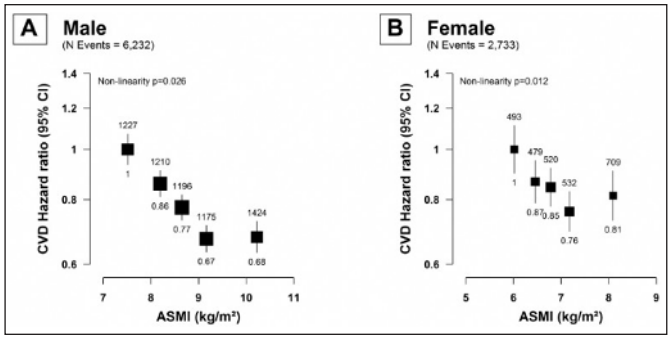
The primary analysis consisted of sex-specific Cox regression models to estimate the shape and strength of the association of quintiles of FMI and ASMI with CVD risk after adjusting for socio-demographic and lifestyle factors, medical history, FM (ASMI models only) and SMM (FMI models only) to yield hazard ratios (HR) and 95% confidence intervals (CI).

Subsidiary analyses assessed the association of body-composition groups with CVD risk. These groups "low muscle/low fat", "low muscle/high fat", "high muscle/low fat", "high muscle/high fat" were defined using sex-specific median ASMI and FMI.

Results: There were 6,232 and 2,733 cases of all fatal and non-fatal CVD in males and females respectively after a median follow-up of 6 years. FMI was positively associated with CVD with extreme quintiles of FMI yielding adjusted HRs of 1.79 (95% CI 1.67-1.91) in males and 1.49 (95% CI 1.33-1.66) in females. ASMI was inversely associated with CVD risk.

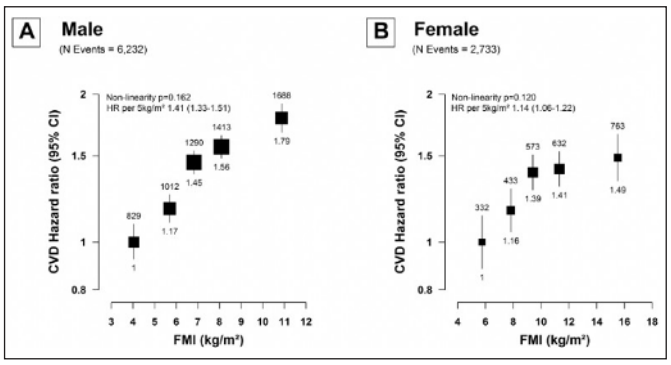
Compared to participants classified as "high muscle/low fat" (mean BMI: male 27 kg/m^2, female 25 kg/m^2) all other groups were associated with a greater CVD risk. "Low muscle/low fat" (mean BMI: male 24 kg/m^2, female 23 kg/m^2) was associated with an increased risk in males HR 1.22, 95% CI 1.17-1.28 but not in females HR 1.04, 95% CI 0.97-1.12. "High muscle/high fat" (mean BMI: male 32 kg/m^2, female 31 kg/m^2) had HR 1.33, 95% CI 1.28-1.38 in males and HR 1.16, 95% CI 1.09-1.23 in females. Finally, those associated with the highest risk had "low muscle/high fat" (mean BMI: male 27 kg/m^2, female 26 kg/m^2) with HR 1.58, 95% CI 1.49-1.69 in males and HR 1.34, 95% CI 1.22-1.47 in females.

Conclusion: Higher FMI was associated with a greater risk of CVD, whilst higher ASMI was associated with a lower risk of CVD. These results show the value of specific measures of body composition to identify people at increased risk of CVD.



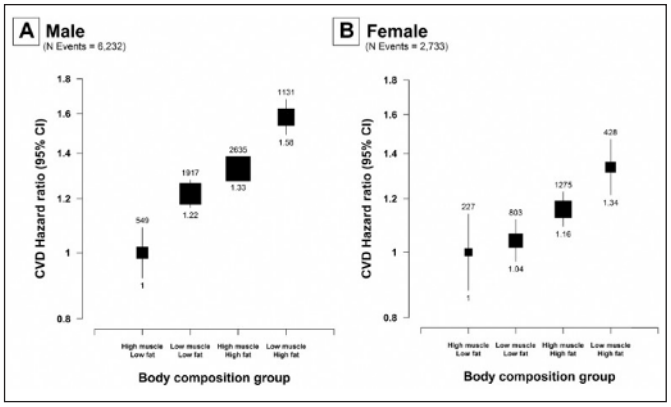
Adjusted hazard ratios (HR) and group-specific 95% confidence intervals (CI) obtained using floated absolute risk method of Cox proportional hazard regression. Adjusted for Townsend index of deprivation, region, education, smoking status, alcohol intake, physical activity, oily fish intake, fruit and vegetable intake, saturated fat intake, hypertension, high cholesterol, diabetes, cancer history, menopause (females), fat mass index. Test for non-linearity of CVD incidence HRs across quintiles of FMI, conducted using LRTs with 3df (p<0.05 indicates significant departure from linearity).

Fig. 1. Hazard ratios of ASMI with fatal and non-fatal CVD, when fat mass is adjusted for.



Adjusted hazard ratios (HR) and group-specific 95% confidence intervals (CI) obtained using floated absolute risk method of Cox proportional hazard regression. Adjusted for Townsend index of deprivation, region, education, smoking status, alcohol intake, physical activity, oily fish intake, fruit and vegetable intake, saturated fat intake, hypertension, high cholesterol, diabetes, cancer history, menopause (females), appendicular skeletal muscle mass index. Test for non-linearity of CVD incidence HRs across quintiles of FMI, conducted using LRTs with 3df (p<0.05 indicates significant departure from linearity).

Fig. 2. Hazard ratios of FMI with fatal and non-fatal CVD, when muscle mass is adjusted for.



Adjusted hazard ratios (HR) and group-specific 95% confidence intervals (CI) obtained using floated absolute risk method of Cox proportional hazard regression. Adjusted for Townsend index of deprivation, region, education, smoking status, alcohol intake, physical activity, oily fish intake, fruit and vegetable intake, saturated fat intake, hypertension, high cholesterol, diabetes, cancer history, menopause (females).

Fig. 3. Hazard ratio associated with fatal and non-fatal CVD risk, by body-composition group.

OS6.02

Association of macronutrient intake with all-cause mortality and cardiovascular disease: findings from the UK Biobank study

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Introduction: Diet is an important modifiable factor for all-cause mortality and cardiovascular disease (CVD) events, but the evidence has been mixed and inadequate. This study aims to investigate the association of macronutrient intake with all-cause mortality and cardiovascular events.
Methods: A prospective population-based study from UK Biobank. Diet was assessed using Oxford WebQ, a web-based 24-hour recall questionnaire and nutrient intakes were estimated using standard method. Outcomes were all-cause mortality and CVD events as ascertained through National Health Service Information Centre (England and Wales), the National Health Service Central Register Scotland (Scotland), Health Episode Statistics (England and Wales), and the Scottish Morbidity Records (Scotland). Cox proportional model was used with nutrient density parametrisation, i.e. nutrients were expressed as percentage of total energy in analysis with total energy intake [TE] and other potential confounders adjusted as covariates. Penalised cubic splines were used to study nonlinear associations.
Results: Of the 502,628 participants in UK Biobank, 195,619 participants who completed at least one dietary questionnaire were included in the analyses. The mean follow-up period for all-cause mortality was 5.0 years (ranging from 3.3 to 7.8) and 4.1 years (ranging from 2.4 to 7.0) for CVD event. Of those participants included in the analysis, 3,291 (1.6%) died and 2,366 (1.1%) developed CVD. Carbohydrate intake had a null relationship with mortality at 20–50% of total energy intake and a positive association when carbohydrate contributed 50–80% of total energy intake ($p = 0.009$). A similar association pattern was also found for sugar but not starch or fibre ($p < 0.004$). Lower intake of monounsaturated (range: 5–15% TE) and polyunsaturated (range: 0–5% TE) fat were associated with higher mortality, whereas the opposite was true for saturated fat (range: 12–25% TE). Sugar were positive associated with CVD at higher intakes (20–55% TE).
Conclusion: Higher intake of carbohydrate, particularly total sugar, had association with all-cause mortality and CVD incidence. Nonlinear associations were found between components of fat and CVD incidence. Future work on the dietary recommendation should observe the potential nonlinearity in the relationships.

OS6.04

Foresight: tackling obesity 10 years on

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Introduction: Foresight: Tackling Obesities (2007) used Health Survey for England data up until 2004 to model the future epidemiological and economic impact of the projected rise in obesity. This high profile report lead to the establishment of 'healthy weight, healthy lives', - the first cross government policy to tackle obesity anywhere globally. Ten years on the team have rerun the Tackling Obesities simulation to see how the predictions have changed.
Method: A dual module microsimulation model was utilised to estimate the future disease and cost burden of obesity-related coronary heart disease (CHD), stroke, type 2 diabetes, knee osteoarthritis, colorectal cancer and breast cancer. Obesity trends in the English population were projected using data from different combinations of HSE data: 1. Annual data from 1993-2004 (as modelled in Foresight), 2. Annual data from 2005-2016.
Results: The results for the updated modelling will be presented for BMI trends by sex and 5 year age group from 2018 to 2040. The economic burden to the NHS, and the incidence of obesity-related diseases over the next 22 years will be presented.
Conclusion: This work will update on the predicted future burden of Type 2 Diabetes, Cardiovascular diseases and cancer which have previously placed an unsustainable burden on both the health service and the economy. Regular forecasting can assist the government and service providers to better manage the resources and assists in future planning and preparedness.

0S7 - Medical Management

OS7.01

Effects of obesity and cardiovascular risk status on healthcare utilisation in a large population representative database study: results from the UK CPRD retrospective study

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Background: Obesity and cardiovascular diseases (CVD) often co-occur, likely increasing the intensity of healthcare utilisation (HCU). The aim of this retrospective, observational database study was to examine the joint effect of obesity and cardiovascular risk status on HCU in the UK.
Methods: Patient demographics and data on cardiovascular disease and body mass index (BMI) were obtained from the UK Clinical Practice Research Datalink (CPRD). Cardiovascular risk status, calculated using the Framingham risk score, was used to categorise people into high-risk (score ≥20%) and low-risk (score <20%) groups, while the CVD diagnosis captured in the database was used to define the established CVD group. Obesity categories were assigned according to BMI using the standard WHO classifications. For each CVD and BMI category, the mean number of annual general practitioner (GP) contacts, hospital admissions and prescriptions was estimated.
Results: Data were available for 1,613,323 people in the CPRD for the period 1 January 2011 to 31 December 2017 (Table 1). Data on CVD status were available on just over one-quarter of the sample (28.4%), largely due to the lack of data on cholesterol required by the Framingham Risk Equation. We were able to classify slightly less than half (43.4%) of patients according to BMI category. At each BMI category, patients with the lowest CVD risk had the fewest GP contacts (Figure 1a) and fewest number of prescriptions (Figure 1b). The number of GP contacts and prescriptions increased consistently with increasing BMI category for each of the three CVD risk groups, and the increase seems fairly consistent across all BMI groups and CVD risk categories. Most (60.1%) GP contacts were administrative in nature, with slightly more than one-third (36.4%) being in-person and only a small proportion (3.4%) were registered as phone/mail contacts. The low and high CVD risk groups were comparable in terms of hospital admissions, whereas the CVD group were more frequently admitted (Figure 1c).
Conclusion: Increasing BMI category and CVD risk group both affected several indicators of healthcare utilisation. These findings highlight the importance of timely obesity management and treatment of CV risk factors as means of preventing increasing HCU.

Funding: Research relating to this abstract was funded by Novo Nordisk.

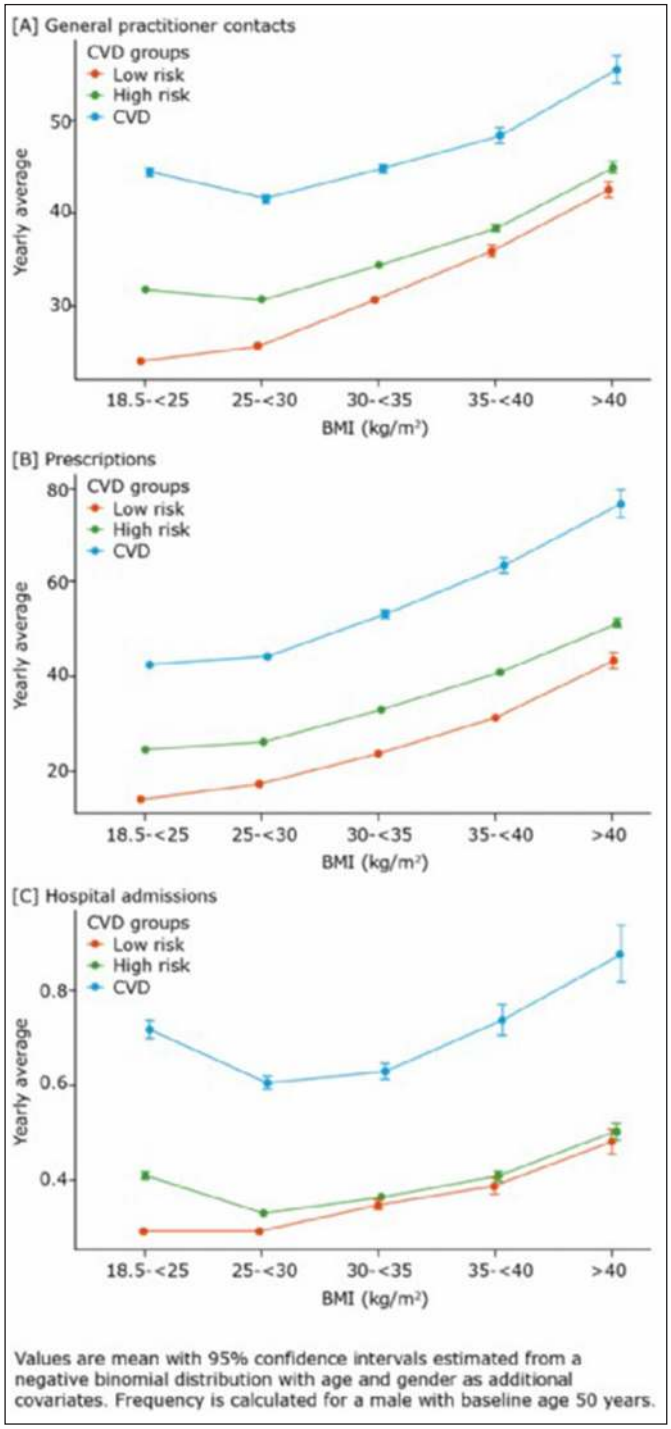

Fig. 1. Estimated frequency of all general practitioner contacts, number of prescriptions, and hospital admissions for patients in the CPRD, based on obesity level and cardiovascular risk.

Tab. 1. Study population.

Variable	Total population N = 1,613,323	Missing (% of total)
Male, N (%)	846,297 (52.5)	0
Mean age, years (SD)	52.9 (18.1)	0
BMI group, N (% of non-missing)		56.6%
18.5–<25 kg/m^2	220,682 (31.5)	
25–<30 kg/m^2	250,354 (35.8)	
30–<35 kg/m^2	141,776 (20.2)	
35–<40 kg/m^2	56,220 (8.0)	
≥40 kg/m^2	31,150 (4.4)	
Mean study length, days (SD)	1,070 (679.0)	0
Mean total GP consultations, counts/yr (SD)	27.3 (37.7)	0
Mean prescriptions, counts/yr (SD)	25.4 (52.7)	0
Mean hospital admissions, counts/yr (SD)	0.453 (2.98)	0
Mean total cholesterol, mmol/L (SD)	4.99 (1.2)	67.6%
Mean HDL-cholesterol, mmol/L (SD)	1.42 (0.4)	71.2%
Mean diastolic blood pressure, mmHg (SD)	77.3 (10.1)	41.9%
Mean systolic blood pressure, mmHg (SD)	131 (16.7)	41.9%
Blood pressure treatment, N (%)	422,596 (26.2)	0
Smoking (Ever), N (% of non-missing)	816,923 (51.6)	1.9%
Type 2 diabetes, N (%)	112,116 (6.9)	0%
CVD risk group, N (% of non-missing)		71.6%
Low*	109,373 (23.9)	
High*	239,297 (52.3)	
Established CVD	109,266 (23.9)	

*Based on Framingham Risk equation.

OS7.02

Liraglutide 3.0 mg as an adjunct to intensive behaviour therapy in individuals with obesity: SCALE IBT 56-week randomised, double-blind, placebo-controlled trial

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Objectives: In this 56-week, randomised, double-blind, US-based multicentre trial (NCT02963935) we investigated the effects of liraglutide 3.0 mg vs placebo, as adjunct to intensive behaviour therapy (IBT) (i.e. reduced calorie intake, increased physical activity [max target: 250 min/week], and 23 counselling sessions). Here we report the effects of treatment on weight change (co-primary endpoints: mean change in body weight [%] and proportion of individuals losing ≥5% body weight), glycaemic variables, cardiometabolic risk factors, safety and tolerability.

Methods: Individuals aged ≥18 years with a body mass index (BMI) ≥30 kg/m^2 and without diabetes were randomised 1:1 to liraglutide 3.0 mg or placebo along with IBT. Continuous and categorical variables were calculated using analysis of covariance (ANCOVA) and logistic regression respectively, with treatment, gender and BMI as factors and baseline

endpoint as a covariate. Missing values were handled using a jump-to-reference multiple imputation model.
Results: There were 282 individuals in the full analysis set; 142 were randomised to liraglutide 3.0 mg (45 years, 16% male, 109 kg, 39 kg/m^2) and 140 to placebo (49 years, 17% male, 107 kg, 39 kg/m^2); 99% and 93% completed the trial, respectively. The intention to treat analysis demonstrated weight loss at 56 weeks of 7.5% with liraglutide 3.0 mg and 4.0% with placebo (estimated treatment difference (ETD) [95% CI], 3.5% [5.3, 1.6]; p = 0.0003). Weight loss in individuals on trial product at 56 weeks was 9.1% (n = 114) and 4.8% (n = 103), respectively. The proportion of individuals achieving ≥5% weight loss was 61.5% with liraglutide 3.0 mg and 38.8% with placebo (estimated odds ratio (OR) 2.5 [1.5, 4.1], p = 0.0003).Significant improvements in secondary efficacy outcomes at 56 weeks were seen for liraglutide 3.0 mg vs placebo (Table). Lipids were improved vs baseline but no significant differences between treatment arms were observed at 56 weeks (all p>0.05). Liraglutide 3.0 mg was generally well tolerated and no new safety signals were observed in this study. The most frequent adverse events were gastrointestinal (liraglutide 3.0 mg: 71%; placebo: 49%).
Conclusion: Treatment with liraglutide 3.0 mg as an adjunct to IBT resulted in significantly greater weight loss, as compared with IBT and placebo.

Funding: Research relating to this abstract was funded by Novo Nordisk.

Tab. 1. Summary of secondary efficacy results at 56 weeks.

	Liraglutide 3.0 mg N = 142	Placebo N = 140	Estimated treatment difference (ETD) or odds ratio (OR) [95% CI]	P-value
Proportion achieving >10% weight loss	30.5	19.8	OR 1.8 [1.0, 3.1]	0.0469
Proportion achieving>15% weight loss	18.1	8.9	OR 2.3 [1.1, 4.7]	0.0311
Change in waist circumference, cm	-9.4	-6.7	ETD -2.7 cm [-4.7, -0.8]	0.006
Change in HbA1c, %	-0.16	-0.06	ETD -0.10% [-0.16, -0.04]	0.0008
Change in fasting plasma glucose, mmol/L	5.16	5.39	ETD -0.23 mmol/L [-0.36, -0.11]	0.0002
Blood pressure (BP) at 56 weeks, mmHg				
Change in systolic BP	-2.79	-0.60	ETD -2.2 mmHg [-4.9, 0.5]	0.11
Change in diastolic BP	-1.01	-0.84	ETD -0.2 mmHg [-2.2, 1.8]	0.87
Change in heart rate, bpm	1.87	0.57	ETD 1.3 bpm [-0.8, 3.4]	0.23

OS7.03

Perception and knowledge of primary care physicians in Turkey about obesity and its treatment

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Aim: Awareness and prevention play an important role in the struggle against obesity. Primary care physicians play an important role in this respect. The aim of the study was to determine the perceptions and the knowledge that the primary care physicians in Turkey have about obesity and its treatment.
Methods: The survey of European CP's for their perception, knowledge about obesity and its treatment was translated to Turkish and validated in Turkish with the permission of EASO. The survey consists of 33 questions, the three of which are open-ended. A total of 136 physicians answered the survey.
Results: Of the 136 physicians 127 (93.3%) think they need more education about obesity, 86 (63.2%) think that they give effective information to the patients and 103 (75.7%) think that health care personel are the ones that are responsible for preventing obesity. Twenty-three of them (16.9%) expect the patient to open the subject of obesity at their encounter, 41 of them (30.1%) record their patients' weight and follow them, 113 (95.6%) think that obesity is a disease, 106 (77.6%) think the etiology of obesity is eating too much, eating too much fatty and sugar-containing food and not doing enough exercise. Seventy-three (53.6%) think that controlling one's weight is the individual's own responsibility, 47 of them (34.1%) think that their collegues are prejudiced against people with obesity, 61 (44.8%) think that the people with obesity lack the will to lose weight, 76 of them (55.8%) think that the people with obesity regain weight because they are lazy and have stopped trying to manage obesity. Finally 88 of them (64.7%) think that biases and misconceptions in healthcare impede with how people with obesity are diagnosed and cared for.
Discussion: The results of the survey indicate that primary care physicians in Turkey mostly accept obesity as a disease and think that they need more education about obesity and its treatment. They also think that there is misconception in health care against the people with obesity.

OS7.04

Intentional weight loss is associated with significant improvement in ejection fraction in obese heart failure

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Introduction: Obesity and heart failure with reduced ejection fraction commonly coexist. However, there are conflicting observations regarding prognosis in obesity and heart failure – both that obesity is associated with improved survival in heart failure, and also that unintentional weight loss is a poor prognostic sign. There is no evidence regarding the impact of intentional weight loss in our contemporary, obese heart failure population. In this study, we sought to investigate the impact of intentional weight loss in obese heart failure on metabolic status, cardiac function and exercise capacity.
Methods: 37 patients with stable idiopathic dilated cardiomyopathy (BMI 35±5 kg/m^2, left ventricular ejection fraction (LVEF) 40±11%), and 23 matched controls (BMI 35±5 kg/m^2, LVEF 65±4%) underwent body composition analysis, quantification of abdominal visceral and hepatic fat, magnetic resonance imaging for geometry and systolic function, echocardiography for diastolic function, cardiopulmonary exercise testing and six minute walk test. All undertook a 12 month dietary intervention (1500 kcal/day) before reassessment.
Results: In obese controls, weight loss (-10±8% body weight) led to a reduction in LV end diastolic volume (EDV by 6±4%, p = 0.001), LV mass (by 12±7%, p = 0.001) and diastolic function (E/e' fell from 9.7±1.3 to 8.3±1.6, p<0.001). In heart failure, intentional weight loss (-7±6%) also led to reductions in LV EDV (by 8±10%, p = 0.010), LV mass (by 6±9%, p = 0.047) and diastolic dysfunction (E/e' fell from 12.6±3.3 to 8.7±2.0, p = 0.002). In addition, there was a significant improvement in LV systolic function (absolute LVEF +8±6%, p<0.001, figure 1 and table). Exercise capacity in heart failure was maintained in weight loss, with a trend towards improvement (six minute walk test distance increase by 28±37m, p = 0.057).
Conclusion: Here we demonstrate for the first time in a prospective study, that intentional weight loss in obese heart failure is associated with sub-

stantial improvements in cardiac structure and function, and prevents decline in exercise capacity. This suggests that weight loss has the potential to be an effective therapeutic strategy in obese heart failure.

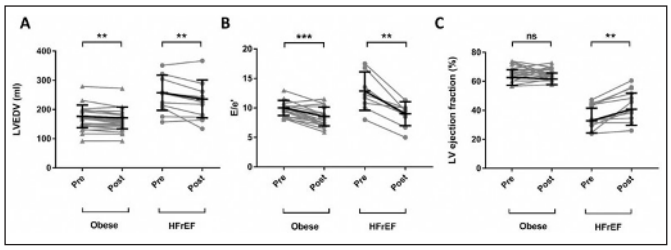

Fig. 1. Successful weight loss leads to improvement in LVEDV (A), E/e' (B) and ejection fraction (C) in individuals with heart failure.
** indicates p<0.01, *** indicates p<0.001.

Tab. 1. Characteristic of those individuals who achieved successful weight loss.

	Pre-weight loss	Post-weight loss	p
Body mass index (kg/m²)	37±7	34±6	0.002
Body Weight (kg)	110±20	102±19	0.002
Systolic bp (mmHg)	133±12	127±14	0.246
Diastolic bp (mmHg)	78±16	78±8	0.921
HOMA-IR	3.0±1.2	2.3±1.1	0.029
Leptin (ng/ml)	76±51	57±50	0.019
LV EDV (ml)	233±61	215±62	0.010
LV ESV (ml)	143±58	118±62	<0.001
LV EF (%)	40±11	48±13	<0.001
LV mass (g)	158±45	149±45	0.031

Tuesday, 30 April 2019

OS8 - Food Environment

OS8.01

Differences and similarities between front-of-pack nutrition labels in Europe: a comparison of functional and visual aspects

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Introduction: Many different front-of-pack (FOP) nutrition labels have been introduced worldwide and in Europe. In ten European countries a positive FOP labelling program is present. Recently, the multi-coloured Nutriscore label is increasingly getting attention, and in Israel the implementation of a negative Warning label is being planned. To continue the debate on the most effective FOP labels for increased consumer health, full comprehension of the visual and functional characteristics of all FOP labels is relevant.
Methods: Characteristics of FOP labels currently existing in Europe and Israel are compared visually by means of the Funnel Model (van der Bend, et al., EJNFS, 2014), with focus on a subset of positive, mixed and negative FOP labels, e.g. Keyhole, Choices, Nutriscore, Israeli Warning Label. The corresponding Funnel Models were completed for each FOP label in collaboration with the FOP labelling organizations.
Results: There are multiple similarities and differences between the FOP labels compared, with each FOP label being characterized by a unique set of features. Similarities across the labels include 1) use of disqualifying components in the product criteria (i.e. components with a negative impact on health), 2) use of 100g/100ml as reference unit, 3) qualification of products based on threshold values, 4) the aim to help consumers making healthier choices. In contrast, positive labels such as Keyhole apply different criteria for different food categories, while the Nutriscore and Warning label use similar criteria for all categories. The recently-launched Nutriscore is distinctive as its criteria are based on both scoring and threshold methods, which will be reviewed. The Israeli Warning label, still in the planning stage, is the only mandatory label.
Conclusion: This comparison of positive, mixed and negative FOP labels provides knowledge to ultimately create more common ground among stakeholders involved in the FOP labelling debate. Importantly, implementation and evaluation activities carried out by FOP labelling organizations are crucial success factors for FOP labels. Also, research focused on methodological differences between FOP labels is highly relevant. We recommend expanding this European comparison to a global level, with periodic updates, as the variety of FOP labels in the global marketplace is changing constantly.

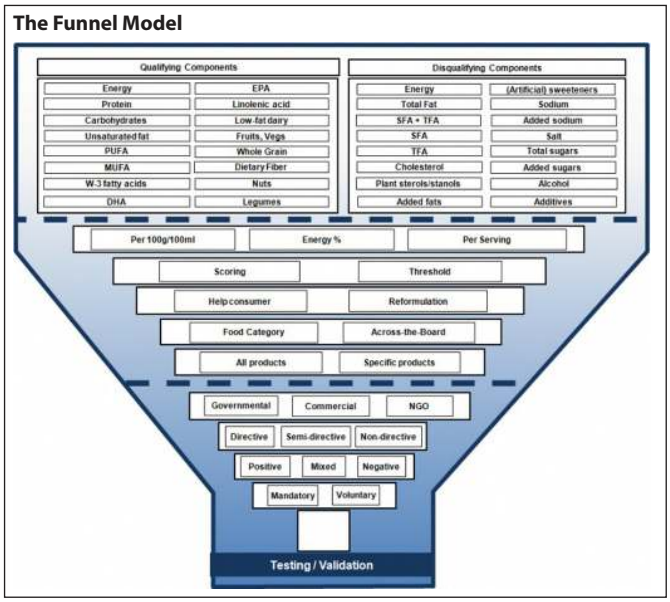

Fig. 1. Characteristics of a FOP label can be highlighted in the Funnel Model, enabling comparison with other FOP labels.

OS8.02

Soft drinks consumption and mortality in 10 European Countries: a multinational cohort study

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This article has been withdrawn

OS8.03

Marketing, promotions and obesity: insights from British take-home food and drink shopping

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Obesity is a national epidemic and the second leading cause of preventable cancer in the United Kingdom. The food and marketing environment is a large factor in this epidemic, and many agree that population-level policy change is needed to reduce the "obesogenic" environment and support people to make healthier choices. In 2018, the UK Government released the Childhood Obesity Plan Chapter 2, which proposed several such population-level measures.

This study demonstrates how household food and drink purchasing data is being used to inform and influence population-wide measures in the United Kingdom. The dataset, obtained from Kantar Worldpanel, include the food and drink purchases of 16,000 households over a 7-month period, as well as demographic, price promotion, and media consumption data, allowing us to identify links between behaviours and overall food/drink purchasing in a real-world setting.

It has been proposed that a restriction on price promotions on unhealthy food could support people into making healthier choices. Using the Kantar Worldpanel data we find that price promotions are prevalent in British take-home food and drink shopping, making up 29.2% of items. We also find that high promotional shoppers show higher prevalence of both overweight and obesity, and tend to show increased purchasing of discretionary food and drink categories which are typically high in fat, salt or sugar (HFSS), such as cakes, sugary drinks, crisps, ice creams, and puddings, at the cost of healthier categories such as fruit, vegetables, and non-sweetened yogurt. Together with a growing body of evidence around price promotions, these findings support the proposal that the UK government should restrict price promotions on unhealthy foods.

An additional proposal has been the restriction of marketing of HFSS foods to children through television and digital media. Whereas evidence showing the link between broadcast advertising and unhealthy eating and obesity is strong, the relationship between exposure to digital media and food consumption is relatively poorly understood. Here I discuss how we are using the Kantar Worldpanel data to identify links between digital me-dia consumption, broadcast media consumption, obesity, and food and drink purchasing.

Use of household panel data such as that obtained from Kantar Worldpan-el is useful in getting a real-world insight into purchasing behaviours. It has allowed us to provide evidence to support population-wide measures to help prevent obesity, and in future may allow us to monitor the effec-tiveness of these measures.

OS8.04

Food insecurity and its associations with psychological wellbeing, disordered eating and body image in Spanish adolescents

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Introduction: Food insecurity is defined as "the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (Anderson, 1990; USDA, 2017). There has been a rise in food insecurity since the economic crisis in 2007 thus affecting adolescent psychological and physical health. Previous research has indicated higher risk of psychological issues (Alaimo et al, 2001) and disordered eating (Neumark-Sztainer et al, 2011) in food insecure adolescents. However, there is lack of sufficient research on food insecurity and its associations in Spanish adolescents. As a result, the first objective of our study was to determine if food insecurity is associated with poor psychological wellbeing in Spanish adolescents. The second objective was to determine if food insecurity is associated with body dissatisfaction, disordered eating and poor dietary habits in Spanish adolescents. Differences in gender were examined for both objectives.

Methods: A cross-sectional study was conducted in a secondary school (grades 7-10) in Catalonia, Spain. The sample included adolescent boys and girls (n 426, 12-17 years). The 'Spanish Child Food Security Survey Module', (CFSSM-S, Shankar-Krishnan et al, 2018) and other validated questionnaires in Spanish were employed to assess psychological wellbeing, body image, disordered eating and dietary habits.

Results: ANOVA was used to investigate the association between food insecurity, gender and these variables. Socioeconomic status (SES), family affluence and weight status were added as adjustment variables to the models. There were no significant interactions between food security status and gender in any of the variables. The overall results indicate poor psychological wellbeing, greater body dissatisfaction and higher drive for thinness in food insecure participants and adolescent females. 18.3% of participants were found to be food insecure and 81.7% were food secure.

Conclusion: Food insecurity is a huge public health burden. This study is one of the first in Spain to examine its negative outcomes on adolescent health. Identifying and tackling food insecurity issues in adolescence could prevent severe psychological and physiological issues in future. The initial findings of this study could be of interest to researchers, psychologists and public health experts.

OS8.05

Sugar content of ready to eat breakfast cereals marketed to children: a comparison between the UK, Mexico, Guatemala and Ecuador

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Introduction: Ready to eat breakfast cereals (REBC) are important contributors to children's diets globally but concerns about their high sugar content exist[1]. Reducing sugar content in foods marketed to children is one of several actions stakeholders at the global level are urged to implement for the reduction of obesogenic environments[2]. Nevertheless very few countries or food manufactures have actively engaged in implementing policies or change formulations. Within the UK, there is a voluntary reformulation programme to reduce sugar content in foods. The aim of this study was to investigate the sugar content of REBC marketed to children in Mexico (MX), Guatemala (GT) and Ecuador (EC), countries without sugar reduction reformulation initiatives, and compare them with those available in the UK.
Methods: A cross-sectional study in large supermarkets targeted to low, middle and high income populations in four large cities in MX, GT, EC and the UK. Nutritional information reported on food labels of REBC available in store and online between October-December 2018 were recorded by 2 independent researchers. REBC marketed exclusively to children were considered if they contained any child oriented imagery on the food packaging. The UK traffic light system and the Public Health England 5% sugar reduction goal were used for high sugar thresholds.
Results: In total 147 REBC were included; 23% (n = 32) in MX, 26% (n = 37) in GT, 29% (n = 41) in EC and 23% (n = 32) in the UK. Cartoon characters were used in 70% products. A larger proportion of REBC in Latin America (LA) were from transnational companies with 59% in MX, 78% in GT, 58% in EC while just 40% in the UK. The sugar content (mean ± SD/100g) of REBC showed little variation across LA countries (MX, 32.6 ± 7.6; GT, 31.1 ± 8.9; EC, 36.1 ± 12.5) but was significantly higher when compared individually against the UK (23.9 ± 6.7; p = 0.002 vs MX, p = 0.012 vs GT and p = 0.000 vs EC). The proportion of cereals with high sugar content according to the UK traffic light system (>22g/100g) was higher in all LA countries compared to the UK (MX, 94%; GT, 89%; EC, 92% vs UK, 56%, p = 0.000). Only 5% of the whole sample (n = 2 in MX, n = 3 in GT, n = 1 in EC and n = 3 in the UK) of REBF achieved the 5% sugar reduction (<14.6g/100g) goal.
Conclusion: The sugar content of REBC in LA is high. The reformulation programme in the UK is likely to have contributed to the reduction of sugar content in REBFC. Stakeholder willingness to implement strategies to improve nutritional profile of foods marketed to children is feasible and these could be adopted in countries where policies for obesity reduction are urgently needed.

Reference

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OS8.06

Assessing credibility of online nutritional information: analysis of key UK social media influencers' weight-management blogs

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Introduction: Social media (SM) influencers have engagement with large audiences subscribed to their SM and blogs and can shape the thoughts and behaviours of these "followers". Despite this, no standards exist to assess the credibility of influencers' blogs. This study evaluated influencers' weight-management (WM) blogs for credibility against a standardised checklist.
Methods: A cross-sectional study was conducted from 09/05-30/06/18. A comprehensive search of 'influence.co', a website used to identify influencers, filtered by 'UK' and 'nutrition', with Instagram and Google Incognito searches using terms, 'blog', 'weight loss', 'nutrition' and 'UK', identified UK influencers with WM blogs. Google Incognito, a private search function, ensured this was not influenced by previous searches. Influencers were selected on the inclusion criteria of: >80,000 followers on ≥1 SM, blue-tick verification on ≥2 SM and an active WM blog. Blogs were excluded if >50% of posts were not nutrition or physical activity-related. Blogs were analysed against 12 credibility indicators, based on those identified by systematic review[1], under themes of 'transparency', 'use of other resources', 'trustworthiness and adherence to nutritional criteria' and 'bias'. These were set as yes (pass)/no (fail) questions, reported as a percentage, with an acceptable pass rate of >50% chosen to ensure those who passed achieved most indicators. The 10 latest meal recipes from each blog were selected and analysed for energy, CHO, protein, fat, saturated fat, fibre, sugar and salt content (g and mg) using Nutritics[2]. Meals were evaluated against Public Health England's (PHE) 'One You' calorie reduction campaign and the UK Food Standards Agency's Traffic Light Scheme (2016).
Results: 14 influencers were identified, nine met inclusion criteria. Seven provided nutrition and WM advice, while five failed to provide evidence-based references for nutrition claims or opinion presented as fact. Five influencers failed to provide a disclaimer. Scores for recipe evaluation against PHE calorie targets and traffic light criteria combined were averaged, with no influencer reaching set criteria. Of the advice-based blogs, only the degree-qualified blogger, registered on the UK Voluntary Register of Nutritionists, passed overall, with 75%. The lowest compliance (25%) was from an influencer without nutritional qualifications.
Conclusion: SM influencers blogs are not credible resources for WM. Popularity and impact of SM in the context of the obesity epidemic suggests all influencers should be required to meet accepted scientifically or medically justified criteria for the provision of WM advice online.

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Wednesday, 01 May 2019

OS9 - Bariatric Surgery

OS9.01

Conversion to diabetes 5 years post-bariatric surgery in individuals with obesity and prediabetes

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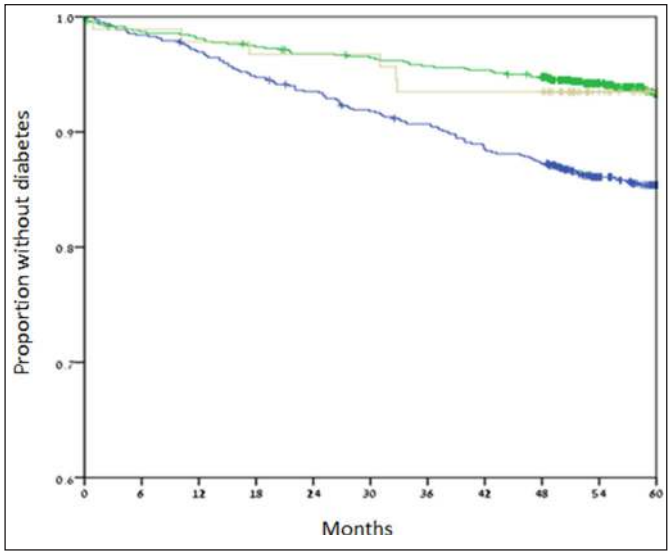
Objective: We assessed conversion rates to diabetes among individuals with obesity and prediabetes, 5 years after undergoing three types of bariatric-surgery, and examined predictors of diabetes development.
Research Design: Prediabetes at baseline was defined in patients who underwent bariatric surgeries in Clalit-Health-Services during 2002-2011as fasting glucose (FG) 100-125 mg/dL (5.6-6.9 mmol/L) or HbA1c 5.7%-6.4% (39-46 mmol/mol). Conversion to diabetes was assessed 1, 2 and 5y postoperatively.
Results: Of 13,099 patients, 1,756 (13.4%) had prediabetes at baseline: 819 underwent gastric-banding (GB), 845 sleeve-gastrectomy (SG), and

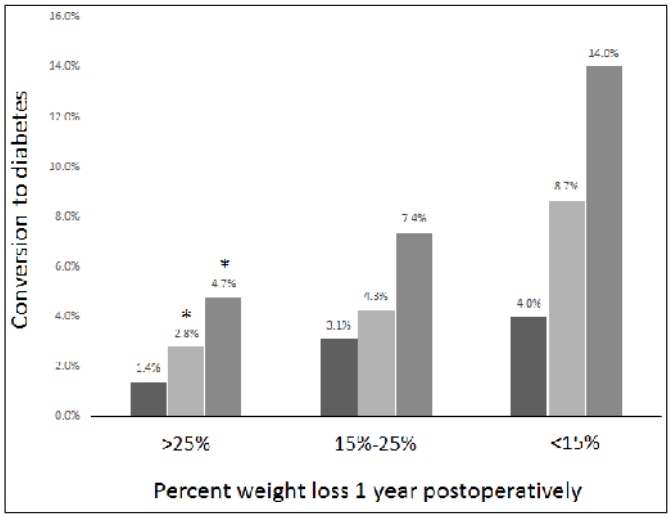
92 Roux-en-Y gastric-bypass (RYGB). Mean age was 41.6 years and 73.5% were women. Diabetes conversion rates 5 years postoperatively were 14.4%, 6.3%, and 6.5% for GB, SG, and RYGB, respectively (p <.001) and was more rapid following GB than SG or RYGB ($\chi2(2) = 29.67$, p <.005). In a multiple-logistic-regression model, predictors of diabetes development 5 years postoperatively were weight-loss during the first postoperative year, and the combination of elevated preoperative levels of FG and HbA1c within the prediabetes range. Neither baseline weight nor number of post-surgery visits to a dietitian predicted conversion to diabetes. Conversion rates were lower at one (1.4%), two (2.8%), and five (4.7%) years postoperatively for patients who lost >25% compared to those who lost 15% or less of their weight during the first postoperative year: (4.0%, p = .11; 8.7%.002, 14.0% <.001, respectively).

Conclusion: Our findings emphasis the importance of preoperative glycemic-control and weight-loss during the first year postoperatively as factors in long-term prevention of diabetes in bariatric-surgery patients with prediabetes.



Blue – Gastric banding; Green – Sleeve gastrectomy; Yellow - Roux en-Y gastric bypass $\chi2(2) = 29.67$, p <.005.

Fig. 1. Conversion from pre-diabetes to diabetes; Kaplan-Meier survival analysis.



Dark grey - One year post-surgery; Light grey - Two years post-surgery; Medium grey - Five years post-surgery. *p <.05 between weight-loss groups.

Fig. 2. Percent conversion to diabetes, at 1, 2, and 5 years post-bariatric surgery, according to weight loss groups.

OS9.02

Elipse intra-gastric balloon: finally, a new tool against obesity for non-endoscopists

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Background: Elipse, the new swallowable intragastric balloon (IGB) can be administered, not only by surgeons and endoscopists, but also by obesity clinicians (nutritionists, endocrinologists, internists) that often represent the first medical specialists consulted by overweight and obese patients. This novel balloon does not require either endoscopy or sedation for placement or removal.

Aim: The aim of our study was to evaluate the safety and efficacy of Elipse treatment administered by these obesity clinicians and to determine the value of strict patient follow up.

Methods: Data was collected from 6 obesity clinicians-led centers in Italy and Spain. The Elipse™ balloon was placed in a 10-15 minutes outpatient visit, without endoscopy or sedation, and filled with 550 ml of fluid. All patients received the same diet and exercise plan. Follow up was performed combining live visits every 2 weeks until the end of the treatment and also virtual visits through a wireless scale with smartphone app whereby patients were in constant contact with the physicians. Via this app, they received motivational messages that encouraged them towards physical activity and following the diet provided by the nutritionist. Elipse™ self-emptied via a valve that opened at 4 months allowing the balloon to pass naturally.

Results: From 2/2018 until 11/ 2018, 150 pts completed the 4 months of follow up; At the time of placement, patient characteristics were: mean age 44.3 yrs; mean BMI 36.6 Kg/m^2, mean weight 107.3 Kg and mean waist circumference 108 cm. Triglycerides and LDL were 155.1 and 126.2 mmol/L respectively, while HbA1c was 6.1%. After 4 months, at the time of Elipse excretion, average weight loss was 19.4 kg and an average reduction of 6.6 points of BMI. An average reduction of 18% of TBW and of 52.7% of EWL was achieved. Triglycerides and LDL recorded a 34.1 and 12.5 mol/L reduction respectively. Waist circumference average reduction was 16.4cm. HbA1c remained unchanged in a non-diabetic range. No serious adverse events occurred.

Conclusion: Our data demonstrates that Elipse intra-gastric balloon treatment administered by obesity clinicians is not only safe, but can produce best-in-class efficacy results. The stricter digital and physical follow-up program may be responsible for these results. There is also improvement in several metabolic parameters. Finally, the extension of the intra-gastric balloon management to other specialists allows its availability to a greater number of patients.

OS9.03

Can state regulations improve the outcomes of bariatric surgery?

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Introduction: Obesity is the new epidemic of the Western world. The most effective treatment for extremely high body mass is bariatric surgery. The operation is only one component of a continuum of treatment, including thorough preparation and close postoperative follow up by a multidisciplinary team. In 2013, the Israeli Ministry of Health initiated a national registry of patients undergoing bariatric surgery, and issued

guidelines that included requirements for preoperative evaluation and follow-up treatment by physicians, dietitians and psychologists. The aim of this study was to compare clinical and treatment characteristics of patients operated before and after issuance of the guidelines.

Methods: We compared data of patients insured by Clalit Health Services (the largest HMO in Israel) who underwent bariatric surgery, between those who were operated before issuance of the guidelines, in the years 2010-2011; and those operated during two periods after their issuance: 2013-2014 and 2015-2016. The data were collected for the year preceding the date of surgery and up to one-year post-surgery, and included BMI, insulin prescriptions, Hba1c levels and visits to a dietitian.

Results: 18,162 patients were included: 21.2% were with diabetes, 70.2% were women, the mean age was 40.5 years, 55.6% were operated within the framework of public hospitals. The types of operations performed were: laparoscopic banding (n = 2,485), gastric bypass (n = 2,431) and sleeve gastrectomy (n = 13,246). Compared to 2010-2011, in 2013-2014 and 2015-2016, the proportions of patients who met with a dietitian were higher, both before the surgery: 52.7% and 82.8% vs. 7.6%; and at 1 year after the surgery: 45.4% and 56.9% vs. 23.9%. Decreases were shown in mean BMI levels at baseline (42.8, 41.9, 41.9 kg/m^2, for 2010-2011, 2013-2014 and 2015-2016, respectively) and at 1-year postoperatively (32.5, 30.1, 29.7 kg/m^2, respectively). Among patients with diabetes, decreases were observed in the proportions with HbA1c>7% at baseline (61.7%, 60.7%, 49.9%, respectively) and 1-year postoperatively (21.2%, 16.9%, 11.4%, respectively); and also in the proportions of patients treated with insulin at 1-year postoperative relative to baseline (66%, 53%, 47%, respectively).

Conclusion: Following the establishment of a national registry of bariatric surgeries and the issuance of clear guidelines for preoperative and postoperative evaluation and treatments, including the involvement of a multidisciplinary team and HMO representatives throughout the country, clinical parameters and adherence of patients to treatment improved substantially.

Conflict of Interest: None.

Funding: No Funding.

OS9.04

Patients' experiences and needs for longer term follow up care after bariatric surgery: a rapid review and qualitative synthesis

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Background: Current guidance in Europe, UK and the USA recommend long term routine metabolic and nutritional monitoring for all patients who have had bariatric surgery as well as an annual clinical review. Initial post-operative care is at the surgical unit, but longer term care may transfer to medical specialist units and/or primary care. However, attendance can be low and failure to attend is associated with poorer clinical outcomes. Understanding patients' experiences and needs is central to the delivery of effective care.

Method: This rapid review has synthesised the current qualitative literature on patient experiences of healthcare professional (HCP) led follow-up from 12 months after bariatric surgery. Data extraction, critical appraisal, and qualitative synthesis were in line with established systematic review and qualitative synthesis methods. The thematic synthesis approach proposed by Thomas and Harden was used.

Results: Synthesis of data from 20 studies highlighted the range of problems experienced after bariatric surgery and patients' desire for knowledgeable HCP support.

A recurring theme was the need for more and extended follow-up care, particularly an increased psychological component and specific support to address weight regain. Enablers to attending follow-up care were patient self-efficacy as well as HCP factors such as a non-judgemental attitude, knowledge and continuity of care. Barriers included unrealistic patient expectations and perceived lack of HCP expertise. Some preferences were expressed including patient initiated access to HCPs and more information pre-operatively about potential post-surgery issues.

Conclusion: This review has highlighted the complexity and continuing medical, nutritional and psychological needs of patients post-bariatric surgery. We have identified barriers and enablers to attendance as well as preferences regarding components of longer term follow-up care after bariatric surgery.

The findings of this review suggest that from the patient perspective there is a need for continued support from knowledgeable HCPs beyond two years post-surgery for a variety of issues that patients can find themselves contending with in the longer term. Given the range of potential issues it is likely that an array of services and types of support are needed.

OS9.05

Bariatric surgery among the elderly: a matched case-control study on 30-day and 5-year mortality

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Introduction: Emerging evidence is supportive of bariatric surgery as a treatment for obesity among elderly patients, due to evidence of remission of co-morbidities and improvement of quality of life in the short-term. The long-term implications of bariatric surgery on all-cause mortality are unknown. The aim of this study was to examine long-term survival in elderly patients compared with younger matched control patients.

Methods: We retrospectively analysed data from a local database of patients who underwent bariatric surgery between 2003 and 2013 at one bariatric unit in the United Kingdom. A total of 41 patients who underwent bariatric surgery were elderly cases, defined as an age ≥65 years. The elderly cases were matched 1:2 to 'typical' aged controls, defined as patients aged between 38 – 53 years old – the IQR age of all patients undergoing bariatric surgery at our unit. Controls were matched based upon procedure, gender, referral body mass index and diabetes status. All-cause mortality outcome was measured from date of surgery to 30-days and 5-years post-operatively. Survival was compared across elderly cases and matched controls using Kaplan-Meier estimators and the log rank test.

Results: Elderly cases (n = 41) had a mean age of 67 years (SD 2.3) (range 65 – 76 years). Matched controls (n = 82) had a mean age of 46 years (SD 5.1). Across the matched groups, mean BMI was 47 kg/m^2 (SD 7.2), 34% were male and 59% had Type 2 diabetes. Most patients underwent laparoscopic adjustable gastric banding (82%), some underwent Roux-en-Y gastric bypass (5%) and sleeve gastrectomy (7%). There was 0% mortality in both cases and controls at 30-days post-operative. At 5-years post-operative; there were 4 deaths in the elderly group (9.8%) (all underwent LAGB procedures) and 1 death in the matched control group (1.2%) (underwent sleeve gastrectomy). No patients died due to surgical complications. Kaplan-Meier estimate mortality rates were 4.9% (n = 2) at 1 year, 7.3% (n = 3) at 2 years and 9.8% (n = 4) at 3 years for elderly cases; whereas for matched controls mortality rates were 0% until 5 years (n = 1, 1.2%). A significant difference between survival curves was found at 5-years (p = 0.03).

Conclusion: Based on results from one bariatric unit, there was no increased mortality among elderly patients at 30-days post-operative; nor due to any surgical complication at 5-years. However, elderly patients have higher all-cause mortality 5 years after their bariatric procedure, than those of a younger age.

Conflict of Interest: None Disclosed.

Funding: No funding.

OS9.06

Bone health in patients with type 2 diabetes treated by Roux-en-Y gastric bypass and the role of diabetes remission. A cross-sectional matched cohort study

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Introduction: Roux-en-Y gastric bypass (RYGB) has been associated with negative effects on bone. Whether this association is affected by pre-surgical type 2 diabetes (T2D) and surgically induced diabetes remission is unknown.
Methods: In this cross-sectional, matched cohort study six years after RYGB, we investigated bone health in 96 individuals with body mass index (BMI) >35 kg/m^2 and T2D (stratified on current diabetes status) treated by RYGB six years earlier compared with 49 non-operated individuals with T2D matched with respect to sex, age, and current BMI. Main outcome measures were areal and volumetric bone mineral density (aBMD (measrured by DXA) and vBMD (measured by HRpQCT)), bone turnover, and odds ratio of osteoporosis/osteopenia.
Results: The overall aBMD determined by DXA was lower in the RYGB as compared with the control group (1.061g/cm^2 vs 1.116 g/cm^2, p<0.02). In addition, vBMD was generally lower in the RYGB group e.g. tibial (269.63 mg/cm^3 [51.5] vs 306.07 mg/cm^3 [43.7], p<0.001) and radial (238.57 mg/cm^3 [63.0] vs 278.14 mg/cm^3 [57.4], p<0.0001). Relative to the control group, c-terminal cross-linked telopeptide, procollagen type I amino terminal propeptide, and osteocalcin were 75%, 41%, and 72% higher in the RYGB group, respectively (all p<0.001). Odds ratio for osteopenia/osteoporosis in operated individuals was 2.21 (95% CI: 1.06; 4.79, p = 0.05) as compared with the control group. In the RYGB group, 52% of the individuals had complete diabetes remission after a mean follow-up of 6.2 years. However, stratified analysis on current diabetes status did not influence the bone related outcomes.
Conclusion: Individuals with T2D treated by RYGB, compared to individuals with T2D of similar age and body composition not treated by RYGB, have lower BMD, lower bone strength and increased levels of several markers of bone turnover, indicating adverse effects on bone health after RYGB. Bone health was not associated with current diabetes status in the RYGB group. More focus on evaluation of bone health after RYGB is recommended.

Conflict of Interest: None Disclosed.

POSTER PITCH SESSIONS

Tuesday, 30 April 2019

PP1 - Basic and Experimental Science

PP1.01

The association of vitamin D receptor gene polymorphisms with obesity-related phenotypes and tissue-specific insulin sensitivity indices

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Introduction: Obesity is associated with low circulating vitamin D levels and increased vitamin D receptors (VDR) expression within subcutaneous adipose tissue (SAT). Transgenic overexpression of human VDR in adipose tissue reduced energy expenditure and glucose tolerance in mice. In addition, our recent study in obese humans showed that a higher VDR gene expression in SAT was negatively associated with adipose tissue insulin sensitivity. Here, we investigated the association of four single-nucleotide polymorphisms (SNPs) in the VDR gene (TaqI/rs731236, ApaI/rs7975232, FokI/rs10735810, and Bsml/rs1544410) with obesity-related phenotypes, and insulin sensitivity indices in overweight/obese Caucasian population of the DiOGenes cohort.
Methods: We included 553 adult overweight/obese (BMI >25 kg/m^2, age range: 24-63 yrs) men (n = 197) and women(n = 356). Genotyping was performed using an Illumina 660W-Quad SNP chip on the Illumina iScan Genotyping System. Insulin sensitivity indices were determined using Matsuda index, Hepatic Insulin Resistance Index (HIRI), Muscle Insulin Sensitivity Index (MISI) and Adipose Tissue Insulin Resistance Index (ADIPO-IR). Data were analyzed using SPSS and SNPStats (https://snpstats.net/). Association between genetic variants, obesity phenotype and tissue-specific insulin sensitivity indices were analyzed by using linear regression models corrected for multiple testing using Tukey's Multiple Comparison Test.
Results: Linear regression analysis in an overdominant model for TaqI or ApaI showed that the AG (Taql) or AC (Apal) genotype was associated with higher BMI (AG mean difference: 1.11 kg/m^2, P = 0.0093; AC mean difference: 1.09 kg/m^2, P = 0.011), waist (AG mean difference: 3.34 cm, P = 0.0035; AC mean difference: 2.83 cm, P = 0.014) and FM (AG mean difference: 2.39 kg, P = 0.021; AC mean difference: 2.34 kg, P = 0.022), even after adjustment of age, sex, and center. However, none of the VDR genetic variants were associated with Matsuda index, HIRI, or MISI. Interestingly, linear regression analysis in a recessive model homozygous for the A allele of FokI showed that the AA genotype was associated with ADIPO-IR (mean difference: –2212.23, P = 0.0046) and lower systemic Free Fatty Acid (FFA) concentrations (mean difference: –89.91µmol/L, P = 0.0094), even after adjustment with age, sex, center and FM.
Conclusion: Our findings suggest that VDR genetic variants might play a major role in obesity-related phenotypes and ADIPO-IR in obese/overweight Caucasian adult population. Whether these VDR polymorphism translate into differences in VDR gene expression and an altered SAT function is currently under investigation.

PP1.02

Is blubber hypoxic? First measurements of dissolved oxygen in a natural animal model of rapid fat tissue expansion

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Introduction: Fat tissue hypoxia is a potential concern in obese patients. It is suggested that an increase in adipocyte size impairs the diffusion of the oxygen itself and/or that vasculature does not grow concomitant with tissue expansion, leading to a mismatch between oxygen demands and supply. Hypoxia theory is supported by reduced blood flow in obesity, while studies on dissolved partial pressure of oxygen (pO2) in adipose tissue do not report hypoxia. Morevover, effects of adiposity on pO2 are not clear. This study aims to evaluate oxygen management using novel methodologies to measure dissolved oxygen in a natural obese animal model, grey seals, in which radical changes occur in fat tissue depth during the life cycle.
Methods: Measurements were performed under anaesthesia and sedation on the dorsal flank subcutaneous fat (blubber) of juvenile grey seals (n = 12). Blood oxygen saturation (SpO2), heart rate and breathing rate

were monitored throughout sampling. pO2 was measured at different depths, with a non-consuming, temperature compensated optical oxygen probe (NX-LAS-8/OT/E, Oxford optronix). Simultaneously, Near infrared spectroscopy (NIRS) was used for future analysis of oxygen supply. In four cases, two probes were inserted simultaneously 33±3 mm apart to examine inter-site variability. To investigate the influence of adiposity, we estimated fatness by photogrammetry and measured blubber depth with an ultrasound. Furthermore, 4 animals were resampled after a natural weight increase of 6 to 25 Kg.

Results: Preliminary results show substantial decreases in blood SpO2 correspond with a lagged decrease in blubber pO2. Blubber depth range from 10 to 28 mm (mean = 18.1 mm) and fatness from 6.9 to 33.4 g/ cm^3 (mean = 22.1 g/cm^3). There are large inter-individual pO2 differences in seal blubber, but pO2 varies between 17 and 71 mmHg (mean = 42 mmHg) irrespective of the depth of the measurement and the overall blubber depth or adiposity. Our finding suggest that blubber does not become hypoxic under the conditions tested, despite its substantial mass. Histological and NIRS investigations will now explore tissue vascularisation.

Conclusion: Overall, blubber is well supplied with oxygen despite its large volume and irrespective of radical changes during the animals' life cycle. pO2 range is consistent with these observed in humans, however, it does not correlate with fatness. This contrasts with data from human fat expansion and may be one reason why seals avoid the typical inflammation-induced comorbidities associated with obesity. Further analysis on vascularity needs to be undertaken, as well as, work on freely diving animals to explore changes in oxygenation and potential hypoxia during large changes in oxygen availability.

PP1.03

Short term effect of omega fatty acids on intestinal satiety hormones and c-Fos protein levels in hypothalamus

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Introduction: Obesity is a chronic disease that is widespread throughout the world and our country, Turkey. The wrong eating habits, high fat foods and unhealthy diet are also important factors leading to obesity. A better understanding of the effect of dietary fats on food intake and satiety metabolism has an important role in combating this disease. In this study, we aimed to research the effects of omega fatty acids on responses of some intestinal hormones related to satiety and c-Fos protein expression in hypothalamus on short-term effects.

Methods: 60 Sprague-Dawley female rats were used in the study. The rats were randomly divided into 6 groups and the groups were determined as baseline (BA), serum physiologic given group (SF), linoleic acid (LA), α-linolenic acid (ALA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Except for the BA, SF and fatty acids were administered by oral gavage at a dose of 400 mg/kg and 1 mL of blood was taken at the end of 15 min, 30 min, 60 min and 120 min. At the end of the second hour, the rats were sacrificed by cardiac perfusion and brain tissues were removed. Cholecystokinin, GLP-1 and peptide YY hormones were analyzed by ELISA. Activation of c-Fos protein in the hypothalamus was determined by immunohistochemical staining. Data were evaluated with SPSS 18.0 program and interpreted at 5% significance level.

Results: Cholecystokinin hormone levels increased in omega-3 groups in the first hour and decreased in LA. Compared with the linoleic acid group, the hormone levels of cholecystokinin, GLP-1 and peptide YY of omega-3 fatty acids were found to be significantly higher at 60 min and 120 min ($p < 0.05$). The highest level in cholecystokinin and GLP-1 hormones was determined in the ALA group and in the peptide YY in the DHA group. When compared between groups, GLP-1 levels are significantly higher in ALA group than in LA group only in 15 minutes. No significant difference was found between the other groups in 30-120 min ($p > 0.05$). When the neuron activities demonstrated by c-Fos expression in the hypothalamus at the end of two hours were compared, it was seen that the highest activation was in the EPA group.

Conclusion: Omega-3 fatty acids have been shown to be effective in short-term satiety. Evidences show that fats stimulate secretion of the gut peptides, which are reported to have satisfactory effects, but have a limited effect on long-term energy intake. Comprehensive studies are needed to better understand the effects of omega fatty acids on nutrient uptake and plays an important role in the fight against obesity.

Conflict of Interest: None declared.

Funding: This work was supported by the Scientific Research Projects Commision of the Istanbul Medipol University (Project No.: 2017/15), Turkey.

PP1.04

Low 24-hour core body temperature as a thrifty metabolic trait contributing to the enhanced efficiency of fat deposition during weight regain

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Introduction: The recovery of body weight after substantial weight loss (or growth retardation) is characterized by a disproportionately higher rate of fat mass vs lean mass recovery, this phenomenon of preferential 'catch-up fat' being partly explained by an energy conservation (thrifty) metabolism due to suppressed thermogenesis persisting during weight regain. We tested in the rat the hypothesis that a low core body temperature constitutes a thrifty metabolic trait underlying the high metabolic efficiency driving catch-up fat.

Methods: The Anipill® DSI system was used for continuous monitoring of core body temperature (Tc) in a validated rat model of catch-up fat driven solely by suppressed thermogenesis. After ex-vivo calibration against mercury thermometers, the telemetry capsules were implanted in the peritoneal cavity. Continuous monitoring of Tc at 5 min intervals was performed in the rats (housed at 22 °C and fed a standard chow diet) during an adaptation period of 1 week, followed by 2 weeks of semi-starvation, and followed by 2-3 weeks of calorie-controlled refeeding when housed at 22°C as well as at thermoneutrality (29°C). Locomotory activity, assessed by infrared diode system, was recorded continuously for 2 consecutive days at different time points during each period.

Results: 24h Tc was reduced during semi-starvation (-0.77°C, $p<0.001$), and it remained significantly lower than in controls during refeeding (-0.30°C, $p<0.001$) whether when housed at 22°C or at 29°C. The lower Tc during the catch-up fat period being more pronounced during light than dark phase of the 24h cycle (-0.30°C vs -0.20°C, $p<0.01$). No significant differences in locomotory activity were observed between refed and control groups.

Conclusion: The reduced core body temperature in response to caloric restriction persists during the dynamic phase of weight recovery, and constitutes a thrifty metabolic trait that contributes to the high metabolic efficiency directed at the rapid restoration of the body's fat stores. Such reduced energy cost of homeothermy persisting during weight regain has implication for the "metabolic adaptation" that facilitates obesity relapse, as well as for the thrifty phenotype in the link between low birth-weight, catch-up growth and later obesity.

PP1.05

Obesity is associated with increased myocardial creatine kinase activity which is reversed by weight loss

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Introduction: Obesity is associated with a wide range of cardiovascular disease, including myocardial dysfunction. Although myocardial energy supply, measured by PCr/ATP, is depleted in obesity, cardiac systolic function is typically maintained. ATP is transferred within the myocyte by the creatine kinase (CK) shuttle system, and we hypothesised that the activity of this system would be increased in order to compensate for lower levels of available substrate. Additionally we investigated the impact of weight loss on myocardial phosphotransfer mechanisms.
Methods: 45 obese (BMI>30 kg/m^2) volunteers without cardiac disease, underwent magnetic resonance imaging of cardiac structure and function, as well as 31P magnetic resonance spectroscopy to determine myocardial PCr/ATP and creatine kinase kinetics, and results compared to 27 age and sex-matched normal weight volunteers. These investigations were repeated following a 12 month low-calorie, low glycaemic index dietary intervention.
Results: The obese cohort (BMI 35±5 kg/m^2, p<0.001 vs normal weight controls BMI 23±2kg/m^2) had lower PCr/ATP (1.9±0.3 vs 2.2±0.2, p<0.001, fig 1A) despite greater left ventricular stroke work (10±2 l*mmHg vs 8±2 l*mmHg, p = 0.001). However, the CK rate constant was higher in obesity (0.16±0.05s-1 vs 0.12±0.06s-1, p = 0.001, fig 1B) leading to a trend towards higher levels of ATP delivery (1.8±0.6µmol/g/s vs 1.4±0.7µmol/g/s, p = 0.063, fig 1C).
27 of the volunteers lost weight, achieving a reduction in body weight of 11±5% and in total body fat mass of 23±14%. In these individuals, there was a 10±3% fall in left ventricular work (p = 0.035), a restoration of PCr/ATP (to 2.1±0.3 from 1.9±0.3, p = 0.040, fig 2A) and a fall in CK rate constant (to 0.12±0.04s-1 from 0.17±0.04s-1, p = 0.001, fig 2B). Overall ATP delivery fell by 17±40% (p = 0.018, fig 2C).
Conclusion: Obesity is associated with an increase in myocardial creatine kinase rate, enabling maintenance of ATP delivery despite depleted creatine levels. These changes are reversed by intentional weight loss. This novel data provides further insight into the subcellular effects of obesity, and has potential to further our understanding of cardiac dysfunction in obesity.

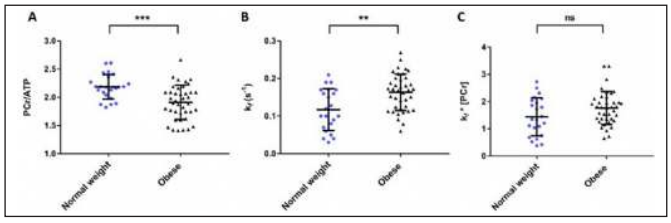

Fig. 1. Obesity is associated with lower PCr/ATP values (A), increased forward rate constant of the creatine kinase reaction (B) and a trend towards increased CK flux. ** indicates p<0.01; *** indicates p<0.001.

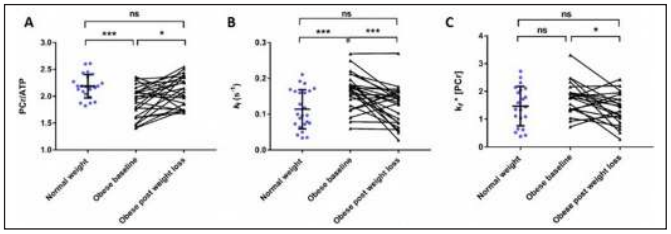

Fig. 2. Weight loss in obesity led to normalisation of PCr/ATP (A), creatine kinase forward rate constant (B) and ATP delivery (C). * indicates p<0.05; ** p<0.01; *** p<0.001.

PP1.06

Microbiota and metabolic changes caused by early life pulsed antibiotic exposure are restored with concurrent prebiotic supplement in rats

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Background: Antibiotics are the most widely prescribed therapeutic agents. They are life-saving drugs, but recent research suggests that early life exposure to antibiotics may increase infant's risk of obesity. On the other hand, non-digestible prebiotics improve metabolic health resulting in lower body weight and fat mass. Our aim was to examine if early postnatal prebiotic supplementation when co-administered with antibiotic can reduce obesity risk in metabolically challenged offspring.
Methods: 10 week old female Sprague-Dawley rats (n = 20) were mated and their pups were cross-fostered when 19 days old. Dams with their litters were randomized to: 1)control [C], 2)antibiotic [A] (azithromycin; dose 10mg/kg/day), 3)prebiotic [P] (10% oligofructose (OFS) oral suspension/diet), 4)antibiotic+prebiotic[A+P] and 5)lean conrol[LC]. The first pulse of antibiotics/prebiotics was administered before weaning from d19-21 of life through a feeding dropper. Animals were weaned onto a high fat high sugar diet (HFS), with prebiotic groups (P and AP) consuming 10% OFS in their diet. Prebiotic groups remained on the diet until the last pulse of antibiotics. The second and third pulse of antibiotic were given d29-31 and d38-40, respectively. Body weight was assessed weekly, fecal samples were collected repeatedly and tissues and blood were collected at sacrifice(wk7 and wk10). Insulin tolerance test(ITT) was performed wk9 of life.
Results: Males and females given antibiotics(A) had higher body weight than any other group; in females (A) higher fasting glucose, insulin and leptin was detected after the third pulse of antibiotics (wk7) when compared to P and AP group and ITT revealed insulin resistance compared to other groups. Similarly, males were insulin resistant compared to P and AP groups, with higher fasting insulin levels. Calculation of homeostatic model assessment of insulin resistance (HOMA-IR) confirmed insulin resistance in males and females with A. Ilumina sequencing of longitudinal samples showed microbial shifts in antibiotic groups. Specifically, pups given antibiotics had reduced Lactobacillaceae and increased Bacteroidaceae. Hypothalamic/hepatic gene expression analysis is ongoing.
Conclusion: Therapeutic doses of antibiotic administered to rats mirrored the concentration commonly used for human children for an acute infection. Antibiotics increased body weight, changed microbiota, impaired insulin production and insulin sensitivity; these effects were reversed with prebiotic co-administration.

PP1.07

Plasma metabolites associated with frequent red wine consumption: a multi-metabolite model in the context of the PREDIMED study

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Background: The relationship between red wine (RW) consumption and metabolism is poorly understood. The aim of this study is to assess the circulating metabolomic profiles in relation to frequent RW consumption as well as the ability of a set of metabolites to discriminate RW consumers from non-consumers.
Methods: Cross-sectional analysis of 1,157 subjects from the PREDIMED study. Participants were categorized according to RW consumption (non-consumers versus consumers of > 1 glass (100 mL/day)) at baseline. Plasma metabolomics analysis was performed using two methods based on liquid chromatography-mass spectrometry. Associations between 387 identified metabolites and RW consumption were assessed using elastic net regression analysis taking into consideration baseline significant covariates. Ten-cross-validation (CV; 90% training, 10% validation) was performed and receiver operating characteristic (ROC) curves were constructed in each of the validation datasets based on weighted models.
Results: A set of 33 metabolites were selected at least one time in the elastic net logistic regression. Out of them, a subset of 13 metabolites was consistently selected in all the 10 CV iterations, discriminating RW consumers versus non-consumers. Based on the multi-metabolite model weighted with the regression coefficients of metabolites and selected covariates, the area under the curve (AUC) was 0.82 (95% CI: 0.79-0.86). These metabolites mainly consisted of lipid species (e.g. triglycerides and phosphatidylcholines), some organic acids and alkaloids.
Conclusion: A multi-metabolite model identified in a Mediterranean population appeared useful to discriminate between frequent RW consumers and non-consumers. Further studies are needed to assess the contribution of the identified metabolites in health and disease.

PP1.08

Hypomagnesemia as a new predictor of diabetes mellitus remission in obese patients submitted to bariatric surgery

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Introduction: Many evidences demonstrate a high prevalence of hypomagnesemia in patients with diabetes mellitus (DM), and a two-ways relationship has been demonstrated between magnesium and glycogen metabolism. Bariatric surgery (BS) lead to remission of DM but the impact of hypomagnesemia on this reversal is unknown.
Objetive: To determine the relationship between the presence of hypomagnesaemia in the preoperative period and the rate of DM remission after the first year of BS.
Methods: We performed a retrospective observational study including all morbidly obese patients submitted to BS – Roux-en-Y gastric bypass (RYGB), laparoscopic adjustable gastric band (LAGB), and sleeve gastrectomy (LSG)- between January 2010 and June 2017 to evaluate the rate of DM remission after the first year of BS. Patients without records of magnesium levels were excluded. To define DM and pre-DM we used the 2018 ADA guidelines criteria. We also considered as having diabetes, patients using antidiabetic treatment. We defined hypomagnesemia as serum magnesium levels≤1.5mEq/L Complete remission of diabetes was defined as normal glycemic measurements. The serum magnesium was measured by spectrophotometric determination in serum with xylidyl blue. To evaluate the association of magnesium levels with diabetes remission binary logistic regression model was performed. Results are adjusted for age, sex, serum magnesium levels in the 1st post-op year, percentage of weight lost in the 1st post-op year, surgical technique and magnesium supplementation.
Results: We included 1551 patients, of which 84.9% were females, with a mean age of 42.0±10.7 years, initial BMI 43.0 kg/m^2 (AIQ = 6.8), waist circumference 123.4±13.26 cm, hip circumference 132.0cm (AIQ = 15.0) and 20.5% of the patients had DM. The mean initial serum magnesium level was 1.59 mg/dL (AIQ = 0.18) with 42.9% of diabetic patients having hypomagnesemia, while only 21.7% of the remaining had this disease ($p<0.001$). We found that higher preoperative magnesium level translates in a greater remission of DM and pre-DM 1 year after surgery, with an increase in remission of 2.526, (95% IC: 1.034-6.166) for each increase in one unit of magnesium. Adjusting for confounding factors (serum magnesium levels in the 1st post-op year, percentage of weight lost, surgical technique and magnesium supplementation), this risk increases to 4.777 (IC 95%: 1.692-13.491).
Conclusion: We observed that hypomagnesemia is very frequent among patients with DM or pre-DM, having a negative effect on remission of DM and pre-DM, and this may become a new predictor of the remission of these pathologies

PP1.09

On the definition of sarcopenic obesity – initial results from UK Biobank

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Background: Sarcopenia is characterized by progressive loss of muscle mass and function. Low muscle mass is commonly detected by estimating appendicular lean mass (ALM) using Dual-energy X-ray absorptiometry (DXA). The proper adjustment of ALM is debated due to challenges in mortality prediction and detection of sarcopenic obesity. Common measures used to identify low function are acquired at low cost but confounded by, e.g., motivation to perform the test, fitness level, neurological causes, pain or arthritis. For effective detection, treatment, and longitudinal follow up of sarcopenia, biomarkers specific to muscle tissue, with a strong link to functional outcomes are needed.
Methods: 9615 participants from the UK Biobank imaging study were included. Body composition assessment, quantifying lean muscle volume (LMV) and muscle fat infiltration (MFI) was performed using magnetic resonance imaging (MRI)[1]. For each subject, a virtual control group (VCG) was created using sex and body mass index (BMI). As a measure of deviating LMV, the individual LMVi (LMV/height^2) z-score was extracted from each VCG distribution (LMVi[VCG]). The potential value of combined muscle assessment (muscle volume and fat infiltration) was investigated through hand grip strength, stair climbing, usual walking pace, and number of falls.
Results: R-squared (R^2) for LMVi[VCG] and MFI was 0.13/0.17 (females/males). The association between LMVi and BMI ($R^2 = 0.663$) was effectively normalized through LMVi[VCG] ($R^2 = 0.007$) (compared to the negative association introduced through division by BMI ($R^2 = 0.647$)). Age was negatively associated with LMVi[VCG] (average 5-year difference: -0.20 standard deviations from mean VCG), and positively associated with MFI (average 5-year difference: 0.40 pp). Low hand grip strength, slow walking pace, and no stair climbing was positively associated with MFI (all $p<0.05$) and negatively associated with LMVi[VCG] (all $p<0.01$). Number of falls were positively associated with MFI ($p<0.01$), but not significantly associated with LMVi[VCG]. For all functional outcomes, LMVi[VCG] and MFI combined resulted in highest diagnostic performance for detection low functional performance.
Conclusion: LMVi[VCG] allowed for BMI invariant detection of sarcopenia, enabling muscle specific sarcopenia assessment within overweight and obesity. 3D-volumetric MRI-assessed LMV provided a better description of the relation to age as compared to DXA-assessed ALM. Further, combining MFI and LMVi[VCG] improved the functional link between imaging biomarkers and outcome, opening up the possibility for objective sarcopenia assessment.

Reference

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PP2 - Childhood and Adolescent Obesity

PP2.01

Underestimation of weight status in children and adolescents aged from 0-19 years old: a systematic review and meta-analysis

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Introduction: It is widely recognised that obesity in childhood is a worldwide public health issue. For any intervention, the first step is to identify overweight status which problematizes the child's current weight to legitimises action. This involves all those in the therapeutic triad: children themselves, parents and healthcare professionals. In policy and health promotion, it is generally accepted that a significant barrier to intervention is that parents (caregivers) of children with obesity underestimate their child's weight status (Lundahl et al, 2014). Furthermore, research has shown that healthcare professionals may be also be underestimating. The aim of this study is to systematically identify and critically evaluate relevant research to investigate the prevalence of, and factors associated with, underestimation of children's weight status.
Methods: Abstracts published between 2000 to 2017 were included, and where identified using the following search engines: CINAHL, EMBASE, PUBMED, and Psych-Info. References of relevant articles were hand-searched for additional studies and the "Related Articles" and "Cited by" functions in search databases were also used. Both qualitative and quantitative research that assessed caregivers, children and healthcare professional's perceptions of children's weight using Likert scale questions, classification into weight categories, pictorial methods, or reporting of height and weight, and were then compared with documented standards for defining overweight for example (IOTF, CDC) based on anthropometric measurements were included. Publication language had no bearing on the nature of the included studies, nor did the publication location. In the meta-analysis, pooled effect sizes were calculated using random-effects model.
Results: A total of 87 articles were included. In the quantitative studies, the random effect sizes revealed that 55% (95% confidence interval 49%–61%) of (caregivers) and children underestimated their degree of overweight. HCPs shared this misperception (but limited studies prevented meta-analysis). Furthermore, underestimation was positively associated with a number of factors such as: child's age, gender (male), current BMI and parental weight status, education and ethnicity. In the qualitative studies, parents commonly describe their children in terms other than obese such as "big boned," "thick, "and "solid", and demonstrated a strong desire to avoid labelling their child with medical terminology.
Conclusion: This review clearly demonstrates that underestimation of child weight status is endemic. Furthermore, underestimation was positively associated with a number of factors such as: child's age, gender (male), current BMI and parental weight status, education and ethnicity.

PP2.02

Maternal BMI is an early life predictor of childhood obesity: a systematic review and meta-analysis

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Background: Early-life intervention to prevent childhood obesity is a priority for public health, global health and clinical practice. Understanding the association between childhood obesity and maternal pre-pregnancy body mass index (BMI) would inform policy and practice by estimating the potential for offspring health gain through channelling resources into intervention. This systematic review and meta-analysis aimed to examine the dose-response association between maternal BMI and childhood obesity among offspring.
Methods: Five databases were searched (MEDLINE, Child Development & Adolescent Studies, CINAHL, Embase, PsycInfo), supplemented by hand-searching reference lists, citation-searching and contacting authors. All searches were completed in May 2018. Observational studies published in English language reporting associations between maternal and child BMI or z-score were included. MOOSE guidelines were implemented. Two researchers independently performed data extraction and quality assessment. Categorical outcomes were defined using BMI (or equivalent z-score): obese (≥95th percentile), overweight/obese (≥85th percentile) and overweight (85th-95th percentile). Continuous outcomes included

BMI and z-score. Child obesity was the primary outcome. Categorical and continuous child BMI/z-score outcomes were analysed separately. Linear and nonlinear dose-response meta-analyses were conducted using random effects models. Sensitivity analyses assessed robustness of the results. Meta-regression and sub-group meta-analyses explored sources of heterogeneity. Studies not able to include in meta-analyses were summarized narratively.
Results: Searches identified 36,134 studies, 67 were included (n = 48 cohorts). Meta-analyses of child obesity included 20 studies (n = 88,872); child overweight/obese 22 studies (n = 181,800); and overweight 10 studies (n = 53,238). Associations were nonlinear for all outcomes. There was significantly increased OR for child obesity with maternal obesity (3.64, 95% CI 2.68-4.95) and overweight (1.89, 95% CI 1.62-2.19). ORs for child overweight/obesity were 2.69 (95% CI 2.10-3.46) for maternal obesity and 1.65 (95% CI 1.47-1.85) for maternal overweight. ORs for child overweight were 1.80 (95% CI 1.25-2.59) for maternal obesity and 1.41 (95% CI 1.19-1.67) for maternal overweight.
Conclusion: This research has identified a 264% increase in odds of child obesity when mothers have preconception obesity. This data provides substantial evidence for the need to develop interventions commencing prior to conception in order to support women of childbearing age with weight management and contribute towards prevention of intergenerational obesity.

PP2.03

Translating Healthy Habits Happy Homes to Scotland: feasibility of adopting a home-based, pre-school, childhood obesity prevention, intervention in a new country

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Introduction: The ability to translate existing interventions and test feasibility in a range of settings and population groups is useful. Healthy Habits, Happy Homes (4H) is a home-based, pre-school childhood obesity prevention intervention targeting changes to family routines and 4 Energy Balance Related Behaviours (EBRB's); physical activity, screen time, family meals and sleep routine which demonstrated efficacy in North America. Translation of 4H intervention to low socio-economic households within UK, will involve testing of study design, recruitment strategy, and practicality of trial procedures with pre-school children and their families living in North East Dundee, Scotland.
Methods: Local workers, parents and researcher co-produced a study website to promote inclusive recruitment of participant families via social media, local press, word of mouth, posters and face-to-face at local community events. Interested families contacted researcher directly via website, email, text message or telephone. Children whose parents had provided consent were randomisation to intervention or control group following baseline measures. Objective measures of child's height, weight, body composition (BIA) and four EBRB's were determined through accelerometer, subjectively through parental self-report at baseline and again after 6months.
Results: 126 parents enquired about study over a 10 month recruitment period. Positive local press coverage shared on social media prompted n = 29 enquiries. 20.6% (n = 26) participant children and their families signed up to the study (I = 14 C = 12) by website (38%, n = 10), face to face (19%, n = 5). 38% (n = 10) of participant families saw study promoted in local press / newspaper facebook site, 34.6% (n = 9) heard of study on social media. At baseline, parental questionnaires were completed in 96.2% (n = 25). Height and weight were collected in100% of children, BIA in 57.7% (n = 15) and 53.8% (n = 14) wore an accelerometer, with child and/or parental refusal main reason for missing data. Between 4-35 (mean 15.2) SMS or email correspondence required to complete baseline visit.
Conclusion: Translating interventions from one country to another can be complex and feasibility should be established. A participatory and co-production approach was utilised for 4H adoption in Scotland. Promotion of study website through positive local press coverage, social media and face-to-face proved useful for inclusive recruitment. Objective measures of physical activity using accelerometer and body composition (BIA) in this population group proved challenging. Arranging home visits via SMS or email was successful, although number of correspondence required was variable between families.

Conflict of Interest: None.

Funding: Hannah Dairy Research Foundation.

PP2.04

Dietary magnesium intake in relation to fasting blood glucose and insulin concentrations and body mass index in middle school students from the HEALTHY study

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Introduction: Type 2 diabetes (T2DM) in children and adolescents has increased dramatically worldwide. Lifestyle factors, such as poor nutrition and low levels of physical activity have been established to prevent obesity and T2DM. The HEALTHY primary prevention trial in the United States was designed in response to increased rates of overweight, obesity, and T2DM in middle school students from 6th through 8th grades. The HEALTHY Study was a three-year, multi-component, school-based intervention designed to address the school food environment, physical education, lifestyle behaviors, and promotional messaging with the goal of reducing modifiable risk factors for T2DM. Specific to nutrition, it has been shown that consuming a diet that is high in fruits, vegetables and whole grains are protective against T2DM. Magnesium is one micronutrient found in these food sources. Evidence indicates an inverse relationship between dietary magnesium intake and risk of T2DM among adults and older populations. The purpose of this study was to determine whether dietary magnesium intake is related to plasma glucose and insulin concentrations and body mass index (BMI) percentile in students enrolled in the HEALTHY Study.
Methods: Participants were 2,334 ethnically diverse students from the HEALTHY Study with complete dietary, BMI percentile, and glucose and insulin concentrations at baseline (6th grade) and the end of the study (8th grade). Dietary magnesium intake was self-reported using the Block Kids Food Frequency Questionnaire. Hierarchical multiple regression models examined the relationships between dietary magnesium intake, BMI percentile, plasma glucose and insulin concentrations at baseline and the end of the study for both control and intervention schools.
Results: After adjusting for sex, ethnicity/race,1st and 2nd degree family history of diabetes mellitus, magnesium intake from supplements, and fitness level, dietary magnesium intake was the only predictor for BMI percentile at baseline ($r = -0.042$, $R2 = 0.382$, $F(9,2324) = 159.277$, $p = 0.044$) and the end of the HEALTHY Study ($r = -0.058$, $R2 = 0.248$, $F(8,2323) = 96.007$, $p = 0.005$). Similarly, BMI percentile was only the only predictor of dietary magnesium intake at the end of the HEATHY Study ($r = -0.059$, $R2 = 0.016$, $F(3,2328) = 12.532$, $p = 0.005$).
Conclusion: We found that dietary magnesium intake related to BMI percentile among middle school students in the United States, indicating that BMI percentile may predict dietary magnesium intake. Additional studies are needed to confirm whether high magnesium intakes may help promote lower BMI, which could have favorable effects on the prevention of T2DM among children and adolescents.

PP2.05

Telomere length and weight loss in Spanish children and adolescents with abdominal obesity

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Introduction: Telomeres are repetitive DNA sequences (TTAGG) located at the end of chromosomes which their main function are to protect chromosomes. Telomeres become shorter with the age and could be consider markers of aging and inflammation. It has been observed that obese children showed shorter telomeres than normal weight children. The effect of weight loss on telomere length remains unclear. Hence/Thus, the aim of the present study was to assess the effect of weight loss on telomere length in a paediatric abdominal obese population.
Methods: Telomere length was measured by quantitative real-time PCR (1) in 108 children with abdominal obesity (defined as a waist circumference > 90th percentile) participating in a 1 year lifestyle program. The program consists on a moderate energy-restricted diet, nutritional education, physical activity promotion and family involvement. Participants were divided in two groups: children n = 59 (< 12 years old) and adolescent n = 57 (≥ 12 years old). Anthropometric, biochemical parameters and TL were measured at baseline, 2 months and 1 year.
Results: Participants of children group have a mean age of 9.22 years (1.35) being 61% females, while adolescents have a mean age of 13.45 years (1.25) and were 65 % females. No differences were found between groups regarding BMI-SDS at baseline. A significant decrease in BMI-SDS was achieved on both groups after 2 month (Δ -0.52 and Δ – 0.44) and 1 year (Δ -0.68 and Δ -0.45) of lifestyle intervention ($p<0.001$). Regarding telomere length children (TL = 1.10 (0.26) and adolescents (TL = 1.02 (0.19)) showed similar TL at baseline ($p<0.095$). After 1 year of intervention, adolescents showed lower telomere attrition on 0.065 (0.033) their telomeres ($p = 0.043$), but not in the children group.
Conclusion: the lifestyle program was successful in children and adolescents with abdominal obesity achieving a decreased on BMI-SDS. The adolescent group lower their telomere shortening after 1 year of intervention.

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Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by MERCK foundation. AOR is fully acknowledged for the fellowships to Asociación de Amigos de la Universidad de Navarra (ADA). LMA and the research leading to these results has received funding from "la Caixa" Banking Foundation.

PP2.06

A new web-based childhood obesity treatment with objective self-monitoring of weight, physical activity and continuous support from the clinic – a randomized controlled pilot study

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Introduction: Mobile applications that supply information and motivational support in obesity treatment have been tested with mixed results. To our knowledge, no apps are evaluated where objective data of weight and physical activity are combined with direct support from the clinic. The aim was to evaluate a new web-based support system (Provement) for childhood obesity treatment and compare with standard care.
Methods: Twenty-eight children with obesity (54% girls, 5-12 years) from three pediatric clinics were randomized to standard care plus Provement (n = 15) or to standard care (n = 13). Provement includes daily weighing at home on a scale with hidden figures and a gamified activity-measuring wristband (Lifee). Weight data was live streamed to parents' smartphones and to a clinic's interface. Weight was shown graphically as a mean over the past seven days, with individual goals for weight development. Clinicians and the families could communicate via the app, e.g. feedback on weight development. BMI z-score was calculated at baseline, three and six months follow-up. Experiences of the treatment from parents and clinicians were collected.
Results: After six months, the average (SD) BMI z-score was reduced in Provement-users, -0.26 (0.17), but not in standard care, 0.01 (0.18) ($p = 0.001$). 89% of Provement users reported that the treatment goal was evident vs 56% in the standard care group. Daily weighing was reported to work out fine for 56%, but 11% found it troublesome. Most parents (67%) using Provement reported that the gamified wristband was fun to use but did not increase their child's physical activity. All clinicians stated that the most prominent benefit with Provement was to work with clear individualized treatment goals. In standard care 85% cancelled and 40% did not show up for at least one visit versus 40% and 9% in the Provement-group.
Conclusion: The Provement treatment approach based on objective data combined with rapid feedback resulted in significantly better treatment results and a reduced number of late cancellations compared to standard care, but it needs to be further investigated in a large-scale randomized study.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by grants provided by the Stockholm County Council and the ALF project.

PP2.07

"Another state of mind" – parents' journeys through childhood obesity treatment

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Introduction: Childhood obesity is challenging to treat and knowledge on how to design the best treatment programs is still lacking. This study aims to understand the challenges parents of preschoolers with obesity face. It also aims to assess parents' experiences of a parent-based group treatment program evaluated in the More and Less Study, an ongoing randomized controlled trial in Stockholm County.
Methods: Parents of preschoolers with obesity were invited to participate in an interview after taking part in a 10-week parent-based group treatment program, which included training in parenting skills. Semi-structured telephone interviews were conducted 3-6 weeks post treatment by researchers who did not lead the treatment groups. The interviews focused on parents' experiences of raising a child with obesity and their reflections on participating in the treatment program. Data were analyzed using thematic analysis.
Results: 36 parents (67% mothers, mean age 39 years, foreign background 33%, university education 50%) were interviewed. Two overarching themes were developed. The first theme, "Emotional burden", focused on parents' experiences of raising a child with obesity, and included three sub-themes: "Loneliness and vulnerability", "Frustration and guilt" and "Uncertainty and worry about hunger and satiety". The sub-theme "Loneliness and vulnerability" captured parents' experiences of seeking help and treatment for their child's obesity. In "Frustration and guilt",

parents linked their feelings to the social stigma attached to having a child with obesity. Under "Uncertainty and worry about hunger and satiety", parents spoke about difficulties in responding to their child's hunger and managing their child's appetite. The second theme, "Skills and strength from others", focused on parents' experiences of group treatment, and included three sub-themes: "Pedagogical tools for handling food", "Positive parenting skills" and "Social strategies". In "Pedagogical tools for handling food", parents reported that they appreciated the practical techniques they were taught, especially those regarding food and how to make everyday life more structured and predictable. In "Positive parenting skills", parents explained that the program's focus on parenting skills, especially positive parenting, gave them the confidence to apply the techniques in their everyday life. Parents highlighted the strength of the group setting in "Social strategies", saying they could openly discuss and learn from other parents in the treatment group.
Conclusion: Childhood obesity carries social and emotional implications for parents. Parent-based obesity intervention programs should offer parents skills and support in managing socially and emotionally challenging situations.

PP2.08

Post-exercise energy replacement does not reduce subsequent appetite and energy intake in adolescents with obesity

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Introduction: Acute exercise has been found to induce subsequent appetite and energy intake modifications in adolescents with obesity, it remains however not known whether this effect is mediated by the induced energy deficit. The present study examined whether these nutritional responses to exercise persist after immediate dietary energy replacement (ER) of the exercise-induced energy expenditure (Ex-EE).
Methods: Fourteen 12-15-year-old adolescents with obesity (Tanner stage 3-4; 8 girls) randomly completed 3 experimental sessions: i) a rest condition without exercise (CON); ii) a 30-min exercise session (EX); iii) a 30-min exercise + energy replacement session (ER+R). On the three occasions, a standardized breakfast was served and the adolescents were asked to remain at rest (CON) or to cycle for 30 minutes (EX and EX+R) between 09:45am and 10:15am. Lunch and diner energy intake (EI) were served ad libitum and food reward (Leeds Food Preference Questionnaire) assessed before and after lunch. Appetite sensations (hunger, fullness, Prospective Food Consumption and Desir to Eat) were assessed at regular intervals through the day (Visual Analog Scale). Ethical agreement 3634 –RM; NCT03742622.
Results: Mean body weight was 95.3 ± 16.1 kg, with a BMI of 34.8 ± 5.7 (z-BMI 2.3 ± 0.4). Ex-EE was significantly higher than the 30-min resting EE ($p<.001$). Lunch, diner and total daily EI (not including ER content) were not different between conditions. Lunch and total EI including the energy content of ER were significantly higher on EX-R compared with both CON and EX, with no difference between EX and CON. Lunch Relative EI (considering ER content) was significantly higher on EX+R (1040 ± 329 kcal) compared with CON (931± 315 kcal) and EX (826 ± 279 kcal) ($p<0.05$ and $p<0.001$ respectively). Total REI was significantly lower on EX (1502 ± 488 kcal) compared with CON (1713 ± 530) ($p<0.05$) and significantly higher on EX+R (1849 ± 486 kcal) compared with CON ($p<0.001$). None of the fasting, pre-lunch and daily AUC appetite feelings, AUC 60 minutes post-lunch and Satiety Quotients was found significantly different between conditions.
Conclusion: While their appetite and energy intake are not modified in response to an acute bout of moderate intensity exercise, adolescents with obesity miss to reduce their post-exercise food intake in presence of an immediate dietary energy replacement covering the induced energy deficit, favoring then a higher energy balance.

Conflict of Interest: No conflict of interest.

Funding: This study was funded by the French University Institute (IUF) and the UGECAM Nutrition Obesity clinic.

PP3 - Health, Behaviour and Environment

PP3.01

School neighbourhood impacts children obesity and body composition

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Introduction: The schools' neighbourhoods provide an important environmental context that may influence the risk of obesity among children. We aimed to assess the effect of school neighbourhoods on obesity and body composition in schoolchildren.
Methods: Data on 701 children (7-12 years old) from 20 primary schools were analysed. Anthropometric measurements and bioelectrical impedance analysis were performed to assess body mass index (BMI) and characterize body composition - body fat percentage, body fat mass, free fat mass and total body water. Land use composition were quantified within a 500m buffer zone around schools. The proportion of effects explained by the school environment was measured by mixed-effect models.
Results: Green urban areas around schools showed a tendency to be associated with lower values of BMI and better body composition parameters compared with built areas, being BMI z-scores and body fat percentage significantly higher in-built than in green urban areas ($\beta = 0.48$, 95% CI 0.05; 0.90 and $\beta = 2.56$, 95% CI 0.39; 4.73, respectively). After adjustment, for confounders, the schools' neighbourhood explained 64%, 85%, 89% and 47% of the school effect on BMI, body fat mass, free fat mass and total body water, respectively.
Conclusion: Our findings suggest that the environment surrounding schools has an effect on BMI and body fat percentage in schoolchildren. These results may contribute to the creation of healthier cities and help reduce health expenses by decreasing exposure to detrimental factors in urban settings.

Conflict of Interest: The authors have no competing interests to declare.

Funding: Fundação para a Ciência e Tecnologia through the scholarships SFRH/BD/112269/2015 and SFRH/BD/108605/2015 and by the Project NORTE-01-0145-FEDER-000010 – Health, Comfort and Energy in the Built Environment (HEBE), cofinanced by Programa Operacional Regional do Norte (NORTE2020), through Fundo Europeu de Desenvolvimento Regional (FEDER) and EXALAR 21 project financed by FEDER/FNR and by Fundação para a Ciência e Tecnologia (EXALAR 21 02/SAICT/2017 - Project nº 30193).

PP3.02

Dissonance in naming adiposity: a quantitative survey of health professionals and general population in New Zealand

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Introduction: Communication has an essential role in the therapeutic relationship between a patient and health care practitioners (HCPs) with terminology playing an important role (1,2). The terminology used by HCPs can significantly impact on an individual's perceptions of weight and experience of stigma (3,4). This papers explores weight-related terminology with HCPs and a general population sample in New Zealand and explores the impact of preferred language during conversations for health care practitioners.
Methods: A self-completion questionnaire developed specifically for use in the study to assess perceptions and preferences of 10 commonly used terms to describe adiposity was administered to adults aged 18 years and over, residing in New Zealand across four different geographical regions in 2016. Participants were asked to rate the degree to which listed terms were 1) stigmatising, 2) blaming of the person for their weight, and 3) motivating a person to lose weight.
Results: 775 participants completed questionnaires. 'Weight' or 'high BMI' were the most preferred terms for describing excess adiposity. The term 'bariatric' was poorly understood in New Zealand. There was dissonance in responses relating to the terms considered most blaming and those considered to be motivating terms to lose weight.
Conclusion: The terms 'weight' or 'high BMI' were the terms most commonly preferred across this and other surveys, although neither term is meaningful in describing accurately the clinical relevance of the person's size during the HCP-patient interaction. While 'one term does not fit all' HCPs should refer to 'weight' or 'high BMI' instead of 'obesity' terms and recognise that language has the ability to harm and must be applied with care, particularly in first encounters. Whichever term is selected, HCP-patient conversations need to be respectful, appropriate and support meaningful dialogue.

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Conflicts of Interest: None disclosed.

Funding: Research relating to this abstract was funded by Victoria University of Wellington, New Zealand.

PP3.03

Adulthood body mass index and risk of frailty in late life: results of a 26-year follow-up in the GAZEL cohort

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Introduction: Frailty is an indicator of decreased physiologic resources in the elderly. Although a cross-sectional association between frailty and obesity has been shown, few studies examined this association from a life-course perspective. This study aimed to assess the association between body mass index (BMI) trajectories during adulthood and the risk of frailty in late life.
Methods: This prospective cohort study included 11,784 adults from the GAZEL cohort included in 1989 (mean age 70y at end point, in 2015). Modified Fried's frailty criteria (weakness, fatigue, unwanted weight loss, low physical activity, and low mobility) were assessed by questionnaire. Frail individuals had 3 criteria or more, pre-frail 1 or 2, and robust 0. BMI trajectories during 26 years of follow-up were defined using latent class mixed models. Their association with frailty status in late life was estimated using multinomial regressions, adjusted for socio-demographic and medical confounders.
Results: In 2015, 4.4% men and 9.6% women were frail; 15% men and 14% women were obese.
Patterns of BMI trajectories were similar between genders, with 3 groups: cluster 1 (prevalence: 95% among men; 90% among women) characterized by constant overweight for men and normal weight for women; cluster 2 (3.9% and 4.7%, respectively) characterized by constant obesity; and cluster 3 (1.5 and 5.1%, respectively) characterized by an evolution from overweight to obesity. Compared to individuals in cluster 1, individuals in cluster 2 and 3 had an increased risk of frailty, with men in cluster 3 (OR cluster 2 = 3.84 [1.93-7.64] and OR cluster 3 = 8.78 [5.73-13.5] for men; OR cluster 2 = 7.97 [4.62-15.1] and OR cluster 3 = 8.36 [4.39-14.5] for women). Also, men and women included in clusters 2 and 3 were at increased risk of pre-frailty compared to individuals in cluster 1.
Conclusion: This study shows that obesity, whether it has been for a long time or has gradually settled in adulthood, is a strong risk factor for frailty in late life among men and women. Further research will investigate the factors associated with the trajectories of BMI in order to help drawing preventive strategies of frailty.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PP3.05

Physical activity behaviour among preschool children: preliminary baseline analysis from ToyBox Study Malaysia

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Introduction: Physical activity (PA) during childhood has been found to reduce the risk of childhood and adulthood obesity, and health benefits of PA in the young are likely similar to those in adults. Planning effective interventions need baseline data that is in-line with current literature. PA

recommendations are moving towards 24-hour movement guidelines, which includes recommendations for moderate-vigorous physical activity (MVPA), light activity, sedentary and sleep. This study aims to determine the MVPA and light activities behaviours among preschool children in Kuala Lumpur and Selangor participating in a RCT trial of an obesity prevention intervention for preschool children called ToyBox Study Malaysia.
Methods: PA was measured using Actigraph (model GT3X+), which was worn over the right hip on an elastic belt for seven consecutive days. Participants from both the control and intervention groups were asked to wear the Actigraph while awake and to remove only during bath time, while doing water-based activities (e.g. swimming) and while sleeping. Valid data is defined as a minimum of five days of at least 10 hours of wear time per day, including one weekend-day. A 60-minute consecutive zero count criterion was considered non-wear period. Activity-intensity levels were calculated using Butte preschool cut-points for Actigraph vector magnitude.
Results: Actigraph data from 267 children aged 4-6 years were analysed for this report. Less than half (42.3%) of the children met the current movement guidelines of at least 60 minutes of MVPA. Average time spent on MVPA was 59 minutes/day. However, the majority (82%) met the guidelines for light activities (several hours of structured and unstructured light activities per day), defined here as spending at least 3-hours in light activities. Average time spent on light activities was 230 minutes/day. Children spent more time in MVPA during weekend-days (65 minutes/day) compared to weekdays (57minutes/day). Boys were found to spend more time in MVPA (63 minutes/day) compared to girls (54 minutes/day). No significant differences were observed for light activities between weekend-days and weekdays, and between girls and boys.
Conclusion: Although Malaysian preschool children do spend the recommended amount of time in light activities throughout the day, more than half the children do not have adequate amounts of MVPA. These findings strongly suggest the need for an intervention program such as ToyBox Study Malaysia, where one of the main aims is to increase time spent in MVPA through structured play.

PP3.06

Approaches to and correlates of takeaway food outlet urban planning policy. A survey and analysis of English local government practice

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Introduction: Takeaway food is typically high in energy, salt and saturated fat. Greater neighbourhood access to takeaway food outlets, or 'takeaways', has been associated with increased takeaway food consumption, less healthy diet and higher body weight. English planning guidelines suggest that the local planning system should be used to promote healthier food environments, through regulation of planning permission for new takeaways. Little is known about how widely this approach has been adopted in England, or the local level correlates of use. We aimed to address these gaps.
Methods: We completed an England-wide census of local government areas with planning responsibility. We reviewed adopted planning policy documents to identify those that specifically addressed takeaways. We classified these as having a health (diet and obesity) or non-health focus. Through content analysis, we categorised approaches to develop an intervention typology.
We used univariable multinomial logistic regression to explore whether the odds of having a health or non-health planning policy varied according to area-level composition (e.g. population-level excess weight) or contextual (e.g. takeaway outlet number) characteristics.
Results: Across 325 local government areas, planning policies specific to takeaways were adopted by 51% (n = 164). Of these, 34% (n = 56) had a health focus.
We developed a typology with two axes: place (e.g. 'retail areas', 'residential areas') and strategy (e.g. 'exclusion zones', 'limit density'). The most frequent health focused approaches were exclusion zones around places for children and families (n = 33) and limiting density in retail areas (n = 18). Compared to local government areas with the lowest, those with highest proportions of 10-11 year old children with excess weight (OR 25.31; 95% CI: 6.74, 94.96), and takeaway number (OR 54.00; 95% CI: 6.17, 472.41), were more likely to have adopted a health-focused planning policy, than no planning policy.
Conclusion: Over half of English local government areas use their planning powers to regulate new takeaways. Strategies are varied and target a range of places. Planning policies were systematically more common in areas with higher indicators of need. Further research should engage with local policymakers to explore the perceived acceptability, successes, and drivers behind implementation, of these approaches.

PP3.07

Joint effects of obesity and key lifestyle habits in cancer risk

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Introduction: Obesity (BMI ≥30 kg/m^2) and many lifestyle habits are risk factors for several cancer types. Although obesity and lifestyle habits co-occur, little is known on their joint effects on cancer risk.
Data & Methods: The METCA cohort was assembled from 6 studies (Finrisk, ATH1, ATH2, Health2000, Finnish Mobile Clinic Health Survey, Mini-Finland Health Survey) gathering health behaviour data in Finland between 1972 and 2015. These studies were prospectively linked to the Finnish Cancer Registry. The data included 1,770,054 person years among 192,763 participants, containing 18,022 incidences of any first primary cancer. BMI, current smoking, heavy alcohol consumption and physical inactivity were harmonized between the studies. Associations of these factors and their joint effects with subsequent first primary cancer were analysed by using multiplicative Poisson models without (main effects only) and with pairwise exposure interaction, estimating hazard ratios (HR) with 95% confidence intervals (CI). The models were adjusted for age, calendar time and study.
Results: Obesity was consistently associated with cancer risk for women and men in all pairwise analyses with other risk factors (all HRs 1.07-1.12 and CIs within 0.99-1.20). Among the other risk factors current smoking had the strongest association with cancer risk (HR 1.42, CI 1.33-1.52 for women and 1.79, CI 1.68-1.90 for men). Physical inactivity was also found to be associated with cancer risk (HR 1.08, CI 1.02-1.14 for women, HR 1.10, CI 1.04-1.16 for men). No pairwise interactions were found for obesity and smoking and obesity and physical inactivity, however their joint effects appeared multiplicative. For heavy alcohol consumption (HR 1.29, CI 1.12-1.48 for women, HR 1.23, CI 1.15-1.32 for men) a negative joint effect with obesity was suggested among women (HR 0.90, CI 0.68-1.19) but not among men (HR 1.33, CI 1.21-1.47).
Conclusion: Obesity, smoking, heavy alcohol consumption and physical inactivity are risk factors for cancer. When these factors occur together their effects on cancer risk are multiplicative. In public health interventions special attention should be paid to those with multiple risk factors.

PP3.08

Socioeconomic inequalities in childhood-to-adulthood BMI tracking in three British birth cohorts

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Introduction: Body mass index (BMI) tracks from childhood to adulthood, but the extent to which this relationship varies across the distribution and according to socio-economic position (SEP) is unknown. The aims of this study were to quantify child-adult BMI tracking in three nationally representative cohorts and investigate whether BMI tracking is associated with SEP.
Methods: We used serial BMI and socioeconomic data from 15095 participants from three British birth cohorts (National Survey of Health and Development (n = 2,274); National Child Development Study (n = 7,143); British Cohort Study (n = 5,678)). BMI tracking between 11 and 42 years was estimated using quantile regression, with estimates reflecting correlation coefficients. SEP disparities in tracking were investigated using a derived SEP variable based upon social class in both childhood and adulthood. This SEP variable was entered into the quantile regression as an interaction term with the 11-year BMI z-score.
Results: In each cohort, tracking was stronger at the upper end of the distribution of BMI at 42 years. For example, for males in the NSHD, tracking estimates at the 10th quantile were 0.30 (0.21, 0.38), increasing to 0.66 (0.50, 0.83) at the 90th quantile. Tracking estimates were generally higher in those from the low SEP group (relative to high SEP) and this pattern was observed in all three cohorts. For example, for males in the NSHD, tracking estimates at the 10th, 50th, and 90th BMI quantiles were 0.25 (0.06, 0.44), 0.17 (0.00, 0.33), and 0.17 (-0.06, 0.41) units higher for the low SEP group compared to the high SEP group. However, evidence from formal tests of effect modification was weak.
Conclusion: We observed greater childhood-to-adulthood BMI tracking at higher quantiles and among lower SEP groups, thereby suggesting that obese children from disadvantaged backgrounds may be more likely to be obese adults than equally obese children from advantaged backgrounds.

PP3.09

The development of hunger, appetite and satiation cues over the first two years of life

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Introduction: Responsive feeding involves a bidirectional exchange between mothers and infants during mealtimes. To feed responsively mothers must identify and then respond appropriately to infant communication cues. The present study aimed to 1) assess developmental changes in infant hunger and satiation cues across the first 2 years of life 2) to characterise changes in expression of appetite cues during a meal and to explore if 3) mode of feeding and feeding environment influence mealtime interactions.
Methods: Thirty-eight women and infants participated in the study. Mothers were within a normal weight range, multiparous and most had breastfed their babies. Participants were filmed on four occasions during a mealtime interaction (during milk feeding, after complementary feeding, at 12-18m and at 18-24m of age). A total of 152 films were coded for features of the feeding environment and for communication cues representing hunger (engagement) and satiation (disengagement).
Results: An increase in frequency of several but not all cues occurred with development. Breastfeeding mothers were more likely to feed without distraction (no TV or toys; $p < 0.05$) and were more likely to pause the feed during a potent disengagement cue ($p < 0.01$), such as turning the head away or face gazing. Following complimentary feeding infants were more likely to communicate potent engagement cues such as babbling, mutual gaze and looking at mother with age. Previously breastfed infants were more likely to put their hand to mouth/stomach compared to formula fed infants. Most feeding cues were stable across the segment of the feed.
Conclusion: Responsiveness was associated with mode of feeding and environment. Therefore, providing fewer distractions during meals and a more ideal environment should promote responsiveness as infants become better at communicating needs. Future research is needed to develop interventions to enhance responsive feeding to promote healthy eating and achieve healthy weight gain.

PP4 - Management and Intervention

PP4.01

Weight change and heart failure in the Korean population: data from the National Health Insurance Health checkup 2005-2015

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Background: Heart failure (HF) is associated with obesity, but the relationship between weight change and HF is inconsistent. We examined the relationship between weight change and the incidence of HF in the Korean population.
Methods: We used the National Health Insurance System health checkup data from 2005 to 2015. A total of 11,210,394 subjects (6,198,542 men and 5,011,852 women) greater than 20 years of age were enrolled in this study. Weight change over 4 years was divided into seven categories from weight loss ≥ 15% to weight gain ≥ 15%. The hazard ratios (HRs) and 95% confidence intervals (CIs) for the incidence of HF were analysed using multivariable Cox's proportional hazard models.
Results: The HR for HF shows a reverse J-shaped curve and > 15% weight loss shows the highest HR (HR and 95% CI = 1.647;1.546-1.735) followed by -15 to -10% weight loss (HR = 1.444 and 1.408, respectively). In underweight subjects, HR decreased as weight increased. HR showed a reverse J-shaped curve in normal and overweight subjects, a U-shaped curve in obesity stage I, and a J-shaped curve in obesity stage II. Weight gain ≥ 15% in obesity stage II showed the highest HR (HR; 95% CI = 2.97; 1.79-4.928). Stable weight for 4 years in the underweight and obesity stage I and II increased the incidence of HF (HR = 1.402, 1.092, and 1.566, respectively).
Conclusion: Both weight loss and weight gain increased HR for HF. Sustained weight in the obesity or underweight categories increased the incidence of HF.

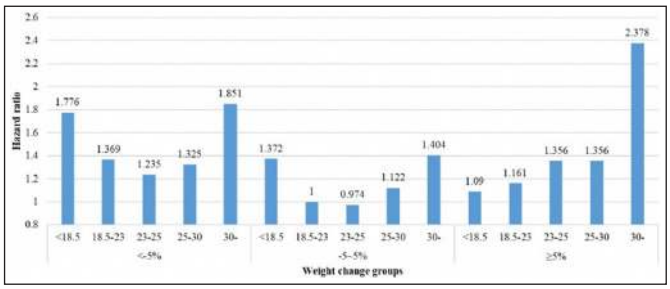

Fig. 1. Hazards ratios of heart failure among three weight change categories in 5 BMI groups.

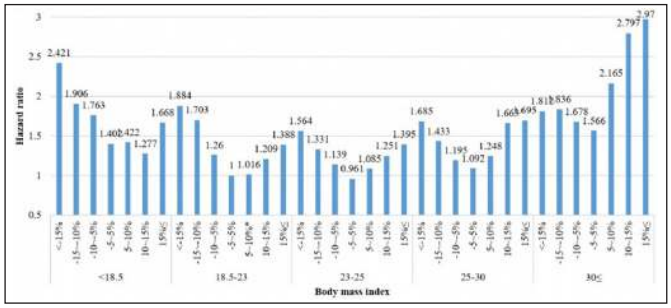

Fig. 2. The hazards ratios of heart failure among weight change in 5 BMI groups.

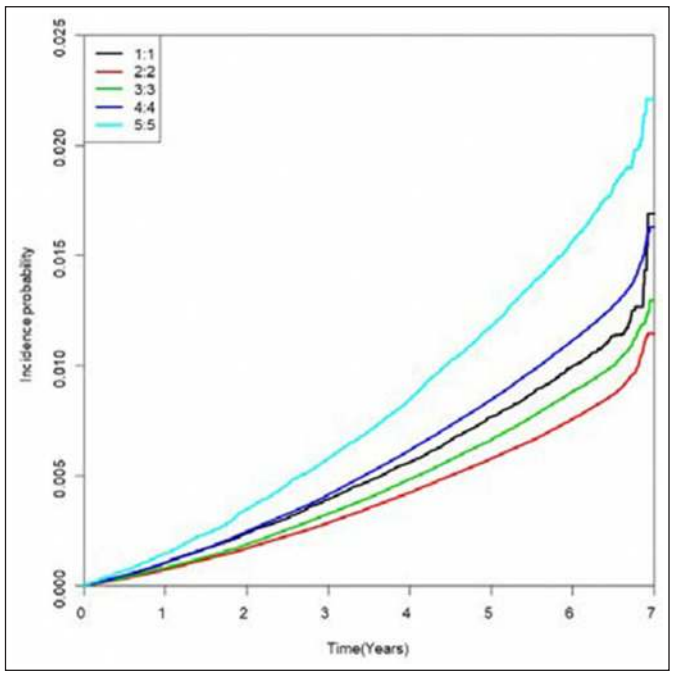

Fig. 3. The cumulative incidence probability of heart failure by stable BMI groups.

PP4.02

Comparing effects of liraglutide-induced weight loss versus lifestyle modification on liver fat content and plasma acylcarnitine levels in obese adults with non-alcoholic fatty liver disease

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Introduction: Non-alcoholic fatty liver disease (NAFLD), defined as excess fat accumulation in the liver, is a risk factor for liver cancer and cardiovascular disease, and is increasingly prevalent due to obesity. Weight loss is the mainstay of management of NAFLD. Liraglutide, a glucagon-like peptide-1 agonist which induces weight loss, has been shown to decrease liver fat[1]. We compared the effects of liraglutide with that of a lifestyle modification program on liver fat fraction (LFF) and acylcarnitine (AC) profile. Plasma AC, which are fatty acid oxidation (FAO) intermediates, were found to increase after weight loss due to lipolysis and efflux from cells[2].
Methods: Thirty obese (mean age 40.7±9.1 years, BMI 33.2±3.6 kg/m^2, weight 96.4±15.8 kg) adults, with NAFLD defined as LFF > 5% on magnetic resonance imaging (MRI) without other causes of hepatic steatosis, were randomized to dieting (restriction by 400 kilocalories/day) plus moderate-intensity exercise (200 minutes/week) with regular supervision by dieticians and trainers to induce ≥ 5% weight loss (DE group, n = 15), or to receive liraglutide 3 mg daily (LI group, n = 15) with standard diet and exercise advice for 26 weeks. LFF, total fat mass (using bioimpedance analysis), and plasma AC (C2, C3, C4, C5, C8, C12, C14, C16, C18) levels (using tandem mass spectrometry) were measured at baseline and week 26.
Results: Both DE and LI groups had significant ($p < 0.01$) and similar reductions in weight (-3.5±3.3 vs. -3.0±2.2 kg respectively, $p = 0.63$), total fat mass (-2.3±2.8 vs. -2.1±1.7 kg, $p = 0.85$) and LFF (-8.1±13.2 vs. -7.0±7.1%, $p = 0.78$). In the DE group, total AC (1.66±2.61 μmol/L, $p = 0.04$) and short-chain (C3,C4,C5) AC (0.07±0.11 μmol/L, $p = 0.04$) increased, but no significant changes in AC were seen in the LI group. Increase in total AC was associated with decreases in weight ($r = -0.67$, $p = 0.01$) and fat mass ($r = -0.75$, $p = 0.003$), and increase in short-chain AC was associated with decrease in LFF ($r = -0.57$, $p = 0.04$).
Conclusion: Weight loss induced by lifestyle modification or liraglutide was effective in improving NAFLD. Increased plasma acylcarnitines in association with reductions in total body and liver fat may indicate that increased lipolysis and FAO contribute to reduction of hepatic steatosis with dieting and exercise, though not with liraglutide.

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Conflict of Interest: None.

Funding: Research relating to this abstract was funded by the National Medical Research Council of Singapore.

PP4.03

Leaving bariatric surgery too late? Rapid decline in physical quality of life with increasing age and body mass in treatment-seeking individuals with severe obesity: results from the Surgical Obesity Treatment Study (SCOTS)

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Introduction: The United Kingdom (UK) National Health Service, like many other health systems, severely rations the use of bariatric surgery, with strict criteria for access including complex pre-surgical pathways and pre-surgical weight-loss requirements. This results in a very low number of individuals with severe and complicated obesity ever receiving surgery. Individuals only generally get surgery after many years of alternative interventions, when their Body mass index (BMI) is extremely high and they are at an older age. It is unclear how this delay of treatment affects physical functioning and quality of life.
Methods: The SurgiCal Obesity Treatment Study (SCOTS) is the first national epidemiological study investigating long term outcomes following bariatric surgery, allowing pre-operative patient-reported outcomes from treatment-seeking individuals with severe obesity to be reported for the first time. These include demographics, Rand 12-Item Short Form Survey

(SF-12), EuroQol 5-level version (EQ-5D) and Impact of Weight on Quality of Life (IWQOL) Lite.
Results: 254 individuals completed the pre-operative questionnaire, mean age 46y (±9.08) and BMI 49 (±8.33); 71.7% were female. Mean score for SF-12 physical component summary (PCS) was 37(±11.36); EQ-5D score 0.54(±0.33); IWQOL-Lite total 29.86 (±11.13). Both increasing age and BMI had a negative effect on QoL scores across the 3 instruments. For each 10 kg/m^2 increase in BMI there was a change of -4.75 (-6.47, -3.04) in SF-12-PCS, -0.10(-0.15, -0.05) in EQ-5D score and -13.7 (10.16, 17.30) in IWQOL-Lite (total), and a 2.9 times increased risk of requiring specialist aids and equipment in the home (OR2.87 [1.86,4.44]), all adjusting for age, sex, smoking and socio-economic status (all p<0.001).
Conclusion: Bariatric surgery in the UK is reserved for individuals with very high BMI and older age. The negative effect on physical function and quality of life of this increased age and BMI in those being listed for surgery is massive and clinically significant. Investment is needed to provide increased access to bariatric surgery before physical function and quality of life becomes severely impaired, with the aim of preventing such decline and restoring function.

Conflict of Interest: JL leads a joint working project between University of Glasgow, NHS Greater Glasgow and Clyde, MSD and Astra Zeneca.

Funding: NIHR Health Technology Assessment Programme (10/42/02).

PP4.04

Cost-effectiveness of behaviour, lifestyle and surgical interventions for severe obesity (the REBALANCE project)

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Introduction: There is an increasing prevalence of adults with severe obesity in the UK (body mass index, BMI ≥35 kg/m^2). Despite the substantial health, social and economic burden of obesity related disease, there is little evidence-based guidance regarding the most cost-effective treatment for this group.
Methods: A systematic review of the cost-effectiveness literature to determine the current evidence base for different weight management programmes (WMPs), and bariatric surgery for adults with severe obesity. Furthermore, the UK Health Forum (UKHF) microsimulation model (MS) was used to determine the long-term cost-effectiveness of 4 WMPs (Look AHEAD which is a long term intensive WMP; two other WMPs of varying intensity and a very-low calorie diet (VLCD) added to a WMP) and Roux-en-Y (RYGB) surgery compared to continuation of UK population BMI trends over a 30 year time horizon from the perspective of the UK NHS. Outcomes were estimated as quality adjusted life years (QALYs) and cost-effectiveness reported as incremental cost per QALY gained. Interventions with an ICER < £20,000 per QALY are considered cost-effective in the UK.
Results: 46 cost-effectiveness studies were included. WMPs were evaluated over short time horizons and with poorly described weight regain assumptions. Surgery was generally cost-effective, but studies underestimated the costs of post-surgery complications, long-term management and follow-up. The MS model accounted for these limitations, finding that WMPs all had ICERs < £20,000 per QALY gained compared to current population trends. However, adding a VLCD to a WMP was not cost-effective compared to a WMP alone. Surgery was expensive to deliver (~£20,000 per individual), but generated the greatest QALY gains among the interventions evaluated, with an ICER of £10,126 compared to baseline.
However, our model did not replicate long term cost-savings for surgery suggested by previous studies. Results were sensitive to assumptions about the rate of weight regain used in the model.
Conclusion: RYGB bariatric surgery is costly, but also cost-effective. Most WMPs are cost-effective compared to the current population trends in obesity although adding a VLCD is not a cost-effective addition to a WMP alone. Although surgery provides most health gain at a cost <£20,000/QALY, in reality not everyone might want surgery or the large budget impact may restrict widespread provision. Under these circumstances, WMPs may offer a cost-effective alternative.

Conflict of Interest: None Disclosed.

Funding: The project was funded by the NIHR Health Technology Assessment Programme (Project number: 15/09/04).

PP4.05

Effect of liraglutide 3.0 mg on glycaemic control parameters in individuals with overweight/obesity and type 2 diabetes (T2D) treated with basal insulin: results from the SCALE Insulin trial

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Introduction: Liraglutide at doses up to 1.8 mg once-daily in combination with insulin is an established treatment for T2D, but the glycaemic effects of a 3.0 mg dose (as used for treatment of obesity in individuals with/without diabetes) in combination with basal insulin have not previously been investigated.
Methods: The 56-week double-blind SCALE Insulin trial randomised individuals with T2D (HbA1c 6.0-10.0%) and overweight or obesity (BMI ≥27 kg/m^2) to liraglutide 3.0 mg or placebo, both as adjunct to intensive behaviour therapy (IBT). The treatment regimens for all participants included basal insulin and up to 2 oral antidiabetic drugs. Outcomes between randomisation and week 56 were assessed using all observed values regardless of treatment status at week 56, and a jump-to-reference (placebo at 56 weeks) multiple imputation approach for missing data.
Results: Mean characteristics at randomisation for liraglutide 3.0 mg (n = 198) included: 55.9 years old, 54.5% females, BMI 35.9 kg/m^2, HbA1c 7.9%, fasting plasma glucose (FPG) 7.83 mmol/L, diabetes duration 11.4 years. Corresponding placebo values (n = 198) were: 57.6 years, 50.0% females, BMI 35.3 kg/m^2, HbA1c 8.0%, FPG 8.08 mmol/L and duration 12.8 years. Of those randomised, 195 and 197 participants, respectively, were exposed to liraglutide and placebo, with 166 (83.8%) and 168 (84.8%) on drug at 56 weeks. Mean change in HbA1c at 56 weeks was –1.09% and 0.55% with liraglutide and placebo, respectively (Figure), estimated treatment difference (ETD) –0.53 (p<0.0001). Respective changes in FPG were –1.02 and –0.64 mmol/L, ETD not significant. 39.0% and 13.9% participants achieved HbA1c <7.0% with liraglutide and placebo, respectively. Odds ratios (OR) significantly favoured liraglutide for achieving HbA1c <7.0%+≥5% weight loss (OR,3.94, p<0.0001), and for HbA1c <7.0%+≥5% weight loss + no symptomatic hypoglycaemia (OR,3.28 p = 0.0006). Mean insulin dose increased by +2.8U and +17.8U (ETD -15U, p<0.0001) with liraglutide and placebo, respectively, from a baseline mean (both groups) of 38U. Documented hypoglycaemia (on-drug) occurred at respective rates of 7.42 and 9.38 events/subject-year with liraglutide and placebo, with 3 and 2 severe events, respectively. Other adverse events occurred with similar incidences between comparators, except gastrointestinal events, reported for 62.1% and 46.7% of liraglutide and placebo recipients, respectively.

Conclusion: In insulin-treated patients with longstanding T2D and overweight/obesity, adding liraglutide 3.0 mg achieved better glycaemic control versus placebo in addition to clinically relevant WL, with need for less basal insulin, and without increasing the risk of hypoglycaemia.

Funding: Research relating to this abstract was funded by Novo Nordisk.

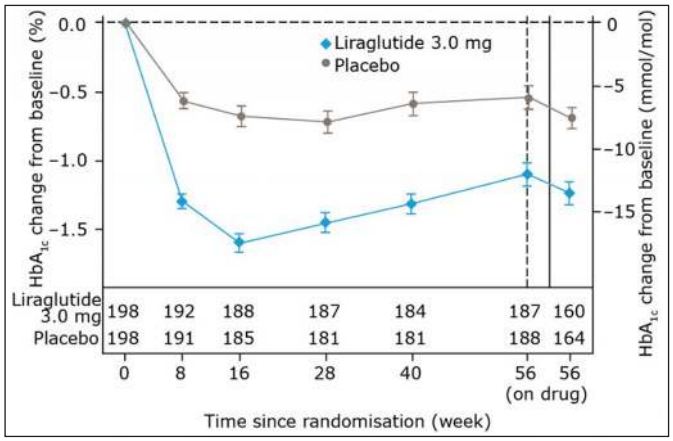

Fig. 1.

PP4.07

Effects of one month of energy restricted diet on sleep and metabolic parameters in obese obstructive sleep apnea patients: a randomized controlled trial

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Rationale: Obstructive sleep apnea (OSA) is highly related to obesity, increasing the risk of metabolic diseases. Weight loss can be considered appropriate supporting treatment, given that the conventionaltreatments have reduced impact in metabolic risk.
Objectives: To evaluate the effects of one month of energy restricted diet with two different macronutrient composition on sleep and metabolic parameters in obese OSA patients.
Methods: Thirty-seven OSA obese male were randomized in two groups of on month energy restricted diet. All participants were submitted to a nocturnal polysomnography, body composition and food intake evaluations before and after the intervention. Diets were design to create a 30% deficit in total energy expenditure and 1.6g of protein/kg/day (PTN group) or 0.8g of protein/kg/day (CHO group).
Measurements and Results: Changes in body mass (-3.7±2.0% for CHO group, and -4.0±1.5% for PTN group), anthropometrics and body composition was similar in both groups. Our results showed an improvement of 38% in AHI in CHO group and 46% in PTN group. All OSA parameters were improved similarly in both diet intervention groups. Also, the time spent in SaO2 <90% reduced in both groups. Both diets resulted in improvements in glucose and lipids metabolism.
Conclusion: We conclude that only one-month of moderate energy restricted diet can result in a significant improvement in OSA severity and reductions in metabolic risk. Increase of protein intake during an energy restricted diet has no beneficial improvements insleep or biochemical parameters than a normal protein diet.

PP4.08

Histology of gastric sleeve specimens after bariatric surgery: the incidence of Helicobacter pylori amongst obese patients undergoing laparoscopic sleeve gastrectomy

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Introduction: There exists an ongoing debate as to the relationship between Helicobacter pylori (H pylori) and obesity. Assessment of gastric sleeve specimen from patients who had laparoscopic sleeve gastrectomy (LSG), provides an opportunity to investigate this relationship. The likelihood of identifying other serious preoperative pathology that may require attention also exists.
Aim: To document the histology findings of all resected specimens from patients undergoing a laparoscopic gastric sleeve gastrectomy.
Methods: A retrospective analysis of the histology reports of all gastric sleeve specimens at a bariatric centre between June 2013 and December 2018.
Results: The study analysed 109 specimens from 113 surgeries. Age range 28 – 68. 66.9% female, and 33.1% male. Abnormal findings on histology were observed in 37.6% of cases. Of which, 28.4% non- specific gastritis, 5.5% had H pylori associated gastritis, 1.8% Gastrointestinal stromal tumors (GIST), 0.9% gastric polyp, 0.9% H pylori with no gastritis, and 0% malignancy or dysplasia. 64% of had normal histology.
Conclusion: Approximately 4 in every 10 patients who underwent a gastric sleeve had positive histology. There seems to be a low incidence of Helicobacter pylori amongst obese patients. This finding may provide an opportunity to further investigate this relationship.

PP4.09

Effects of obesity and of bariatric surgery on human faecal short-chain fatty acids: findings from the Biomarkers of Colorectal cancer After Bariatric Surgery study

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Introduction: The worldwide obesity epidemic is worsening and in the UK over a quarter of adults were obese in 2016. Obesity is associated with many detrimental effects on health which may be mediated via gut microbiota dysbiosis and subsequent alterations to short-chain fatty acid (SCFA) concentrations. Whilst bariatric surgery is the most effect treatment for obesity, it has effects on the gut microbiome and consequences for SCFA concentrations are unclear.
The current study investigated the effects of i) obesity and ii) bariatric surgery-induced weight loss on faecal SCFAs in human volunteers. We hypothesised that i) obese individuals have increased SCFA concentrations compared with non-obese and that ii) bariatric surgery reduces faecal SCFAs.
Methods: The Biomarkers of Colorectal cancer After Bariatric Surgery (BOCABS) study recruited 38 bariatric surgery patients and 12 non-obese healthy participants (Controls) (Afshar et al., 2018). Participants were extensively phenotyped and samples including stool were collected at baseline and at 6 months post-surgery. Concentrations of the SCFAs acetate, butyrate, propionate, isobutyrate, isovalerate and valerate were quantified by gas chromatography.
Results: Faecal concentrations of butyrate, propionate, isobutyrate, isovalerate and valerate were significantly greater in obese individuals (pre-surgery) compared with the Control group (non-obese) ($P<0.05$). The molar proportion of acetate was 12% lower ($P = 0.005$) in obese individuals, whilst molar proportions of butyrate ($P = 0.024$) and of valerate ($P = 0.006$) were increased significantly in the obese participants. At 6 months

post-surgery, when bariatric surgery patients had lost mean 28kg body mass faecal concentrations of acetate (P = 0.019) and propionate (P = 0.014) were reduced by approximately a third and butyrate (P = 0.035) by almost 20% compared with pre-surgery. The proportion of isovalerate was almost four-fold greater post-surgery compared with baseline (P<0.001). Post-surgery SCFA concentrations were similar to Controls except for isovalerate (p = 0.049) and valerate (p = 0.041) where concentrations remained elevated.

Conclusion: In agreement with the existing literature, faecal concentrations of all SCFAs, bar acetate, were significantly greater in obese compared with non-obese individuals (P<0.05). The findings from this study suggest that weight loss following bariatric surgery tends to normalise faecal SCFAs. This is in agreement with a reported reduction in acetate, propionate and butyrate post-bariatric surgery and a trend for greater isovalerate concentrations (Tremaroli et al., 2015). We are investigating potential mechanism for these weight loss related changes in SCFA focussing on dietary intake, drug use and stool habit.

Conflict of Interest: None.

PP4.10

Type 2 diabetes remission, relapse, and risk of diabetic complications following Roux-en-Y gastric bypass: a populations-based Danish cohort study

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Introduction: Roux-en-Y gastric bypass (RYGB) has been introduced in the treatment of individuals with severe obesity (BMI ≥35 kg/m^2) and type 2 diabetes (T2D). In a cohort of individuals with T2D, we aimed to investigate the long-term effects of RYGB on diabetes remission, predictors of not achieving remission, diabetes relapse, and development of micro- and macrovascular complications.

Methods: Using data from Danish registries, we identified 1111 individuals with obesity and glucose-lowering drug (GLD) treatment for T2D, treated by RYGB from 2005 to 2015. These individuals were matched on date of surgery to 1074 individuals with T2D not treated by RYGB by birth year, sex, and T2D duration. We followed individuals from surgery date/matching date to end of 2015.

Results: At baseline, individuals treated by RYGB were median 46.9y (IQR: 39.9; 54.3) old, with a diabetes duration of 3.6y (IQR: 1.1; 7.0). Baseline HbA1c was similar in RYGB operated and non-operated cohorts (51 mmol/mol versus 53 mmol/mol). Metformin as monotherapy was the most commonly prescribed GLD (42% in both cohorts). At one year of follow-up, 74% of the individuals treated by RYGB displayed diabetes remission, defined as no GLD use with HbA1c ≤48 mmol/mol, or metformin monotherapy with HbA1c<42 mmol/mol. Predictors of non-remission at one year were age >50y, diabetes duration >5y, baseline treatment with other GLDs than metformin, and baseline HbA1c>53 mmol/mol. Among individuals with T2D treated by RYGB in remission at one year, 27 % experienced T2D relapse at five years, defined as HbA1c>48 mmol/mol or prescription of new GLD. Using adjusted Cox regression with median 5.3y follow-up, individuals treated by RYGB had a 47 % lower risk of microvascular events (HR 0.53 [95% CI 0.38; 0.73]) and a trend towards lower risk of macrovascular events (HR 0.76 [95% CI 0.49; 1.18]) than the non-operated comparison cohort. Diabetes remission at one year was associated with lower risk of microvascular events (HR 0.43 [95% CI 0.25; 0.72].

Conclusion: In a population-based setting, three out of four individuals with severe obesity and T2D treated by RYGB fulfil criteria of diabetes remission one year after RYGB; nevertheless 27 % exhibit T2D again within five years. Indirect measures of T2D severity and poorer beta cell capacity predict non-remission following surgery. RYGB is associated with decreased risk of microvascular events, and a trend towards less macrovascular events, with remission of T2D at one year being a predictor of less microvascular events.

Conflict of Interest: None Disclosed.

Funding: Research related to this abstract was funded by the Danish Diabetes Academy, the Novo Nordisk Foundation, the Health Research Fund of Central Denmark Region, and the A.P. Møller Foundation.

PP4.11

MicroRNAs profile in patients with obesity: association with coronary artery disease

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Introduction: Obesity and type 2 diabetes mellitus (T2DM) remain the major risk factors for coronary artery disease (CAD). Recent studies claim that microRNAs (miRNAs) may participate in the pathogenesis of CAD.

Aim: To study miRNAs expression in patients with obesity.

Methods: MiRNAs were detected in peripheral blood samples of 66 patients, aged 48-65 years. Patients with BMI 30.0-39.9 kg/m^2 were divided into 3 groups. The 1st group included 21 patients with CAD (confirmed by coronary angiography) and T2DM, the 2nd group - 22 patients with T2DM and excluded CAD (according to the treadmill test), the 3rd group - 23 patients with obesity and excluded CAD and T2DM. For miRNA profiling, the RT-qPCR assay was performed. Based on literature data 9 miRNA associated with CVD were selected for the study: miRNA-1, miRNA -21, miRNA -26a, miRNA -27a, miRNA -33a, miRNA -33b, miRNA -133a, miRNA -133b and miRNA -208.

Results: Expressions of these miRNAs were compared in studied groups. There were statistically significant differences between studied groups in miRNA-21 (p = 0.0004), miRNA-26a (p = 0.003) and miRNA-33a (p = 0.0009) expression. MiRNA-21 expression was lower in the 2nd group of patients. We found that in all patients miRNA-21 was negatively correlated with HbA1c (r = -0.360; p = 0,001), as well as cholesterol (r = -0.222; p = 0.048). Negative correlation was also found for the miRNA-21 and hypertrophy of interventricular septum and posterior wall of the left ventricle (r = -0,397; p = 0.0002 и r = -0.382; p = 0.0005, respectively). MiRNA-26a was lower in patients with CAD (1st group). In patients with CAD miRNA -26a was positively correlated with LDL-cholesterol (r = 0.541; p = 0.011) and waist circumference (r = 0.481; p = 0.027). MiRNA-33a was lower in patients with CAD. In the 3rd group miRNA-33a was negatively associated with cholesterol (r = - 0.419; p = 0.046).

Conclusion: Expression of miRNA-21, - 26a and 33a differ in patients with CAD, T2DM, and "healthy" obesity. MiRNA-21 was negatively correlated with heart remodeling processes and therefore may determine the severity of CVD in patients with obesity.

Conflict of Interest: None Disclosed.

Monday, 29 April 2019

CP1 - Basic and Experimental Science & Management and Intervention

CP1.01

Melatonin exerts benefic effects on the rat model of metabolic syndrome

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Introduction: Given the worldwide epidemic of Diabetes, Obesity and Metabolic Syndrome (MS), studying possible prevention or attenuation treatments is mandatory. MS is a multifactorial phenomenom not only related to an unadequate nutrition and sedentarism, but also to an unbalanced life style and unnatural light-dark cycles. Prolonged exposure to light during night and sleep impairment negatively affect many vital processes, as shown by a decreased melatonin production, modified circadian rhythms and oxidative overload. Previous work from our team and others have shown that melatonin is capable to counteract some of the undesired metabolic effects of a high fat diet.
Methods: Male Wistar rats fed ad libitum with regular chow and 10% fructose drinking solution were used as a valid MS experimental model. We established 4 groups: control(C), fructose 10% (F), fructose + melatonin (FM) and melatonin (25 µg/mL drinking solution) (M). We checked MS progression by body weight (BW) and blood pressure (BP) assessments. By the 10th week of treatment MS was developed. After sacrifice, along with the progression markers of MS, we also studied oxidative markers in blood and in adipose tissue, in abdominal white adipose tissue (WAT) and interscapular brown adipose tissue (BAT). We evaluated lipid peroxidation by TBARs determination and the oxidative status by glutathion levels (GSSG/GSH). We also evaluated adipose tissue composition modification in MS rats.
Results: Fructose treatment induced MS: it increased body weight (BW), systolic blood pressure (BP) and blood concentration of triglycerides, cholesterol, LDL-c, glucose, insulin and leptin but not that of lactate. Melatonin significantly counteracted the changes in BW and systolic BP in SM rats (50 days): BW (g) C) 393,2 ±17,8; F) 481,4 ±25; FM) 391,2±33,3; M) 366±40,2 and BP (mmHg): C) 102 ± 8; F) 129 ± 6; FM) 103 ± 4; M) 100 ± 8. Melatonin also decreased glycemia even in untreated animals: C) 107,5 ±6.3 vs. M) 91,8±3,8. Melatonin also improved glucose tolerance in MS animals. Melatonin was able to prevent the changes in insulinemia, leptinemia, plasma LDL-c, triglyceride and cholesterol, and the rest of evaluated parameters. Particularly, melatonin increased BAT mass (expressed as a percentage of WAT) when compared with F or FM rats.
Conclusion: These results demonstrate some benefic effects of melatonin administration during development and establishment of the MS model, foreseeing interesting expectations about the possible utility of melatonin in the treatment of clinical MS, improving deteriorated markers in MS patients and possibly preventing MS development in people at risk.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by PIP0702 and PICT2012-0984.

CP1.02

Reduced levels of kallistatin in obesity promote adipose tissue inflammation. Impact of weight loss

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Introduction: Kallistatin was initially identified as a factor with important roles in the inhibition of inflammation, oxidative stress, fibrosis and angiogenesis. However, its role on obesity and adipose tissue inflammation has not yet been described. Thus, the present study was designed to determine the impact of kallistatin in obesity and its associated metabolic alterations as well as its role in adipocyte inflammation and oxidative stress.
Methods: Visceral adipose tissue (VAT) and liver gene expression levels as well as circulating concentrations of kallistatin were analysed in 95 subjects. Serum kallistatin concentrations were also measured before and after weight loss achieved by Roux-en-Y gastric bypass (RYGB, n = 27). To gain insight into the molecular mechanisms involved, the role of kallistatin in LPS- and TNF-α-mediated inflammation as well as oxidative stress signalling pathways in human visceral adipocyte cultures was also studied.
Results: Circulating concentrations of kallistatin were dramatically reduced (P<0.00001) in obese patients and increased (P<0.00001) after weight loss achieved by RYGB. Additionally, gene expression levels of SERPINA4, the gene coding for kallistatin, were downregulated (P<0.01) in the liver from obese subjects with non alcoholic fatty liver disease. We also revealed that kallistatin downregulated (P<0.05) the expression of inflammation-related genes (CCL2, IL1B, IL6, IL8, TNF, TGFB1) and, conversely, increased (P<0.05) mRNA levels of ADIPOQ and KLF4 in human adipocytes in culture. Kallistatin inhibited (P<0.05) LPS- and TNF-α-induced inflammation in human adipocytes via reducing the expression and secretion of key inflammatory markers. Furthermore, kallistatin also blocked (P<0.05) TNF-α-mediated lipid peroxidation (MDA concentrations) as well as NOX2 and HIF1A expression, while stimulating (P<0.05) the expression of SIRT1 and FOXO1.
Conclusion: These findings provide, for the first time, new insights into the protective role of kallistatin by limiting adipose tissue inflammation and oxidative stress. In addition, we demonstrated that the reduced kallistatin circulating levels in human obesity increase after weight loss.

Conflict of Interest: There is no conflict of interest.

Funding: This work was supported by ISCIII-Subdirección General de Evaluación y FEDER (PI14/00950 and PI16/01217; Plan Estatal I + D + I/2013-2016). CIBER Fisiopatología de la Obesidad y Nutrición (CIBEROBN) is an initiative of the ISCIII, Spain.

CP1.03

Inhibition of the serine transporter SLC7A10 promotes ROS generation and lipid accumulation linked to BCAA catabolism in adipocytes

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Introduction: Perturbed amino acid metabolism affects adipocyte function, lipid storage and associates with type 2 diabetes (T2D). We have found that impairment of the neutral amino acid transporter SLC7A10 in adipocytes reduces serine uptake, insulin-dependent glucose uptake, mitochondrial respiration and glutathione levels, and increases reactive oxygen species generation (ROS) and lipid accumulation. Here, we sought to further delineate mechanisms whereby SLC7A10 affects adipocyte function, with a focus on amino acid metabolism.
Methods: We profiled amino acid flux throughout differentiation in inhibitor-treated primary human adipocytes by LC-MSMS. Further, we performed RNA sequencing following 24-hour inhibition of SLC7A10 in mature adipocytes, measured protein levels of amino acid catabolic enzyme by Western blot and conducted ROS generation measurements using a ROS-probe.
Results: SLC7A10 inhibition markedly increased influx of the branched chain amino acids (BCAAs) leucine and isoleucine, and promoted efflux of the valine degradation product 3-hydroxyisobutyrate (3-HIB) during mid-to-late stage adipogenesis. Consistently, SLC7A10 inhibitor-treated adipocytes showed increased expression of genes involved in cellular BCAA catabolic processes, including BCKDH, HIBADH and ALDH6A1 (the latter mutated in patients with developmental delays and increased serum levels of 3-HIB). In addition, several studies point to high 3-HIB levels in plasma being a promising predictor of T2D risk. Moreover, SLC7A10 inhibition throughout human primary adipocyte differentiation increased protein levels of HIBCH, the rate-limiting enzyme in the valine catabolic pathway that removes the CoA group to form free 3-HIB that can leave the cell. We previously found increased ROS upon SLC7A10 inhibition in conjunction with lipid accumulation. To assess a causal role for 3-HIB in this mechanism, we added 3-HIB to mature murine adipocytes and found a potent increase in ROS, although lipid accumulation was not significantly affected.
Conclusion: Our data link reduced serine uptake, increased production and release of the valine degradation product 3-HIB, and ROS generation, suggesting a novel potential mechanism in the regulation of adipocyte function and lipid accumulation.

Conflict of Interest: The authors declare no conflict of interest.

Funding: Research related to this abstract was funded by the Norwegian Research Council and the KG Jebsen Center for Diabetes Research.

CP1.04

Adipocyte amino acid metabolism in obesity-related metabolic diseases

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Introduction: Metabolomics studies have implicated altered cellular catabolism of the branched-chain amino acids (BCAAs) (valine, leucine and isoleucine) in obesity and insulin resistance. BCAA catabolism in adipocytes may play a particularly important role, and may at least partly explain the increased circulating BCAA levels observed in obesity and insulin resistance. Interestingly, an intermediate of valine degradation, 3-HIB, was recently shown to have a regulatory function in muscle, stimulating uptake of fatty acids and promoting insulin resistant myocytes. 3-HIB forms by hydrolyzation of 3-HIB-CoA via the enzyme HIBCH. A functional role for 3-HIB in white and/or brown adipocytes has however not been demonstrated.
Methods: qPCR analyses and Western blot were used to examine expression of genes encoding BCAA catabolic enzymes and the level of the HIBCH protein during adipogenesis of cultured mouse and primary human adipocytes. GC/MS was used to anlayze uptake and release of the BCAAs and 3-HIB. Lipid accumulation was measured by Oil-Red-O after siRNA-mediated knockdown of Hibch in white and brown primary mouse adipocytes. Effects of 3-HIB supplementation on mitochondrial respiration (measured by Seahorse) and reactive oxygen species (ROS) were assessed.
Results: BCAA consumption increased in the mid-to-late stages of adipogenesis, and extracellular 3-HIB levels increased in association with lipid accumulation. Gene expression analysis of genes encoding BCAA catabolic enzymes revealed a marked increase in mRNA levels during adipogenesis of 3T3-L1 cells and in mature mouse and human adipocytes. BCAA enzymes were expressed at higher levels in brown compared to white adipocytes. Knockdown of Hibch reduced lipid storage in both cell types. Extracellular addition of 3-HIB did not appear to affect lipid accumulation, but affected cellular mitochondrial respiration and ROS production, partially with opposite effects in white and brown adipocytes.
Conclusion: Our data indicate that BCAA metabolism is important during adipogenesis, both for producing intermediates that enter the TCA cycle and in lipogenesis, where the valine metabolite 3-HIB may play an important role. Since 3-HIB has been detected in the circulation, this metabolite may potentially represent a novel adipokine involved in a metabolic cross-talk between different metabolic tissues and adipocyte subtypes.

CP1.05

A microbial genus in the human gut associated with visceral fat regardless of sex

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Introduction: Recent studies suggest the involvement of intestinal microbiota in obesity. Compared with body mass index (BMI), visceral fat is more strongly associated with cardiovascular disease and overall mortality. Computed tomography (CT) is the gold standard for measuring visceral fat, but radiation exposure and cost are obstacles to using this method. Therefore, the association between the intestinal microbiota and obesity is studied mainly by focusing on BMI. A 2006 report indicated that the association between intestinal microflora and obesity based on BMI was explained by two dominant phyla, Firmicutes and Bacteroidetes[1]. This association was not supported by findings in 2008[2]. Taking into account the subjects' characteristics in the previous studies[1–2], we hypothesized that sex differences accounted for the inconsistent results.
Design: A population-based cross-sectional study was performed in 391 men and 610 women (mean age and standard deviation, 51.2 ± 14.1 years for men, 54.2 ± 13.7 years for women). Visceral fat area (VFA) was measured using an impedance method whose results correlate highly with those obtained using CT (R>0.8)[3].
Results: Women with higher visceral fat area (VFA) harboured more Firmicutes phyla (P for trend <0.001) and fewer Bacteroidetes phyla (P for

trend 0.030), whereas men with higher VFA harboured fewer Firmicutes phyla (P for trend 0.076) and more Bacteroidetes phyla (P for trend 0.013). Similar results were obtained using BMI as an index, but the differences in men were not significant. At the genus level, Blautia was the only intestinal microflora significantly inversely associated with VFA regardless of sex, even after adjusting for confounding factors. Bifidobacterium, which improved BMI level in an intervention study, was significantly inversely associated with VFA only in men.
Conclusion: Our results suggest that VFA is more closely associated with microbial flora than is BMI. Furthermore, Blautia was the only microbial genus significantly inversely associated with visceral fat accumulation independent of BMI and waist circumference in both sexes.

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Conflict of Interest: None Disclosed.

Funding: This study was financially supported by Japanese Government, and Kao Co. (Tokyo, Japan).

CP1.06

Glucose metabolism in brown adipose tissue (BAT) determined by deuterium metabolic imaging (DMI) in rats

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Introduction: Since evidence of brown adipose tissue (BAT) in adult humans emerged, BAT has been revitalized as a potential target in the treatment of obesity. Currently, the gold standard method for in vivo measurements of BAT activity in humans is FDG PET/CT. However, to supplement these investigations novel radiation-free methods are warranted. To accommodate this need Deuterium Metabolic Imaging (DMI) may be a potential tool. DMI is a novel modality that combines magnetic resonance spectroscopic (MRS) imaging with deuterium labelled glucose ([6,6'-$^2H_2$]-glucose). This allows for spatial and metabolic imaging beyond glucose uptake. We aimed to evaluate if DMI could determine and discriminate glucose metabolism during BAT activation (cold acclimatized) compared to non-activated BAT (thermo-neutrality) in rats. We expected that [^{2}H]-labelled lactate would be elevated in activated BAT due to a shift towards anaerobic metabolism.
Methods: Male Sprague-Dawley rats were housed at either cold (9 C, n = 4) or at thermo-neutrality (30 C, n = 6) for one week. Subsequently, rats were anesthetized, received a [6,6'-$^2H_2$]-glucose (1M, 1.95 g/kg) infusion and were scanned by the DMI method at baseline and after every 20 min. for one hour. Dixon MRI, a chemical shift imaging method using the in-phase/out-of-phase cycling of fat and water was performed for anatomical determination of the interscapular BAT (iBAT) depot and finally the [^{2}H]-labelled metabolites in iBAT was assessed.
Results: We found time-dependent significant increases in [^{2}H]-labelled glucose metabolites such as glutamine/glutamate, lactate and water in iBAT after infusion of [6,6'-$^2H_2$]-glucose in cold rats ($p = 0.05$) while time-dependent [^{2}H]-signal enhancement was only observed for water and glutamine/glutamate in thermo-neutral rats. Furthermore, the [^{2}H]-labelled glutamate/glutamine, lactate and water signals were higher in cold-acclimatized rats compared to thermo-neutral rats.
Conclusion: DMI of iBAT in rats revealed increases in all metabolites after [6,6'-$^2H_2$]-glucose infusion indicating an overall increase in uptake and glucose metabolism with higher glutamine/glutamate and lactate production in cold acclimatized rats compared to thermo-neutral rats, potentially originating from an elevated TCA cycle flux and an associated increased anaerobic metabolism in the cold-acclimatized rats. This is the first study to evaluate BAT activity by DMI, which may open up for DMI of BAT also in humans. DMI may be an important tool in future evaluation and development of drugs targeting BAT.

Conflict of Interest: The authors declare no conflicts of interest.

Funding: The study was funded by the Innovation Fund Denmark and Department of Health, Aarhus University.

CP1.07

Associations between the rate, amount and composition of weight loss as predictors of weight regain in adults achieving clinically significant weight loss: a systematic review and meta-regression

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Background: Weight regain following weight loss is common although little is known regarding the associations between the characteristics of weight loss (e.g. amount, rate and composition) and subsequent weight regain in overweight and obese adults following clinically significant (≥5%) weight loss. Emerging evidence suggests that consideration of fat mass (FM) and fat-free mass (FFM) change, rather than weight change per se during weight loss may better predict subsequent weight outcomes.
Methods: 43 studies (52 groups; n = 2,379) with longitudinal body composition (BC) measurements were identified in which weight loss (≥5%) and subsequent weight regain (≥2%) occurred. Data were synthesized for changes in body weight and BC. Meta-regression models were used to investigate associations between (1) amount, rate and composition of weight loss as predictors of subsequent weight regain and (2) amount and rate of weight loss as predictors of FFM loss.
Results: On average, individuals lost 10.9% of their body weight over 13 weeks comprised of 19.6% FFM, followed by a body weight regain of 5.4% body weight over 44 weeks comprised of 21.6% FFM. Significant associations between the amount ($p<0.001$) and rate ($p = 0.049$) of weight loss, and the interaction of both variables ($p = 0.042$) with weight regain were observed. Rate of weight loss was of greater importance at greater amounts of weight loss. FFM ($p = 0.017$) and FM loss ($p<0.001$) both predicted weight regain although the effect of FFM was attenuated following adjustment for FM. FM and FFM loss combined explained greater variance in weight regain than weight loss alone (40% vs 29% respectively). The amount ($p<0.001$), but not the rate of weight loss ($p = 0.150$) was associated with FFM loss.
Conclusion: The amount and rate of weight loss, and their interaction, were predictive of weight regain. Changes in BC compartments during loss explained more variance in subsequent weight regain than weight loss alone, although this was largely due to the contribution of FM loss. Further research is required at an individual level to expand understanding on the associations between the amount, rate and composition of weight loss on weight regain.
Full manuscript has been submitted for consideration to Obesity Reviews.

Conflict of Interest: None to declare.

Funding: No funding to declare.

CP1.08

Influence of energy balance on the rate of weight loss throughout one year of Roux-en-Y gastric bypass: doubly-labeled water study

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Objective: To investigate the influence of changes in energy balance and in body composition on the rate of weight loss throughout one year of Roux-en-Y gastric bypass.
Methods: Eighteen obese women (BMI > 40 and < 50 kg.m^2, age 20 to 45 years) participated in this study. The studied variables were collected pre, six and twelve months post-surgery. The doubly-labeled water technique was used to measure the total energy expenditure (TEE), fat-free mass (FFM) and fat mass (FM). The physical activity energy expenditure (PAEE) was obtained through a triaxial accelerometer. The self-reported energy intake (EI-sr) was obtained through three non-consecutive food diaries. The metabolic adaptation and the calculated energy intake (EI-c) was assessed through deviations from TEE predictive equation based on pre-surgery data and the sum of TEE and change in body stores, respectively.
Results: A significant weight loss (6 months: -31 ± 4 kg, 12 months: -38 ± 6 kg) had the contribution of FM reduction from 58.4 ± 5.9 kg to 32.4 ± 7.0 kg at six months and to 26.1 ± 6.4 kg at twelve months of surgery. In relation to pre-surgery value, the FFM decrease significantly 5.3 ± 2.1 kg at 6 months, and 6.1 ± 4.2 kg at 12 months. The TEE reduced significantly in both point time when compared to pre-surgery value (six months: -612 ± 317 kcal.day-1, -20%; 12 months: -447 ± 516 kcal.day-1, -10%), see table 1. At 6 months post-surgery, a metabolic adaptation was evidenced and the energy balance was -1151 ± 195 kcal.day-1, while at 12 months it was -332 ± 158 kcal.day-1, see table 2. Changes in the values of TEE was associated with changes on PAEE, body weight, and FM, only at 12 months post-surgery. A significant difference was observed between EI-sr (1115 ± 402 kcal.day-1) and EI-c (2083 ± 309 kcal.day-1) at 12 months postoperative.
Conclusion: The higher rate of weight loss at 6 months post-surgery was a response to the energy imbalance, which was probably caused by the high restriction in energy intake even with the presence of metabolic adaptation at this time. The EI-sr was not sufficiently accurate to evaluate the energy consumption of this population.

Tab. 1. Measured and predicted values of TEE and at 6 and 12 months after bariatric surgery.

	TEE (Kcal/day)	Mean ± SD	p-value*
Pre-surgery:	TEEm	2904 ± 547	0.922
	TEEp	2897 ± 449	
6 months	TEEm	2292 ± 446	0.194
	TEEp	2452 ± 307	
12 months	TEEm	2538 ± 336	0.335
	TEEp	2426 ± 365	

TEEm = measured total energy expenditure; TEEp = predicted total energy expenditure based on pre-surgery TEEm relationship with body composition and the number of steps adjusted by actual body weight; p-value* = paired t-test.

Tab. 2. Metabolic adaptation at 6 and 12 months after bariatric surgery.

	Period	Mean ± SD	Mediam (1º; 3º Quartiles)	p-value*
	Pre-surgery	7 ± 311	28 a (-129; 180)	
TEE residual (kcal.day-1)	6 months	−159 ± 500	-239 b (-428; -49)	p = 0.017
	12 months	112 ± 478	157 a (-125; 384)	

TEEm = measured total energy expenditure; TEEp = predicted total energy expenditure based on pre-surgery TEEm relationship with body composition and number of steps adjusted by actual body weight; TEE residual = TEEm – TEEp = residuals calculated as measured minus predicted TEE in each period of the study; p-value* = Friedman' test followed by the Student-Newman-Keuls adjustment. Medians followed by the same letter do not differ significantly at the 5% level by the post-hoc test.

CP1.09

Central and peripheral effects of FGF21 are sex-specific in mice with melanocortin obesity

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Introduction: Activation of melanocortin 4 receptors (MC4R) in hypothalamus decreases energy intake and increases energy expenditure. Blockage of MC4R in mice with Ay mutation results in hyperphagia and obesity. Fibroblast growth factor 21 (FGF21) was shown to decrease adiposity and improve carbohydrate and lipid metabolism in obese males, and its action is mediated via central hypothalamic signalling pathways. The aim of this study was to investigate whether FGF21 affects metabolism in obese Ay mice of both sexes.
Methods: Male and female C57Bl-Ay mice were hosed individually with ad libitum access to standard chow and water. Mice were administered for 10 days with vehicle or recombinant mouse FGF21 (1 mg/kg of body weight). Food intake and body weight were measured daily, and blood parameters and the expression of genes related to lipid and glucose metabolism in the liver and to food intake regulation in the hypothalamus were analyzed.
Results: FGF21 effect strongly depended on the mouse sex. In males, FGF21 administration did not affect food intake, and decreased body weight and insulin blood levels. In females, FGF21 administration increased food intake and liver weight, but did not affect body weight. In the liver of Ay mice received vehicle, the expressions of genes involved in FFA oxidation (Pgc1, Cpt1) and glucose metabolism (Pck1, G6p, Glut2) were higher in females than in males. FGF21 administration did not affect significantly gene expression in the liver of males, and inhibited expression of genes involved in glucose and lipid metabolism in the liver of females. In Ay females, the inhibitory effect of FGF21 on liver gene expression combined with its orexigenic effect could be the cause of the increased liver weight.
There were no sex differences in hypothalamic expression of genes encoding orexigenic (NPY, AgRP) and anorexigenic (POMC, CRF) neuropeptides in mice received vehicle. FGF21 administration decreased POMC mRNA only in the hypothalamus of male mice. It suggests that in males, the possible orexigenic effect of FGF21 may realized through the influence on the melanocortin system of the hypothalamus (which is blocked in Ay mice), whereas in females additional or other central regulatory pathways are involved.
Conclusion: The blockage of MC4Rs in Ay mice does not prevent anti-obesity effect of FGF21 only in males. In females, FGF21 has strong orexigenic effect and possibly inhibits carbohydrate and lipid metabolism in the liver. Thus, the pharmacological effects of FGF21 are significantly different in males and females with melanocortin obesity, and in females, FGF21 affects health rather negatively than positively.

Funding: Research was funded by the Russian Science Foundation, grant No. 17-15-01036.

CP1.11

Effect of turmeric on body weight, glycemic status, lipid profile, hs-CRP and total antioxidant capacity in hyperlipidemic type 2 diabetes mellitus patients

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Introduction: Diabetes Mellitus (DM) is the most common metabolic disorder worldwide. The increase in blood lipids and sugar in diabetic patients exacerbates the incidence of DM late-onset complications. This study examined the effect of turmeric supplementation on body weight, glycemic status, lipid profile, hs-CRP and total antioxidant capacity in hyperlipidemic type 2 diabetic patients.
Methods: In this double blind, randomized clinical trial, 80 hyperlipidemic type 2 diabetic patients were divided into two groups. The intervention group received 2100 mg of turmeric powder daily for 8 weeks; while the placebo group received placebo over the trial period. Body weight, fasting plasma glucose, HbA1c, serum insulin, insulin resistance index, triglyceride (TG), total cholesterol (TC), LDL-c, HDL-c, apolipoprotein A1, apolipoprotein B, hs-CRP, and total antioxidant capacity were measured before and after intervention. Statistical analysis was carried out using paired and independent t and chi-square tests.
Results: Seventy five patients completed the study. After 8 weeks of intervention, the turmeric group showed significant decreases in body weight (P value = 0.000), BMI (P value = 0.000), TG (P value = 0.000), and LDL-c (P value = 0.009) compared with baseline. BMI, TG, and TC decreased significantly in the turmeric group compared with the placebo group (P value < 0.05). No significant changes were observed in body weight, fasting plasma glucose, HbA1c, serum insulin, insulin resistance index, HDL-c, LDL-c, apolipoprotein A1, apolipoprotein B, hs-CRP, and total antioxidant capacity between the two groups after intervention (P value < 0.05).
Conclusion: Turmeric powder improved some fractions of lipid profile and decreased body weight in hyperlipidemic patients with type 2 DM. It had no significant effect on glycemic status, hs-CRP, and total antioxidant capacity in these patients.

Conflict of Interest: None.

Funding: Research relating to this abstract was funded by Iran University of Medical Sciences, Research Bureau,Tehran, Iran.

CP1.12

The effect of weight-loss interventions on non-alcoholic fatty liver disease: a systematic review and meta-analysis of randomised controlled trials

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Introduction: Non-alcoholic fatty liver disease (NAFLD) affects about 25% of adults worldwide and is strongly linked with obesity. Weight loss may improve liver function in people with NAFLD, but its effects have not been previously quantified. We aimed to examine if weight loss interventions in people with NAFLD affect liver function.
Methods: We searched 9 databases (March 2018) for randomised controlled trials in people with NAFLD of any intervention aiming to reduce weight, including behavioural weight loss programmes (BWLPs), pharmacotherapy, and surgery that recorded any index of liver disease as an outcome (PROSPERO ID: CRD42018088882). Two independent reviewers screened the studies and extracted the data, and assessed the risk of bias using the Cochrane tool. Random effect meta-analyses were conducted.
Results: Twenty-one studies met the inclusion criteria (24 comparisons, 2420 participants), of which 13 tested BWLPs, 7 pharmacotherapy with or without a BWLP, and 1 surgery with a BWLP. The median intervention duration was 6 months (IQR: 6 months) and all trials examined outcomes at intervention completion. Compared with minimal or less intensive interventions, participants in the more intensive weight loss interventions lost significantly more weight (-3.6kg, 95% CI: -5.2, -1.9, n = 22 comparisons) and significantly improved fasting glucose and HbA1c. Blood markers for liver disease significantly improved including ALT (-8.2U/L, 95% CI: -11.7, -4.7, n = 23 comparisons) and AST (-4.5U/L, 95% CI: -7.0, -2.0, n = 22 comparisons). Weight loss reduced liver steatosis measured by histology, MRI, or ultrasound (SMD: -1.5, 95% CI: -2.3, -0.7, n = 12 comparisons), NAS activity score (-0.9, 95% CI: -1.8, -0.1, n = 6 comparisons), and presence of definite NASH (OR: 0.1, 95% CI: 0.04, 0.5, n = 2 comparisons). There was no significant change in liver fibrosis score (-0.1, 95% CI: -0.5, 0.3, n = 6 comparisons). Most estimates did not materially change when studies with high risk of bias (n = 10) were excluded.
Conclusion: Weight loss leads to statistically and clinically significant improvements in liver function in people with NAFLD in the short-term. Trials with longer-term follow-up are needed.

CP1.13

A systematic review of UK based long-term non-surgical interventions for people with severe obesity (BMI ≥35 kg/m²): Results from The REBALANCE Project

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Introduction: There has been a continued rise in severe obesity (body mass index [BMI] weight kg/(height m)2 ≥35 kg/m²) in the United Kingdom (UK). Effective Tier 3 weight management services could reduce the numbers of patients moving on to Tier 4 services (bariatric surgery), or contribute to the subsequent effectiveness of bariatric surgery. However, more information on the effectiveness of weight management programmes for people with severe obesity in the UK is needed.
Methods: We systematically reviewed the UK evidence base for long-term (≥12 months) behavioural and pharmacotherapy (orlistat) interventions for weight loss and weight maintenance for adults with severe obesity. Four data sources were searched from 1990 to September 2018.
Results: 29 studies were included (eight randomized controlled trials (RCTs), two non-randomized comparative studies, and 19 non-comparative studies). One was in a community setting, 10 weight loss programmes were delivered in NHS primary care, three evaluated orlistat in primary and secondary care, 14 studies were in secondary care, and one was a commercial study. Few studies (34.6%) reported data beyond 12 months. Few studies (34.6%) reported data beyond 12 months. Across the studies, more women (68.1%) were involved than men. Overall, very low calorie diets showed a mean weight change of -12.4kg (standard deviation, SD 11.4) to -15kg (SD 9.6) at 12 months. However, whether including VLCDs offers better weight loss outcomes and better improvement in comorbidities and quality of life after 12 months is unclear. However, limitations and differences in evaluation, reporting (particularly for denominators), unclear dropout rates, and variances between participant groups in terms of comorbidities and psychological characteristics, made comparisons and inferences challenging.

Conclusion: It would be very useful, if data collection for weight outcomes and dropouts, and their timing, were standardised across the UK, allowing comparison of long-term interventions.

Conflict of Interest: None.

Funding: Research relating to this abstract was funded by the NIHR HTA Programme.

CP1.14

Predictors of successful weight loss in individuals with overweight and obesity on an 8-week low energy diet

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Introduction: A low energy diet (LED) is an effective approach to induce a rapid weight loss in individuals with overweight and obesity. However, reports of disproportionally large losses of fat-free mass (FFM) after an LED trigger the question of adequate protein content. Additionally, the degree of weight loss success obtained with an LED may be dependent on many different non-nutritional factors. Identifying behavioural characteristics associated with individual success on an LED could be valuable in order to identify the individuals in need for additional support during an LED and thereby optimise the individual's outcome of an LED.
Methods: After an 8-week LED providing 5020 kJ/d for men and 4184 kJ/d for women (84/70 g protein/d) among adults with overweight and obesity, we aimed to investigate the relationship between protein intake relative to initial FFM and proportion of weight lost as FFM as well as the individual characteristics associated with weight loss success. We assessed all outcomes at baseline and after the LED.
Results: A total of 286 subjects (64 men and 222 women) initiated the LED of which 82% completed and 70% achieved a substantial weight loss (defined as ≥8%). Protein intake in the range 1.0-1.6 g protein/d/kg FFM at baseline for men and 1.1-2.2 g protein/d/kg FFM at baseline for women were not associated with loss of FFM (P = 0.632). Higher level of hunger at baseline and reductions in disinhibited eating behaviour and hunger during the LED were associated with larger weight loss (all P≤0.020); whereas lower sleep quality at baseline predicted less successful weight loss using intention to treat analysis (P = 0.021), possibly driven by those dropping out (n = 81, P = 0.067 vs. completers: n = 198, P = 0.659).
Conclusion: The protein intake relative to initial FFM was sufficient for relatively maintenance of FFM, and specific eating behaviour characteristics were associated with weight loss success. Further investigations of optimal protein content of LED are needed, and especially further investigations of different eating behaviour characteristics seem promising in order to identify expected weight loss success as well as the individuals in need for additional support during an LED.

CP1.15

Fatty acids composition of blood cell membranes and peripheral inflammation in the PREDIMED study: A cross sectional analysis

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Introduction: Inflammation plays a key role in a wide range of chronic diseases. To define novel markers for inflammation may improve the selection of individuals for preventative strategies. Therefore, this study examined associations between baseline and 1-year changes in the levels of fatty acids in blood cell membranes with circulating inflammatory markers in older adults at high cardiovascular risk.
Methods: This is a cross-sectional analysis using baseline (n = 283) and 1-year (n = 144) data of a case-control study within the PREDIMED study. We used gas chromatography to measure the proportion of 22 fatty acids in blood cell membranes and ELISA to measure the inflammatory markers in serum at baseline and 1-year. Linear regression with elastic net penalty was applied to test associations between measured fatty acids and inflammatory markers.
Results: Several fatty acids were associated with IFNγ and interleukins (ILs) IL6, IL-8, and IL-10 at baseline and additionally also with IL-1b at 1-year changes. At baseline, IL-8 was positively associated with omega-6 fatty acids such as C20:3n6, C22:4n6, C22:5n6 and C18:2n6, and negatively associated with total MUFA, C14:0, C20:5n3 and C20:1n9. Baseline levels of C20:2n6 were positively associated with IL-6; while other fatty acids including C14:0, C20:0, C16:1n7trans and C18:3n3 were negatively associated with IL-6. C20:1n9 was negatively associated with IFN-γ. The SFA, C18:0 was positively associated; while the MUFA, C24:1n9 inversely associated with IL-10. None fatty acid was selected for IL-1b. At 1-year changes, C16:1n7trans was negatively associated with IFN-γ, IL-6, IL-8, IL-10, IL-1b, whereas C16:1n7cis was positively associated with IL-1b. Omega-3 fatty acids including C20:5n3 and C18:3n3 were negatively associated with IFN-γ at 1-year changes.
Conclusion: This study adds to the growing body of evidence suggesting potential differences in inflammatory or anti-inflammatory properties of fatty acids in blood cell membranes.

Conflict of Interest: None.

Funding: Funded by Fundació La Marató de TV3 (201512.30.31.32). JM has received funding from the 301 European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska302 Curie grant agreement No. 713679 and from the Universitat Rovira i Virgili (URV). CP is supported 303 by a postdoctoral fellowship granted by the Autonomous Government of Catalonia (PERIS 2016- 304 2020 Incorporació de Científics i Tecnòlegs, SLT002/0016/00428). ASV holds a Miguel Servet 305 contract (CP12/03299, Instituto de Salud Carlos III, Spain).

Tab. 1. Fatty acids ranked from the highest to the lowest elastic net positive or negative regression coefficients for inflammatory markers at baseline (n = 283).

Inflammatory markers	Fatty acids	Coefficient	Fatty acids	Coefficient
IFNγ			C20:1n9	-0.10509
IL-6	C20:2n6	0.022538562	C14:0	-0.07683
			C20:0	-0.06500
			C16:1n7trans	-0.04174
			C18:3n3	-0.01398
IL-8	C20:3n6	0.150047930	Total MUFA	-0.221585897
	C22:4n6	0.026600250	C14:0	-0.193820000
	C22:5n6	0.025047484	C20:5n3	-0.028783824
	C18:2n6	0.011594436	C20:1n9	-0.012930716
IL-10	C18:0	0.247852933	C24:1n9	-0.009369263
IL–1b	None	None	None	None

Tab. 2. Fatty acids ranked from the highest to the lowest elastic net positive or negative regression coefficients for inflammatory markers at 1-year changes (n = 144).

Inflammatory markers	Fatty acids	Coefficient	Fatty acids	Coefficient
IFNγ			C16:1n7trans	-0.088828660
			C24:1n9	-0.062020416
			C20:5n3	-0.000904281
			C18:3n3	-0.000167641
IL-6			C16:1n7trans	-0.099400090
IL-8	C22:5n6	0.04588701	C16:1n7trans	-0.189734830
			C18:1n9cis	-0.079781270
IL-10	C20:2n6	0.02705901	C14:0	-0.302841880
			C16:1n7trans	-0.153422720
IL-1b	C16:1n7cis	0.069584927	C14:0	-0.126967538
			C16:1n7trans	-0.103744563
			C24:1n9	-0.027106362
			C18:3n3	-0.007501129

CP1.16

Efficacy of liraglutide, dulaglutide and SGLT2 inhibitors in obese/overweight patients with type 2 diabetes mellitus

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Introduction: Obesity is a major public health issue and new drugs for weight management are needed, in particular for patients with type 2 diabetes mellitus (T2DM) and metabolic syndrome. An effective weight loss can improve and prevent T2DM and its related comorbidities. Therefore, we evaluated the efficacy – in terms of weight loss and glycemic control - and safety of the glucagon-like peptide 1 receptor agonists or GLP1-RA (liraglutide and dulaglutide) and sodium-glucose transporter 2 inhibitors or SGLT2-I (empagliflozin and dapagliflozin), in a population of overweight and obese T2DM patients.

Methods: we retrospectively studied a cohort of 90 consecutive patients with overweight or obesity and T2DM, followed at the Diabetes Unit of Siena University for six months. 30 patients were treated with liraglutide (15 females and 15 males, mean age 59±3 years, mean BMI 37,9 ±2,6 kg/m², mean HbA1c 7,9±0,4%), 30 patients were treated with dulaglutide (17 females and 13 males, mean age 62±18 years, mean BMI 32±1,2 kg/m², mean HbA1c 8±0,4%) and 30 patients were treated with empagliflozin or dapagliflozin (14 females and 16 males, mean age 61±8 years, mean BMI 31,7±7,4 kg/m², HbA1c 8,1±0,9%), at the maximum tolerated dose. Patients were screened to exclude type 1 diabetes; pancreatic enzymes and urine exams were performed before treatment start. All patients had previously failed multiple lifestyle interventions, such as diet and physical activity, and anti-diabetic therapy with metformin only.

Results: Ideal weight (IW) and excess weight (EW) were 65±7 Kg and 40±6 kg respectively in the liraglutide group, 64±5 Kg and 25±6 kg respectively in the dulaglutide group, 67±18 Kg and 24±20 kg respectively in the SGLT2-I group. Estimated mean weight loss was 4,8% at 3 months and 5,5% at 6 months for the liraglutide group, 2,9% at 3 months and 3,3% at 6 months for the dulaglutide group, 2,8% at 3 months and 3,6% at 6 months for the SGLT-2 group. A significant weight loss was observed in the liraglutide group versus dulaglutide group ($p<0,03$) at 3 months and versus SGLT2-I group ($p<0,05$) at 6 months. HbA1c was significantly reduced in all the 3 groups at 6 months compared to baseline ($p = 0,0001$ for liraglutide; $p< 0,0001$ for dulaglutide; $p< 0,0001$ for SGLT2-I). Adverse events (nausea, diarrhea, constipation and also amylase and lipase increase) were most frequently reported in the liraglutide group; however no treatment discontinuation due to adverse events was observed. Urinary infections were considered a criterion to stop SGLT-2.

Conclusion: liraglutide induced clinically relevant weight loss compared with dulaglutide and SGLT2-I. We didn't found any significant difference in glycemic control between the 3 different treatment groups.

CP1.17

Relationship between obstructive sleep apnea syndrome and weight loss after laparoscopic sleeve gastrectomy

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Background: Surgical techniques are a growing component in the treatment of obesity, offering, in addition to significant and sustained weight loss, constant improvement in comorbidities. Obstructive sleep apnea (OSA) is one of these disorders which is associated with worse morbidity-mortality prognosis in patients with obesity. The objective of this study was to evaluate the influence of the presence of OSA on anthropometric parameters in dynamic, in patients undergoing laparoscopic sleeve gastrectomy (LSG).

Methods: The study included patients undergoing LSG between 2014 and 2018 in our center, who had preoperative polysomnography data and who were evaluated preoperative and at six and 12 months after surgery. The results are presented in comparison between patients without OSA and patients with OSA.

Results: We included 113 patients, of which 79 patients had OSA. At baseline, patients with OSA were more frequently male, older, had higher anthropometric measurements, serum glucose, uric acid and CRP levels, but lower eGFR and HDL-cholesterol values than patients without OSA. There were no significant differences in blood pressures values between the two groups.

As compared with baseline levels, at 6 months there was a significant decrease in BMI values, but without a significant difference in the slope of decrease between the two groups of patients (-12.5 Kg/m², 95% CI -14.0 to -10.9 Kg/m² and -11.9 Kg/m², 95% CI -13.1 to -10.7 Kg/m² in patients without and with OSA, respectively). At 12 months, BMI levels continued to be lower than the baseline ones, but there was no further decrease as compared to the 6 months levels, irrespective of OSA status. Similar patterns were also noted for weight and waist circumference. Serum glucose and HbA1c values also improved significantly at six and 12 months after surgery, but with no difference between the groups. We also calculated percent excess BMI loss (%EBMIL) defined as [ΔBMI/(initial BMI-25)] x 100 and we observed a significantly greater decrease in patients without OSA at both 6 months (-69.6%, 95%CI -75.3 to -64.0% and -59.6%, 95%CI -64.0 to -55.1% in patients without and with OSA, respectively; $p = 0.01$ for the comparison) and 12 months (-82.9%, 95%CI -89.4 to -76.5%

and -67.8%, 95%CI -72.9 to -62.7% in patients without and with OSA, respectively; p<0.001 for the comparison).
Conclusion: Patients with OSA lost significant less weight after surgery compared with patients without OSA. The assumption that OSA is a predictor of inadequate weight loss after surgery needs further investigation.

CP1.18

Role of vitamin D and parathormone in metabolic syndrome in obese patients

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Introduction: It has been suggested that 25-hydroxy-vitamin D (25-OH-D) and parathormone (PTH) may play a role in the metabolic syndrome aetiology, however, data are limited and inconsistent. This study aimed to evaluate the impact of 25-hydroxy-vitamin D (25-OH-D) and PTH levels on the presence and development of metabolic syndrome in morbidly obese patients before and after surgical treatment.
Methods: Retrospective study of patients followed in multidisciplinary consultation of morbid obesity between January 2010 and June 2017. Patients with CKD (GFR <60mL/min/1.73m^2), previous history of bone fractures and abnormal levels of serum calcium, phosphorus and magnesium were excluded. We evaluated the association through linear regression and logistic regression models (adjusted for gender, age, body mass index [BMI], and 25-OH-D or PTH).
Results: 290 patients were included; 82.4% women, mean age 41.04 ± 10.52 years, BMI 43.57 ± 5.66 kg/m^2, and mean levels of 25-OH-D and PTH of 14.75 ± 7.95 ng/mL and 59.51 ± 22.88 pg/mL, respectively. Metabolic syndrome was present in 67.5% of patients. We found an association between lower levels of 25-OH-D and the presence of metabolic syndrome (OR = 0.96; p = 0.049). Higher PTH levels were associated with higher waist circumference (β = 0.065, p = 0.042), lower prevalence of diabetes mellitus (OR = 0.984, p = 0.029), and lower values of HOMA-IR (OR = 0.023, p = 0.014).
One year after bariatric surgery, the mean 25-OH-D and PTH levels were 23.81 ± 10.78 ng/mL and 46.37 ± 17.90 pg/mL, respectively. Higher 25-OH-D levels were associated with lower waist circumference (β = -0.218, p = 0.013), lower BMI (β = -0,119, p = 0.001), and higher triglyceride levels (β = 0.528; p = 0.024). We found association between higher levels of PTH and higher BMI (β = 0.047, p = 0.039), and higher values of systolic (β = 0.213, p = 0.019) and diastolic (β = 0.141; p = 0.019) blood pressure.
Conclusion: Our data suggest that low levels of 25-OH-D in obese patients may contribute to the development of metabolic syndrome. Surprisingly and contrary to that suggested for the general population, in obese patients, higher levels of PTH appear to be associated with lower insulin resistance and DM. On the other hand, in patients submitted to bariatric surgery, elevations of PTH may play a role in the development of hypertension, even in the absence of hypercalcemia.

CP2 - Childhood and Adolescent Obesity & Health, Behaviour and Environment

CP2.01

Implicit bias for sedentary activities is positively associated with BMI z-score in children

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Introduction: The Activity Preference Assessment (APA) is a novel, computerized behavioral task based on a widely used and well-validated measure of explicit liking and implicit wanting for different types of food (Leeds Food Preference Questionnaire). We have applied this framework to assess similar cognitive constructs around physical and sedentary activity preferences. High levels of sedentary behavior are associated with adverse health outcomes, and the prevalence of youths engaging in excessive sedentary time has dramatically increased. However, the cognitive determinants of these habits are not well understood. The purpose of this study is to determine whether scores from the APA are associated with weight status in children ages 6-17 years.
Methods: Primary outcomes of the APA include explicit liking for and wanting to engage in activities measured using visual analog scales (VAS). In addition, implicit bias scores for sedentary vs. physical activities are computed based on choices (coded as 'wins') and reaction times in a forced-choice paradigm. Positive scores indicate a bias towards sedentary activities, while negative scores represent a physical activity bias. Seventy-nine participants age 11.6 ± 3.3 years (59% female, 57% white, 35% overweight or obese) completed the APA at a laboratory visit for the Shape Up Kids study. Height, weight, and waist circumference were measured, and age- and sex-specific BMI z-scores (BMIz) were calculated.
Results: Explicit liking and wanting scores for sedentary and physical activities were not associated with BMIz or waist circumference. However, implicit bias scores were positively associated with BMIz (r = 0.29, p < 0.01). This association was driven by girls (r = 0.49, p < 0.01), with a non-significant association in boys (r = 0.05, p = 0.78). In girls only, implicit bias scores were also positively associated with waist circumference (r = 0.42, p < 0.01). Child age was not significantly associated with any of the APA outcomes.
Conclusion: In a novel behavioral task, children's implicit bias around leisure time activities was associated with weight status. This association was driven by girls. Implicit bias for sedentary activities was positively associated with BMIz and waist circumference, similar to previous studies of objectively measured sedentary time. The implicit bias outcome represents an underlying preference for or predisposition to choose sedentary vs. physical activities. Importantly, this task only takes an average of 10 minutes to administer, highlighting the utility of the APA as a screening tool. Future studies will investigate associations between the APA outcomes and objectively measured behaviors, as well as additional markers of children's cardiometabolic health.

CP2.02

Developmental trajectories of body mass index from childhood into late adolescence and subsequent late adolescence–young adulthood cardiometabolic risk markers

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Introduction: Reports on body mass index (BMI) trajectories from childhood into late adolescence, their determinants, and subsequent cardiometabolic risk markers, particularly among European populations have been few. Moreover, sex-specific investigation is necessary considering the sex difference in BMI, and the sex-specific association between BMI and some cardiometabolic risk markers.
Methods: Using a sample from the DOrtmund Nutritional and Anthropometric Longitudinally Designed study, we explored sex-specific trajectories of the BMI standard deviation score (SDS) from four to 18 years of age in 354 males and 335 females by latent (class) growth models. The determinants of trajectory were assessed by logistic regression. We identified cardiometabolic risk markers that were highly associated with BMI SDS trajectory by random forest regression, and finally we used generalized linear models to investigate differences in the identified cardiometabolic risk markers between pairs of trajectories.
Results: We observed four: 'low-normal weight', 'mid-normal weight', 'high-normal weight', and 'overweight', and three: "low-normal weight', 'mid-normal weight', and 'high-normal weight' trajectories in males and females, respectively. Higher maternal prepregnancy BMI was associated with the 'overweight' trajectory, and with 'high-normal weight' trajectory in both sexes. In addition, employed mothers and first-born status were associated with 'high-normal weight' trajectory in females. BMI SDS trajectory was associated with high-density lipoprotein-cholesterol and interleukin-18 (IL-18) in males, and diastolic blood pressure and interleukin-6 (IL-6) in females. However, only males following the 'overweight' trajectory had significantly higher IL-18 when compared to their 'low-normal weight' counterpart.
Conclusion: We identified sex-specific distinct trajectories of BMI SDS from childhood into late adolescence, higher maternal prepregnancy BMI as a common determinant of the 'high-normal weight' and 'overweight' trajectories, and 'overweight' trajectory being associated with elevated IL-18 in late adolescence–young adulthood. This study emphasizes the role of maternal prepregnancy BMI in overweight, and highlights IL-18 as a cardiometabolic signature of overweight across life.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Federal Ministry of Education and Research, Germany (grant number: 01EA1705A) through the European Joint Programming Initiative-A Healthy Diet for a Healthy Life Metabolic HEALTH through nutrition, microbiota and tryptophan bioMARKers (HEALTHMARK) project.

CP2.03

Abdominal obesity in 7-year old children in European countries evaluated by waist to height ratio – Childhood Obesity Surveillance Initiative (COSI)

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Introduction: Childhood obesity is a serious health problem causing a wide range of complications. Theseare often associated with body fat distribution rather than merely weight or body mass index (BMI) alone. Our study examined waist to height ration (WtHR) as an alternative measure of obesity that is potentially a better predictor of cardiometabolic risk in children than BMI. The study was conducted within theWHOChildhood Obesity Surveillance Initiative (COSI) which has been measuring trends in overweight and obesity inprimary-school children aged 6–9 years since 2007.
Methods: The study evaluated data from the first three rounds of COSI (2007/2008, 2009/2010, and 2012/2013)collected in ten European countries that performednot only basic anthropometric measurements (weight, height) but measured also waist circumference (BUL, Bulgaria; CZH, Czech Republic; GRE, Greece; IRL, Ireland; LVA, Latvia; LTU, Lithuania; MKD, Macedonia; NOR, Norway; ESP, Spain; SWE, Sweden). Standardized WHO techniques were used for the anthropometric measurements. Children aged 7.00 – 7.99 years were selected from each of the three rounds, creatingthe final sample size of 38.975 children. Abdominal obesity was defined as WHtR>0.5.
Results: In total,13.6% of boys and 13.8% of girls exceeded the threshold of WHtR>0.5.The highest percentage of children with WHtR>0.5 was found in southern European countries of Macedonia (boys: 27.6%, girls 23.0%), Greece (boys: 24.9%, girls: 25.4%) and Spain (boys: 22.2%, girls: 22.1%), while the lowest values were found in Sweden (boys: 4.8%, girls 7.9%), Norway (boys 6.6%, girls 8.1%) and Latvia (boys: 9.0%, girls 7.8%).
Conclusion: The percentage of 7years old children with abdominal obesity was found to be significantly higher in Southern European countries than in Central and Northern Europe.

Conflict of Interest: None Disclosed.

Funding: Supported by grants: AZVMZČR 17-31670 A and MZČR - RVOEÚ 00023761.

CP2.04

Oxidative stress is associated with systolic hypertension in obese children and adolescents

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Introduction: Hypertension is a frequent complication of obesity from childhood onwards and is a strong predictor of cardiovascular morbidity and mortality.
Understanding the mechanisms linking childhood obesity to increased blood pressure would be of great importance to guide research on potential options to prevent or treat hypertension in the obese child.
Oxidative stress is a candidate driver of hypertension in obese children, because it produces endothelial dysfunction, a known cause of increased blood pressure.
We aimed to assess whether oxidative stress was associated with blood pressure and hypertension in a cohort of obese children/adolescents.
Methods: One hundred and fifty-three obese children/adolescents (80 boys; age 11.9+/-2.5 years, z-BMI 2.1+/-0.8) were consecutively recruited at the Obesity Out-Patient Clinic of the Pediatric Diabetes and Metabolic Disorders Unit of the University Hospital of Verona and underwent physical examination and blood drawing. Blood pressure was measured and classified according to the latest American Academy of Pediatrics Guidelines and the degree of adiposity was estimated as the z-score of the BMI according to the Italian national charts. The systemic oxidative status was assessed by measuring the total anti-oxidant capacity (TAC) of serum with a commercial kit (Sigma- Aldrich). TAC results from the amount of both anti-oxidant and oxidant species and correlates inversely with the oxidative stress. General linear models and binary logistic models were run to test whether TAC was associated with the blood pressure as continuous variable or dichotomous variable respectively.
Results: The average TAC was 1.11+/-0.4 mMol/Trolox equivalents. TAC correlated inversely with systolic blood pressure (B = - 5.2, p = 0.019), independently of other significant predictors: z-BMI (B = 4.5, p < 0.001) and height[cm](B = 0.35, p = 0.001). In contrast, diastolic blood pressure was predicted by age[years] (B = 0.82, p = 0.03), z-BMI (B = 2.36, p = 0.005), and HOMA-IR (B = 0.71, p = 0.001), but not by TAC. The prevalence of elevated blood pressure and hypertension was 23% and 25% respectively. TAC was not associated with overall elevated blood pressure/hypertension or hypertension, but was negatively associated with systolic elevated blood pressure/hypertension (OR = 0.4[0.1-0.9], p = 0.037), independently of the other significant predictor: z-BMI (OR = 2.1[1.3-3.6], p = 0.004).
Conclusion: Oxidative stress is associated with systolic hypertension in obese children and adolescents, as suggested by the inverse correlations between systemic anti-oxidant capacity and systolic blood pressure and between systemic anti-oxidant capacity and systolic elevated blood pressure/hypertension.

Conflict of Interest: None.

CP2.05

APOLO-Teens, a Web-based intervention for adolescents with overweight/obesity seeking treatment: an effectiveness study

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Introduction: The APOLO-Teens intervention was designed to enhance treatment as usual outcomes for adolescents with overweight and obesity seeking treatment at public health care centers, regarding dietary patterns, eating behaviors, physical activity levels, and psychological distress. This randomized clinical trial aims to examine the effectiveness of the 6-month web-based intervention APOLO-Teens that combines a manualized intervention delivered by Facebook®, chat sessions and a self-monitoring web-application with personalized feedback.
Method: One-hundred and twenty-two participants were randomly allocated to treatment as usual control group (n = 60) and APOLO-Teens intervention group (n = 62). The participants, aged 13 to 18 years, filled in a set of self-report measures and completed an anthropometric assessment at baseline and end of intervention. The final sample included 77 adolescents (per completed protocol analysis) distributed into control group (n = 39) and intervention group (n = 38), 52 (67.5%) were female with a mean age of 14.92 (SD = 1.62) years. To test within/between differences into group conditions two-way mixed ANOVAs were conducted.
Results: At the end of the 6-month APOLO-Teens intervention, both intervention and control groups decreased BMI z-score, pastries/cakes intake, depressive symptomatology and grazing eating pattern, and increased vegetables on the plate consumption ($p < 0.05$). The APOLO-Teens intervention group depicted a greatest increase on fruit consumption between baseline and end of intervention, when compared with the control group, who decreased on fruit consumption. On average, the intervention group increased fruit consumption from 5 to 6 times per week to consume about two pieces of fruit per day ($p < 0.05$). Additionally, the APOLO-Teens high adherence group presented a significant and positive change on weekly intake of fruit, vegetables on the plate, problematic eating behaviors and depressive symptomatology ($p < 0.05$).
Conclusion: APOLO-Teens web-based intervention was effective, as an affordable complementary intervention to the treatment as usual, in increasing fruit intake on adolescents with overweight and obesity. The high adherence group showed improved behavioral, psychological and eating behavior outcomes. If successfully implemented, this intervention can lead to significant clinical changes with potential to reduce the gap in specialized treatment access between adolescents from high vs low socioeconomic status.

CP2.06

Should the soft drinks industry levy ("the sugar tax") be framed as a childhood obesity intervention?

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The Soft Drinks Industry Levy (SDIL) came into effect on the 6th of April 2018 and it is designed to tackle Sugar Sweetened Beverages (SSBs); the largest contributor of sugar in children's diets. It has been mandated as part of the Childhood Obesity Plan and is projected to result in an 8.55% reduction in the rates of children and adolescents who are obese (Briggs et al., 2016). To understand more about the potential impacts of action on SSBs, this study aimed to consider the characteristics of children in the UK who drink, and do not drink, SSBs and the impact of overall energy intake.
Methodology: Data from 4-day estimated food diaries of 1298 children aged 4-10 years from the National Diet and Nutrition Survey Rolling program from 2008 to 2016 were analysed using SPSS version 24. Based upon their consumption or not, children were categorised as "drinkers" and "non-drinkers" of SSBs. Other variables included child age, gender, weight classification (IOTF cut-offs calculated from weight (kgs) and height (cm) (Cole et al. 2007)), total energy requirements for age, total energy intake (<90% of energy requirement met by intake taken as lower than recommended energy intake, 90-100% as met recommended energy intake, >110% above recommended energy intake), and Non-Milk Extrinsic Sugar (NMES) intake (<5% of total energy requirement as low NMES intake, 5–10% as medium NMES intake, >10% as high NMES intakes) (WHO, 2015).
Results: The consumption of NMES from food and drink within the total population was higher than recommended in 78.4% (n = 1017) children and significantly higher among the 790 (60.86%) of children classified as drinkers of SSBs (67.6%, n = 688) compared to non-drinkers (32.2%, n = 329).

However, 78.1% (n = 617) children who were drinkers of SSBs did not exceed their total energy requirements and there was no significant difference between the two groups of drinkers and non-drinkers in terms of age, gender or body weight classification.

Conclusion: In this representative sample of UK children, high intake of NMEs was not directly correlated with high energy consumption, therefore, depending on a single- nutrient approach in tackling childhood obesity might not be the most effective.

Furthermore, SSB drinking is not a behaviour particular to children with a higher body weight, on the contrary, framing sugar reduction in tackling obesity might reinforce negative stereotypes around "unhealthy dieting". More equitably, policies should focus on those children whose consumption of SSBs significantly increases their total NMEs.

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CP2.07

Clinical, biochemical and instrumental evaluation of hypertension in obese children

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Aim: In this study a relationship between hypertension and biochemical profile, left ventricular mass index (LVMI) and carotid intima-media thickness (c-IMT) has been evaluated in a population of obese children.

Methods: Fifty obese patients (25 M; mean age (SD) 11 (2) ys, BMI z-score 2,79 (0,49)) have been enrolled. They underwent clinical visit, blood samples (total cholesterol, high-density lipoproteins, low-density lipoproteins and triglycerides (T-CHOL; HDL; LDL; TG)), blood pressure measurements (BP office mean of 3 measurements), 24h ambulatory blood pressure monitoring (ABPM), echocardiogram and carotid ultrasonography. Left ventricular hypertrophy (LVH) was defined as LVMI greater than the 95th specific percentile for age and sex[1]. Children were classified as hypertensive if they had pre-hypertension, hypertension, white coat hypertension or masked hypertension, according to Flynn[2]. Children were classified as normotensive if they had normal BP with both methods.

Results: Twenty-seven obese children (54%) were classified as hypertensive and 23 obese children (46%) were classified as normotensive. Twenty-two children (44%) had TG values greater than normal cut-off specific for age and sex; 16 hypertensive children (59,2%) and 6 normotensive children (26%) had elevated TG values. A statistically significant difference in TG values between hypertensive and normotensive groups was found (p = 0,019). No statistically significant difference in T-CHOL, HDL and LDL values between the two groups was found. Fourteen children (28%) had LVH; 8 hypertensive children (29,6%) and 6 normotensive children (26,1%) had LVH. No statistically significant difference in LVH diagnosis between the two groups was found. Twenty-six children (52%) had c-IMT greater than the 95th percentile specific for age and sex1; 18 hypertensive children (66,7%) and 8 normotensive children (34,8%) had c-IMT greater than the 95th percentile specific for age and sex. A difference in c-IMT among hypertensive and normotensive groups was found (p = 0,026).

Conclusion: Despite the small sample size, a significant difference in c-IMT and TG values between hypertensive and normotensive obese children was shown. We found no statistically significant difference in T-CHOL, HDL, LDL values and LVH diagnosis between the two groups. These results suggest a prominent role of a combined instrumental and blood samples evaluation in children, underlying the importance of using ABPM, echocardiogram and carotid ultrasonography in obesity-related hypertension in pediatric age.

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Conflict of Interest: None declared.

Funding: No funding.

CP2.08

Development and validation of a UK Nutrient-based Diet Quality Score - NDQS

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Food or nutrient based composite scores are used in nutritional epidemiology to assess population level adherence to a priori dietary patterns. The UK Nutrient-based Dietary Quality Score (NDQS) was developed to provide a standardised measure for assessing adherence to UK Dietary References Values (DRVs) and government guidelines for nutrient intake. Currently, such a tool does not exist in the UK.

Inclusion criteria and scoring were informed by government dietary guidelines, population intake and expected impact on public health in the UK. Macronutrients included as a percentage of total energy were: saturated fat; trans fats; cis n-3 and cis n-6 polyunsaturated fatty acids and non-milk extrinsic sugars. Non-starch polysaccharides and protein were included as average daily grams. Micronutrients included were: sodium, calcium, iron, folate and vitamin C (average daily grams). Alcohol was included due to its contribution to energy intake, its association with multiple negative health outcomes and its overall high consumption in the UK. UK National Diet and Nutrition Survey 2008-2012 data were used to evaluate the validity of the score (n = 2083). Adults were scored according to their nutrient intake. Regressions with sample characteristics and correlations with biomarkers of nutritional status in a sub-sample (n = 1769) were analysed.

The resulting UK NDQS score ranged from 0 for the lowest quality diet and 100 for the highest. The mean score for adults in the NDNS dataset was 66.9 (SD 12.84) and the distribution of the score was normal. Higher scores were positively associated ($p<0.001$) with age (0.16), higher levels of selenium (0.26), alpha-tocopherol (0.11), total carotenoids (0.22), vitamins B6 (0.19), C (0.22) and 25-hyrdroxy vitamin D (0.12). Lower scores were associated ($p\leq0.01$) with smoking (-5.85), being white (-3.48), levels of homocysteine (-0.09), c-reactive protein (-0.11) and urinary sodium (0.09). The highest two socioeconomic groups had greater mean scores than the two lowest ($p<0.001$). Individuals categorised by Body Mass Index as being 'underweight' had lower mean NDQS scores than those in the 'healthy weight', 'overweight' or 'obese' categories ($p>0.01$).

The Nutrient-based Diet Quality Score provides a standardised, validated measure for assessing and monitoring diet quality in the UK.

CP2.09

Longitudinal course of body image in people with overweight and obesity attempting weight maintenance following clinically-significant weight loss: a 12 month cohort study

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Introduction: Weight loss (WL) attempts are often motivated by body-image concerns but body image does not uniformly improve with weight loss in individuals with overweight or obesity. Little is known about body

image's longitudinal course after clinically significant weight loss (≥5%). Previous research has focused solely on negative body image and used body image measures not designed for people with higher BMIs. This study examined the longitudinal course and predictors of negative and positive body image over 12 months in individuals attempting WL maintenance.

Methods: 2141 participants (age 19-85y) with objectively verified WL of ≥5% in the previous 2 years and pre-WL BMI ≥25kg/m² were recruited from a weight management organisation's mailing list. They completed an online survey twice, 12 months apart, reporting: WL history; positive and negative body image; self-efficacy; motivation; WL outcome satisfaction; ideal and perceived body size (via figure choice scale); energy balance behaviours; and mood. Predictors of positive and negative body image at 12 months (T2) were examined separately in linear multiple regression analyses, controlling for baseline (T1) levels of the respective outcome. Perceived body size was compared to current (post WL) BMI to ascertain accuracy of body size perception.

Findings: Negative body image at T2 was predicted by higher T1 extrinsic weight loss motivation, lower self-efficacy, social support and positive body image, a larger perceived-ideal body size discrepancy, younger age, and higher weight gain over the 12-month study period (R^2 = .62, F = 301.14). Positive body image at T2 was predicted by lower T1 levels of depressive symptoms and negative body image, higher self-efficacy and satisfaction with weight outcomes, and lower weight gain over the 12-month study period (R^2 = .59, F = 364.93). In both models, body image outcomes were unrelated to BMI, % weight originally lost, time since weight loss was achieved and energy-balance behaviours. At both T1 and T2, women overestimated their post-WL body size whereas men's body size perceptions were accurate.

Discussion: Predictors of negative and positive body image following weight loss differed, although self-efficacy and weight regain were associated with body image outcomes in opposite directions. Positive and negative body image inversely predicted one-another. The poor predictive utility of BMI and % weight loss for either outcome underscores the primacy of psychological variables and weight regain over baseline WL history variables as determinants of body image following weight loss.

Conflict of Interest: None Disclosed.

Funding: This project (NoHoW) was funded by the European Union's Horizon 2020 Research and Innovation Programme,Grant Agreement No. 643309.

CP2.10

The START childhood obesity campaign on the island of Ireland: parents intentions and confidence

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Introduction: Maintaining a healthy weight in children is a major health challenge on the island of Ireland. As one of the actions of the public health strategies on the island of Ireland (1) (2), safefood in partnership with both Departments of Health, Healthy Ireland, the Health Service Executive and the Public Health Agency developed a 5 year multi-component campaign entitled START to address this. The evidence-based campaign messages encourage and support behaviour change and lifestyle habits in families using television, radio, social media, outdoor advertising and press.

Methods: A representative sample of parents (n = 974) of children (6 m-12 years) were interviewed face-to-face in Sept/Oct 2018 regarding eating behaviours, physical activity, screen time and support. A booster sample of 519 parents in lower socioeconomic groups were also interviewed. Benchmark data was collected in Sept/Oct 2017 before the campaign commenced.

Results: The data showed that whilst healthy behaviours are on the increase this was offset by unhealthy behaviours; consumption of crisps, biscuits and sweets increased. 'Playing games that involve a lot of running around like football' was the activity with the highest proportion of everyday participation (34%). More parents reported finding it difficult to be healthy as a family than in 2017. Screen time was the top reason given in ROI (50%), whereas finding time to cook healthy meals was reported as the main challenge in NI. An increased number of parents reported that they had 'ever tried to change' behaviours but there was no increase in the number who reported that they 'stuck with this change'. The campaign television ad was recalled by 51% of parents, it was reported to be clearly understood (97%) and made parents feel confident (89%).

Conclusion: The campaign successfully generated awareness of the key behaviours that impact on childhood obesity. However the findings illustrate the gap between intentions and behaviours and the challenge of communications in relation to achieving behaviour change.

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CP2.11

Eating out revolutions: Scotland and the UK

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Introduction: In the UK we consume up to a quarter of our calories out of home (1). Portion sizes out of home tend to be twice as big as those in retail (2) and unsurprisingly habitual consumption of meals out of home in the UK is associated with higher calorie consumption (3). Additionally, over the last few years there has been a rapid growth of companies specialising in ready food deliveries, slowly transforming the relationship we have with food. In the context of increasing burden of obesity and diet related diseases changes to the out of home food environment in the UK are being debated (4, 5).

Methods: Review of recent policy proposals to improve out of home food environment in Scotland and the UK, supplemented with an overview of the out of home food sector in the UK and Scotland, and results of Obesity Action Scotland's research (6).

Results: A range of measures to improve out of home environment and help the public to make better informed choices when eating out were suggested by both the UK and Scottish governments through public consultations. While the UK (England) focused on calorie labelling out of home committing to time-bound legislative measures, Scotland explored extra opportunities such as portion size reduction, improving children's menus, public sector action and tackling promotion and marketing of less healthy options, however, there was no time-bound commitments to implementation of any of the proposals.

Conclusion: We are waiting for the outcomes of the public consultations and decisions. This is the first step towards improving out of home food environment and it remains to be seen whether these proposals will be enough in the context of our poor diet and changing food culture.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

CP2.12

Critical reasoning and advertising in children and adolescents: a systematic scoping review

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Introduction: There is considerable interest in tightening food and drink advertising restrictions to address childhood obesity. However, regulations often focus on protecting children aged 12 years and younger, with the assumption that older children are cognitively capable of understanding advertising. However, studies of adolescent brain development have indicated that reasoning ability may develop later and teenagers are vulnerable to making risky decisions. This review aims to systematically scope studies relating to 'critical reasoning' of advertising to young people to establish the nature of the literature and inform future evidence synthesis.
Methods: Since the extent of the literature was largely unknown, inclusion criteria were broad (>5 years to <18 years; any advert as the exposure; a measure of 'judgement' as an outcome; experimental, intervention, cross-sectional, longitudinal, and qualitative methodologies; with no restrictions on language or date). The following databases were searched: Ovid Medline, Cochrane, Scopus, Psych Info, ProQuest (ASSIA), Web of Science (Social Science and emerging sources), Social Policy and Practice, and Child Development and Adolescent Studies. Articles were double screened on title and abstract and EPPI-Reviewer 4 systematic review software used to manage the review and apply machine learning to the screening.
Results: A total of 7467 articles were identified of which 618 were considered potentially relevant on title and abstract. The largest groupings of articles reported understanding of advertising (n = 178) and attitudes/ beliefs towards the advertised product or behaviour (n = 179), these comprised cross-sectional and longitudinal studies with many focusing on alcohol and tobacco advertising. Other studies reported the impact of health promotion advertisements (n = 85) and media training (n = 29), and impact on attitudes to branding (n = 38). Fewer studies examined body image, models of cognition, or used qualitative methodologies.
Conclusion: The literature is highly heterogenous and surprisingly rich, although much of it focuses on advertising for alcohol and tobacco rather than food and drink. This scoping review will inform future work and indicates scope to synthesise studies relating to the impact of advertising on understanding and attitudes of messages/ products.

Conflict of Interest: None Disclosed.

Funding: This report is independent research commissioned and funded by the National Institute for Health Research Policy Research Programme. The views expressed in this publication are those of the authors and not necessarily those of the NHS, the National Institute for Health Research, the Department of Health and Social Care or its arm's length bodies, and other Government Departments.

CP2.13

Using related data to explore associations between childhood, parental, and environmental factors and childhood obesity in New Zealand: a nationally representative cross-sectional study

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Introduction: Supportive environments are increasingly considered fundamental in shaping behaviours and obesity. However, inconsistent evidence proposes the need to consider new approaches to establish the strength and applicability of these links. This study simultaneously examines the interrelationships between child, parent and environmental exposures and childhood obesity.
Methods: New Zealand Health Survey (NZHS) data (2013-2017) for children and adults data including sociodemographic, behavioural, self-reported health status and measured height and weight were linked resulting in a unique, nationally representative sample of children and their parents (n = 9,206). Food and physical activity environments within a 1600m radial buffer (~10 minute walk) were linked to individuals using Geographical Information Systems. These included objectively measured green and blue spaces, fast-food, takeaway, supermarket, fruit and vegetable, and dairy/convenience food outlets and physical activity facilities within a residential environment (1600m radial buffer). Multilevel logistic regression (children and parents nested in meshblocks) explored risk factors for childhood obesity. Hierarchical cluster analysis accounted for the clustering of environmental features to develop neighbourhood typologies.
Results: Child-level risk factors of increased odds of childhood obesity included: age (OR = 1.03[1.01,1.06]), Pacific ethnicity (OR = 1.61[1.13,2.27]), greater than three hours of TV (OR = 1.28[1.11,1.47]) and screen time (OR = 1.32[1.13,1.54]) in the past week and meeting fruit and vegetable guidelines (OR = 1.15[1.001,1.32]). European (OR = 0.75[0.59,0.94]) and Asian ethnicity (OR = 0.49[0.26,0.93]), and eating breakfast at home every day in the past week (OR = 0.66[0.56,0.77]) were associated with decreased obesity risk. Parent-level risk factors associated with increased childhood obesity risk included older parent age (OR = 1.01[1.01,1.02]), smoking (1.44[1.24,1.69]) and parent obesity (OR = 2.08[1.80,2.41]). Only, high parental education-level (OR = 0.82[0.68,0.99]) was associated with decreased obesity risk. Higher area-level deprivation was associated with increased risk of childhood obesity. Food and physical activity environmental exposures were unrelated to childhood obesity.
Conclusion: Using a unique linked dataset several child- and parent-level factors were associated with childhood obesity however, food and physical activity environment factors were not. Policymakers and researchers may need to consider moving beyond policies which only modify geographical exposure (i.e. physical distance) to environmental features.

Conflict of Interest: None.

Funding: Research relating to this abstract was funded by the New Zealand Ministry of Health through the GeoHealth Laboratory contract.

CP2.14

"In my size there are only ugly dresses!" - motives for weight loss in people with morbid obesity

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Introduction: "No […] success stories [of successful weight reduction] have been reported worldwide in the past 33 years"[1]. Urgent global action is needed in revisions of the currently available strategies.
According to the model of action-result-expectation[2], a person is only motivated to engage in treatment and to change if his/her individual motives are addressed[3]. Identifying a person's motives for weight loss may help in tailoring dietary and psychological components of a weight loss program to the individual[4]. Only few studies assessed motives for weight loss; with contradictory results (e.g.[4],[5],[6]).
Besides, to our knowledge, no validated instrument to assess weight loss motives is available.
Methods: Based on the upper categories of motives found in previous studies (e.g.[4],[5],[6]; health/fitness, appearance, social pressure, problems in everyday life and wellbeing) 30 questions on individual motives for weight loss were formulated and now form a new questionnaire. The questionnaire was used in a pre-test of 44 participants (50 % male, mean age 51.52 ± 11.97 years, BMI 45.16 ± 7.22 kg/m²), who are enrolled in a multidisciplinary one-year weight loss program. Data were evaluated by means of descriptive statistics, computer-aided by the statistics program R.

Results: The most important motives for weight loss are fitness (mean = 5.02, SD = 0.98, range 1-6), health (mean = 4.13, SD = 0.82, range 1-6), problems in everyday life (mean = 3.84, SD = 1.12, range 1-6) and wellbeing (mean = 3.78, SD = 1.24, range 1-6). The least significant reason was social impulse (mean = 2.44, SD = 1.05, range 1-6). Significant differences were found for sex (problems in everyday life: r = .37, p <.05) and BMI (wellbeing: r = .50, p <.001; problems in everyday life: r = .44, p <.01; social impulse: r = .30, p <.05).
Conclusion: This questionnaire aims to provide a tool for assessing weight loss motives. The results are still limited, and a study with more participants is needed in the future. The motives for weight loss found in this study are divers and change with higher BMI and sex. Weight loss programs that consider not only biological, but also individual psychological and social aspects are needed[3]. These programs should primarily focus on fitness and health outcomes to match the most important motives of the participants.

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Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Göttingen Campus Q PLUS (BMBF No. 01PL16061).

CP2.15

Mental health in the Belgian population is related to lifestyle and overweight: moderated mediation

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Introduction: We hypothesize that mental health is related to more overweight and that this is mediated by an unhealthy lifestyle, perhaps in an age- and sex-specific way.
Methods: In 4687 participants (≥15y) of the cross-sectional Belgian health survey 2013, mental health was measured via anxiety/depression symptoms and distress questionnaire (SCL90R and GHQ12). Examined lifestyle factors were daily fruit/vegetables, daily soft drinks, alcohol overconsumption, daily snacks, physical activity, sleeping problems and current smoking. Logistic regression, multiple mediation and moderated mediation analyses were adjusted for age, sex, socio-economics and physical health.
Results: Mental health was significantly related to higher overweight prevalence (odds ratio = 1.180[1.174-1.186]) and unhealthier lifestyle: more smoking, sleep problems, eating disorders, soft-drink and alcohol consumption, while less fruit/vegetables and physical activity. In contrast, lower daily snack intake was related to mental health problems. These effects were often sex- and age-specific e.g. a positive relation between mental health and snacking was found in youth. Eating disorders, physical activity and smoking were significant mediators from mental health towards overweight. Significant moderated mediation showed that the mediation was stronger in the youngest and for smoking also in women. In addition, snacking was only a significant mediator in the youngest.
Conclusion: Mental health is related to higher overweight via mediation by eating disorders (loss of control over eating), lack of physical activity and smoking; and in youth also by snacking. Youth and women are high-risk groups. Psychological prevention/intervention is thus pivotal for physical health. Emotional-induced deteriorations in diet and activity should be highlighted and targeted.

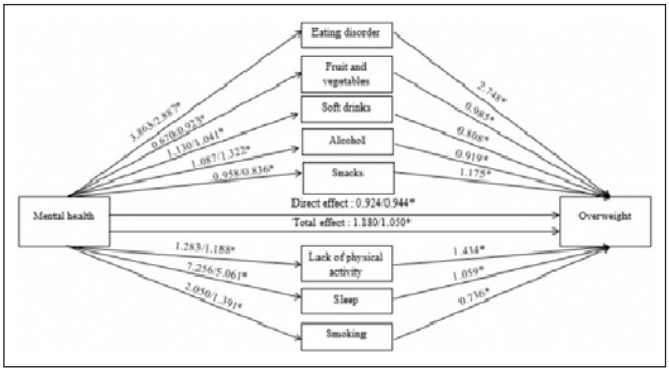

Fig. 1. Mental health, lifestyle and overweight.

CP2.16

Relationship between nutritional status, body fat composition, android body distribution and cardiovascular risk of a female population employed by a fruit company in the city of Chillán, Chile

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Introduction: Rotating shift work generates irregular lifestyles. It is also associated with an increase in the morbidity of workers, especially women. Possible causes of this increase would be malnutrition due to excessive consumption of food and cardiovascular risk. The objective of this research was to evaluate the relationship between nutritional status, body fat composition, android body distribution and cardiovascular risk of a female population employed by a fruit company in the city of Chillán, Chile, with the years under rotating work shift and hours of sleep.
Methods: The study was descriptive of cross section. The sample consisted of 61 women, strategically selected from a universe of 440 employees of the fruit plant. The body composition was determined by tetrapolar bioimpedance. The body distribution was established by calculating the waist-hip index. The type of shift and the years of service of the workers were established through the application of a general data questionnaire. The hours of sleep were defined by applying the sleep questionnaire. The contribution of the diet was quantified by applying a reminder of 24 hours of three non-consecutive days. The level of physical activity developed by the subjects of the sample was established after the application of the international IPAQ questionnaire. Cardiovascular risk was classified through the measurement of waist circumference.
Results and Conclusion: Women under rotating shift, for a period of more than two years, present malnutrition due to excess, body composition with a high percentage of fat mass, android body distribution and presence of high cardiovascular risk. In addition, there was an excess in the consumption of total calories and carbohydrates contained in the diet, a marked preference for the consumption of nightly meals, consumption of foods rich in caffeine, carbohydrates and saturated fatty acids.

CP2.17

Systematic review of the evidence for sustained efficacy of dietary interventions for reducing appetite or energy intake

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Despite the broad literature of published studies on the effects of ingredients, foods and diets on appetite and energy intake (EI), researchers and regulators lack an objective basis to determine the appropriate duration of efficacy trials in appetite control. This gap creates uncertainty in requirements and study designs for the substantiation of satiety-enhancing approaches to help control eating behaviour. To address this question, a systematic search of literature (Prospero registration number CRD42015023686) was undertaken to identify studies reporting data on the acute and chronic effects of food-based interventions aimed at reducing appetite or EI. From a total of 9680 records identified 178 papers were selected for full screening. Twenty-six trials met the inclusion criteria and provided data sufficient for use in this analysis. Most of these trials (21/26) measured appetite outcomes and over half (14/26) had objective measures of EI. A significant acute effect of the intervention was retained in 10 of 12 trials for appetite outcomes, and six of nine studies for EI. Initial effects were most likely retained where these were more robust and studies adequately powered. Where the initial, acute effect was not statistically significant, a significant effect was later observed in only two of nine studies for appetite and none of five studies for EI. Risk of bias was identified across the trials, with the main cause being a lack of a-priori power calculation and failure to report analyses based on intention-to-treat. Furthermore, 12/26 studies were not adequately powered to detect a meaningful reduction in appetite (~10%). Maintenance of intervention effects on appetite or EI needs to be confirmed, and in studies appropriately powered and analysed, but seems likely where observed acute effects are robust and replicable in adequately powered studies.

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Conflict of Interest and Funding: This work was conducted by an expert group of the European branch of the International Life Sciences Institute, ILSI Europe and coordinated by the Eating Behaviour and Energy Balance Task Force. Industry members of this task force are listed on ILSI Europe's website at http://ilsi.eu/task-forces/nutrition/eating-behaviour-and-energy- balance/.

POSTERS BY TRACKS

Monday, 29 April 2019

PO1 - Posters

Basic and Experimental Science

PO1.001

Influence of different types of hypercaloric diets on metabolic, inflammatory biomarkers and oxidative stress

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Introduction: Obesity reflects the excessive increase of adipose tissue and is considered health epidemics of the XXI century, being an independent risk factor for diseases. Studies using hypercaloric diets showed significant results regarding changes in body composition and biochemical profile. Obesity affects mitochondrial metabolism, contributing to the development of oxidative stress. Another important aspect is the relationship of obesity and metabolic diseases with a chronic state of low grade inflammation.
Objective: To evaluate the influence of three types of hypercaloric diets on metabolic, inflammatory and oxidative stress biomarkers in obesity experimental model.
Materials and Methods: This study was approved by University of Espírito Santo Ethics Committee in the Use of Animals (08/2016). Thirty-day-old male Wistar rats were randomized into four groups: control (C), high-sucrose (HS), high-fat (HF) and high-fat with sucrose (HFS) for 20 weeks. Nutritional, metabolic, hormonal and biochemical profiles were analyzed. The inflammation was assessed by serum levels of interleukin 6 (IL-6). The antioxidant enzymes activities superoxide dismutase (SOD) and catalase (CAT) and oxidative stress biomarkers as malondialdehyde (MDA) and carbonylated protein were assayed in serum and epididymal and visceral adipose tissue homogenates.
Results: HF model caused obesity by difference of the final body weight and increase of fat pads and adiposity index. The comorbidities were glucose intolerance (HF after 30 and 60 minutes) and arterial hypertension in all groups when compared to C. There was no significant difference between the groups for insulin ($p = 0.095$), HOMA-IR ($p = 0.127$), leptin ($p = 0.079$), glucose ($p = 0.450$), cholesterol ($p = 0.484$) and low (LDL) and high-density (HDL) lipoproteins ($p = 0.42$ and $p = 0.63$, respectively). MDA and carbonylated protein in serum and visceral and epididymal adipose tissues present results similar among the groups. In addition, there was no difference among groups for serum SOD and CAT activities, as well as inflammation.
Conclusion: The experimental model from a high fat diet was effective in triggering obesity. Nevertheless, all experimental models of hypercaloric diets, proposed in this study, were unable to promote oxidative stress and inflammation. Funding: CNPq (grant number 402090/2016-0) and CAPES (grant number 88881.196771/2018-01).

PO1.002

Androgenic status in adolescent boys with obesity and underweight

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Introduction: The most important medical and social indicator of youthful well-being is the state of reproductive health, which is determined by sex hormones levels. Androgen deficiency is associated with age and obesityin mature males. But, there is no certain association between testosterone levels and obesity in boys. At the same time, young men have the same

frequency of obesity and body mass deficiency. Verylittle is known about effect of underweight on androgenic status. The aim of the study was to estimate the androgenic status in boys with underweight and obesity.
Material and methods. An anthropometric and hormone-biochemical examination of 60 young men aged 19.8 ± 1.6 (M ± SD) were performed. 26 young men (group 1) were obese with a body mass index (BMI) 34.4 ± 4.5 kg/m^2 and 34 –deficiency of body weight with BMI 17.1 ± 1.0 kg/m^2.
Results: Boys from group 1 had significantly higher trochanter index values, than boys from group 2: 1.98 ± 0.09 and 1.76 ± 0.05 cu (p <0.0001). The young men from the group 1 also had larger indicators of shoulder width, however, the ratio of the shoulder width to the pelvis width in 1group boys was significantly lower than that in 2 group boys (1.40 ± 0.14 and 1.53 ± 0.19 cu, respectively, p <0,010). Analysis of the hormonal and metabolic index in young men from 1 group revealed a complex of clinical (high blood pressure) and metabolic disorders (abdominal obesity) of the metabolic syndrome, and the metabolic syndrome was detected in 42% of young men from group 1. It was shown, that boys in the 1 group had a significantly lower testosterone level compared to the 2 group (10.6 ± 3.6 and 17.4 ± 5.9 nmol/l, p <0.0001) and a lower FSH level (2, 7 ± 1.1 and 3.9 ± 2.2 IU / l, respectively, p <0.010), and this group did not differ in LH and DEAS levels.
Conclusion: These results suggest a higher rate of sexual development in the 1 group of boys, but they also have a constitutional predisposition to the accumulation of adipose tissue. Low testosterone levels may have both as peripheral genesis due to increased transformation of androgens into estrogens, and as a central - due to reduced levels of pituitary tropic hormones.In spite of the underweight in boys in the 2 group the clinical, hormonal and biochemical profiles conform to young men with normal body weight.

PO1.003

Disturbed leptin-adiponectin axis in the metabolic syndrome is associated with inflammation and oxidative stress in humans

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Introduction: The International Diabetes Federation estimates that 25% of the adult population worldwide suffers from the metabolic syndrome (MS). It has been reported that the MS may induce or even may be caused by increased systemic inflammation and oxidative stress in relation with an altered adipokine secretion. In this sense, the MS is characterized by elevated circulating leptin concentrations, in parallel to a decrease in blood levels of adiponectin. Our aim was to study whether the leptin-adiponectin axis may have a pathophysiological role in the increased systemic inflammation and oxidative stress in patients with the MS.
Methods: Leptin, adiponectin, and markers of inflammation and oxidative stress were analysed in a sample of 140 Caucasian subjects (74 men/66 women), aged 28-82 years, 60 with and 80 without the MS.
Results: Total as well as high molecular weight (HMW), medium molecular weight (MMW) (P<0.001 for all) and low molecular weight (LMW) (P<0.05) adiponectin concentrations were significantly lower in individuals with the MS. In contrast, leptin levels were significantly higher (P<0.001) in subjects with the MS. The ratio adiponectin/leptin was dramatically decreased (P<0.001) in subjects with the MS, whereas systemic oxidative stress, as evidenced by levels of thiobarbituric acid reactive substances (TBARS), as well as markers of inflammation such as serum amyloid A (SAA), C-reactive protein (CRP) and osteopontin were significantly increased (P<0.05). Furthermore, the ratio adiponectin/leptin was negatively correlated with SAA concentrations (r = -0.26, P = 0.003) as well as with CRP levels (r = -0.40, P<0.001).
Conclusion: A low adiponectin/leptin ratio can be considered a marker of dysfunctional adipose tissue contributing to the increased oxidative stress and inflammation in patients with the MS. New cut-offs to estimate obesity- and MS-associated cardiometabolic risk according to the adiponectin/leptin ratio are proposed.

Conflict of Interest: There is no conflict of interest.

Funding: Supported by grants FIS-PI16/01217, PI17/02183 and PI17/02188, and CIBEROBN, ISCIII–FEDER, Spain.

PO1.004

Expression of the thiamine transporter 2 (SLC19A3) in human adipose tissue

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Introduction: The adipocytes have very specific roles in the body and therefore also express specific subsets of genes. Adipose tissue-specific genes, such as leptin, usually play key roles in adipocyte function and energy metabolism. We have previously used microarray expression profiles from a panel of human tissues to search for adipose tissue-specific genes. The aim of this study was to search for novel adipose tissue-specific genes using a panel of RNAseq expression profiles.
Methods: RNAseq expression profiles from 53 human tissues (5-564 samples per tissue) were downloaded from GTex. Gene expression in different adipose tissue depots (n = 10), in adipose tissue from subjects with normal weight or obesity (n = 17 and 32, respectively) and adipose tissue during diet-induced weight loss (n = 24) was analyzed by microarray (Affymetrix). Statistical analysis was performed using independent sample t-test or by one-way ANOVA followed by paired t-test as post-hoc test
Results: The RNAseq-based tissue distribution expression screen identified the thiamine transporter 2 (SLC19A3) as predominantly expressed in adipose tissue. The predominant expression of human SLC19A3 in adipose tissue was verified in additional datasets. The SLC19A3 expression in subcutaneous adipose tissue was higher than in omental adipose tissue (P = 0.002). The expression of SLC19A3 was also higher in subcutaneous adipose tissue from subjects with normal weight compared with subjects with obesity (P = 0.01). Increased expression of SLC19A3 in subcutaneous adipose tissue was observed after 16 weeks of diet-induced weight loss (P = 0.003).
Conclusion: The predominant adipose tissue expression of SLC19A3 and its regulation during weight loss suggest a role in metabolism beyond thiamine uptake.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Swedish Research Council and by grants from the Swedish state under the agreement between the Swedish government and the county councils (ALF-agreements).

PO1.005

Determination of collagen content and number of CD68 and CD163 positive cells in white adipose tissue of male rat offspring depending on maternal and postnatal diet

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Introduction: Adipose tissue dynamically responds to increased or decreased caloric intake by adipocytes passing through hypertrophy and hyperplasia process and thus maintaining the energy homeostasis of the body. Processes of adipose tissue change are called adipose tissue remodelling and occur during obesity. They are characterized by infiltration of proinflammatory cytokines, enhanced angiogenesis and increased deposition of extracellular matrix proteins, and collagens form the largest group of extracellular matrix proteins which structure and density are strictly regulated. Another important step in adipose tissue remodelling is inflammation and macrophage infiltration into growing adipose tissue. Obese subject have an elevated percentage of macrophages and increased collagen build-up in adipose tissue. To conclude, inflammation and fibrosis are two biological processes that can explain the effects of obesity.
Methods: Ten female Sprague Dawley rats were at 9 weeks of age randomly divided into two groups and fed either standard laboratory chow or food rich in saturated fatty acids during 6 weeks and then mated with genetically similar male rats. After birth and lactation, male rat offspring were divided into four subgroups depending on the diet they were fed until 22 weeks of age. After sacrifice, samples of white adipose tissue were taken from the subcutaneous, epididymal and perirenal white fat compartment. Histological staining of extracellular components was performed with Mallory's trichrome connective tissue stain, and histomorphometric analysis of digital images of histological tissue sections was conducted using the free online image analysis program Fiji. Immunohistochemical staining for CD68 and CD163 was also performed, and the number of CD68 and CD163 positive cells was counted per mm^2 of adipose tissue.
Results: The staining of extracellular components such as collagen showed a reduced collagen deposition in the control group in all fat pads, which was statistically significant compared to the groups of pups fed high-fat diet. The number of CD68 positive cells per mm^2 of adipose tissue was the highest in groups where both mother and offspring were fed a high-fat diet, although there was no statistical significance among groups. When counting the number of CD163 positive cells per mm^2, the highest number in subcutaneous and epididymal fat was found in the groups with changed diet, which was statistically significant compared with the groups with unchanged postnatal diet in epididymal adipose tissue compartment.
Conclusion: Mother's diet and changes in postnatal diet in offspring can induce morphological changes in adipose tissue and cause increased deposition of extracellular matrix proteins and changes in macrophage polarisation.

PO1.006

Carotid body modulation: a therapeutic target to produce adipose tissue browning and ameliorate metabolism promoting weight loss

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Introduction: The therapeutic options to treat obesity are clearly scarce (1). We have proposed a role for carotid body (CB) in metabolic disturbances by demonstrating that the abolishment of its activity, through resection of carotid sinus nerve (CSN) prevents and reverses metabolic dysfunction (2,3). Furthermore, CSN resection decreased weight gain and body fat mass in an obese animal model (4). Herein, we investigated if these effects on weight gain are related with alterations on white (WAT) and brown (BAT) adipose tissues function.
Methods: Experiments were performed in 9 weeks male Wistar rats. Animals were submitted to 10 weeks of high-fat diet (HF) (5.1Kcal/g) or to a standard diet (2.56Kcal/g). Afterwards, animals were submitted to either bilateral CSN resection or to a sham procedure and kept under the respective diets for more 9 weeks. Insulin sensitivity, glucose tolerance, caloric intake and body weight were monitored throughout the protocol. At a terminal experiment rats were anaesthetised with pentobarbital (60mg/kg i.p.) and WAT and BAT depots were collected, weighted and stored for analysis of proteins involved in adipose tissue metabolism, for quantification of UCP1 protein and for quantification of adipocytes perimeter. In vivo glucose uptake was also evaluated by an intravenous glucose tolerance test.
Results: HF diet increased total WAT amount by 120% and adipocyte perimeter in perienteric depot by 60%. In BAT, HF diet decreased insulin receptor (IR) expression by 68% and increased IL-1 and IL-6 receptors expression by 30% and 179%. Moreover, HF diet promoted a decrease in UCP1-labelled cells both in WAT (34%) and BAT (27%) adipose tissues. In HF animals, CSN resection decreased adipocyte perimeter by 56% and increased the uptake of glucose in WAT (75%) and BAT (67%) depots. Moreover, it also increased IR expression in BAT by 157% and decreased significantly IL-1 and IL-6 receptors expression by 57% and 47%, respectively. Furthermore, HF animals with CSN resection presented a significantly increase in UCP1-labelled cells, both in WAT (58%) and BAT (45%) depots.
Conclusion: We conclude that CSN denervation positively impacts weight gain and metabolic function in HF rats via an improvement of WAT and BAT metabolism, being CSN modulation a possible approach for obesity treatment.
JF Sacramento and BF Melo are supported by the Portuguese Foundation for Science and Technology (PD/BD/105890/2014 and PD/BD/128336/2017).

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PO1.007

Effects of choline and folate on the leptin role reversing the offspring detrimental metabolic imprinting in adipose tissues after gestational maternal calorie restriction

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Introduction: Undernutrition during pregnancy can produce lasting metabolic impairments, increasing obesity risk and other metabolic alterations in the offspring. Leptin is an essential hormone present in milk that could play a role in the protection of the offspring against obesity in later life, probably through epigenetic mechanisms, among others. Choline and folate are essential nutrients during development involved in 1C metabolism and therefore the availability of methyl donors for epigenetic regulation. In this study, we aimed to assess possible synergistic effects of the combined oral supplementation throughout lactation of leptin with folic acid or choline, at physiological doses, in the reversion of the metabolic malprogramming caused by maternal mild calorie restriction during gestation, in white and brown adipose tissues.
Methods: Male and female pups from Wistar dams submitted to 20% of calorie restriction (CR), from day 1 to 12 of gestation, were randomly distributed into CR-Control, CR-Leptin, CR-Leptin+Fol and CR-Leptin+Chol (n = 9-11 per group and sex). Leptin means oral supplementation of the pups with leptin (5 times of daily intake from maternal milk), Fol with folic acid (4 times of the daily folate) and Chol with choline (4 times of the daily choline). The supplementation was from day 1 to 20 of lactation. Non-supplemented pups from control dams were included in the study (n = 11-12/sex). Animals were sacrificed between postnatal days 25 and 27. Inguinal white and interscapular brown adipose tissues, iWAT and BAT respectively, were collected. Gene expression was analysed by RT-qPCR and Western-blot.
Results: Maternal undernutrition produced sex-dependent changes in iWAT and BAT gene expression, modulated by the different supplementations. Among other effects, leptin supplementation modified the expression of some iWAT lipolytic and oxidative genes, especially in females, in a different way depending on the added supplementation of folic

acid or choline. In BAT, the effects of the treatments were more marked in males, especially in adrenergic signalling related genes and in the expression of leptin receptor; the latter was decreased by the CR condition, an effect prevented in all the supplemented groups.
Conclusion: Mild maternal calorie restriction during gestation causes sex-dependent changes in WAT and BAT metabolic programming, which are differently modulated by leptin supplementation during lactation alone or in combination with folic acid and choline, in a sex- and tissue-dependent way.

Conflict of Interest: None Disclosed.

Funding: Research related to this abstract was funded by the Spanish Government AGL2015-67019-P (MINECO/FEDER, EU).

PO1.008

Protective effect of *Lampaya medicinalis* extract on insulin signaling impairment induced by palmitic acid in 3T3-L1 adipocytes

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Introduction: Obesity is reaching pandemic proportions positioning this pathology as a serious worldwide concern. An important player in the pathogenesis of obesity is adipose tissue (AT) dysfunction, which is characterized by a low-grade chronic inflammation that induces and/or aggravates insulin resistance (IR) of adipose cells. Adipocyte IR is a key component in the development of lipotoxicity and whole body IR, leading to metabolic impairment and type 2 diabetes. Palmitic acid (PA) is a saturated fatty acid with well-known IR-inducing effects in vivo and in vitro. Lampaya medicinalis Phil (Verbenaceae) is a small bush that grows in the "Puna atacameña" in the North of Chile. The infusion from leaves and aerial parts of the plant has been used by local ethnic groups to treat and cure inflammatory diseases. The aim of this study was to assess in vitro the effect of the hydroalcoholic extract of Lampaya medicinalis (HEL) against PA-induced IR in adipocytes from the 3T3-L1 cell line.
Methods: 3T3-L1 cells were in vitro-differentiated to adipocytes using a standard adipogenic cocktail (10 µg/ml insulin, 1 µM dexamethasone, 0.5 mM isobutylmethylxanthine). Cytotoxicity of HEL (0.01, 0.1, 1, 10 µg/ml for 18 h) was evaluated by Trypan blue exclusion. Cells were treated with HEL 2 h prior to and along with PA exposure (16 h). Experimental conditions were: a) vehicle-treated control, b) 0.65 mM PA, c) 0.01 µg/mL HEL, d) HEL+ PA. After the 16h treatment, cells were exposed to 100 nM insulin for 15 min, and Akt phosphorylation (p-Akt/Akt) was evaluated by Western blot.
Results: HEL was not cytotoxic at any concentration assessed. Insulin-stimulated phosphorylation of Akt was not affected by treatment with 0.01 µg/ml HEL compared with vehicle-treated cells. PA-treated adipocytes showed a 31% reduction in insulin-stimulated phosphorylation of Akt compared to control ($p<0.05$). Interestingly, when HEL was present, Akt phosphorylation increased significantly (45%, $p<0.05$) with respect to PA-treated adipocytes.
Conclusion: HEL restores the decrease in Akt phosphorylation in PA-treated adipocytes to activation levels comparable to those found in control cells. These findings suggest a protective role for HEL against PA-induced IR, and therefore that *Lampaya medicinalis* may represent a promising therapeutic tool for adipocyte IR. More studies are necessary to further establish how *Lampaya medicinalis* may contribute to the management of obesity-related complications.

Conflict of Interest: authors declare that no competing interests exist.

Funding: This research was funded by ABCvital project number 03-2018 and Fondecyt 1150651.

PO1.009

Oxidative stress in offspring of female adult Wistar rats with induced obesity

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Introduction: The prevalence of obesity is raising in all age groups, and this is also evident among women of reproductive age. Maternal obesity and overnutrition during pregnancy and lactation may influence the health of the offspring, and also predispose to certain diseases in adult life. Even though the underlying mechanisms are poorly understood, oxidative stress has gained attention. Malondialdehyde (MDA) is a marker of OS which can produce epigenetic changes via DNA alteration, and is potentially atherogenic together with hypertriglyceridemia. The aim of this study was to evaluate the impact of diet-induced obesity and high-fat diet during pregnancy and lactation in rats and the levels of oxidative stress (OS) in their offspring at weaning.
Methods: Two groups of 8 Wistar adult female rats were selected. The control group was fed with a standard diet (SD). The other group underwent a 8 week obesity induction protocol using a high fat diet (HFD). Each diet was maintained during pregnancy (3 weeks) and suckling period (other 3 weeks). After mating, seven of SD dams and six of HFD dams got pregnant. All the pups and dams were sacrificed after weaning. A panel of metabolic parameters was measured from blood samples of mothers and their offspring. MDA, total glutathione, total thiols levels were measured in liver and pancreatic tissue homogenates of dams and pups. Also, histopathological studies were performed on pancreatic and liver tissue samples.
Results: HFD dams had higher blood glucose ($p<0.01$) and cholesterolemia ($p<0.05$), and a lower albumin levels ($p<0.05$) compared to lean dams, but there was no significant difference between their offspring. Hypertriglyceridemia was significantly higher both in HFD dams ($p< 0.04$) and their offspring ($p< 0.05$) compared to SD rats and their offspring. Elevated MDA was observed both in HFD dams and their offspring compared to SD dams and their offspring ($p<0.05$). There were no significant differences between total glutathione and total thiols levels in HFD and SD groups. The histopathological assessment of the liver revealed lesions of minor hepatopathy and inflammatory infiltrate in pancreas in both in HFD dams and their pups.
Conclusion: In conclusion, the offspring of female rats with diet-induced obesity are exposed to increased levels of OS. These findings suggest that maternal nutritional status during pregnancy and lactation and probably breast milk composition can affect intrauterine environment and early-life oxidative stress exposure is an important factor that may participate in offspring metabolic programming.

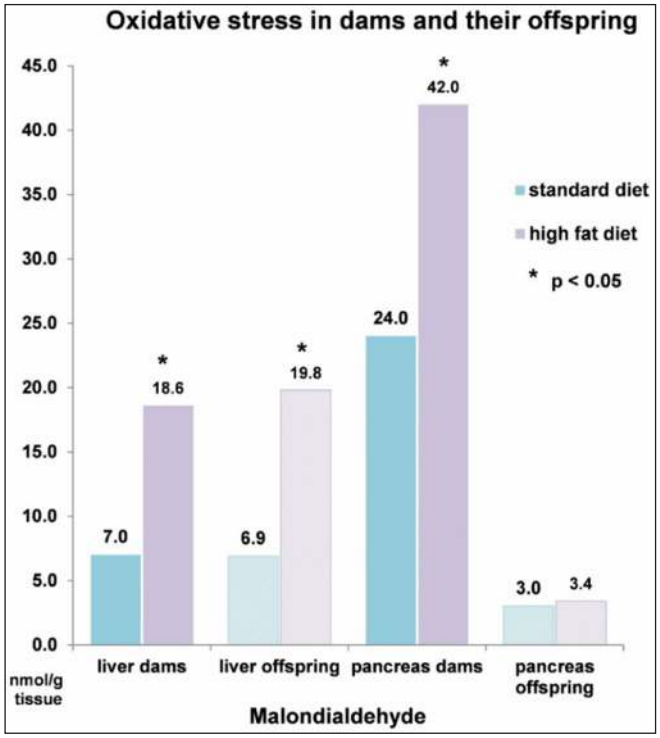


Fig. 1. Oxidative stress in dams and their offspring.

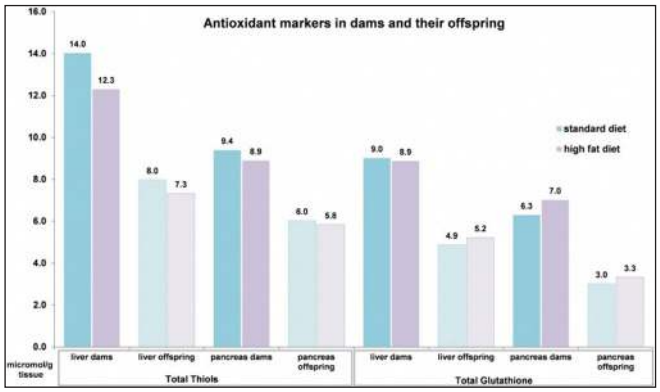


Fig. 2. Antioxidant markers in dams and their offspring.

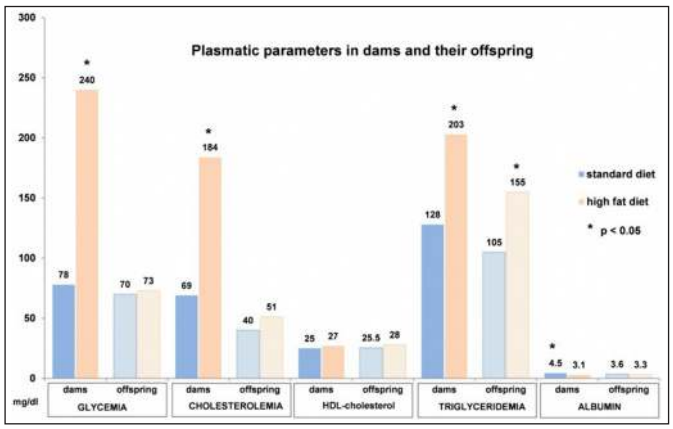
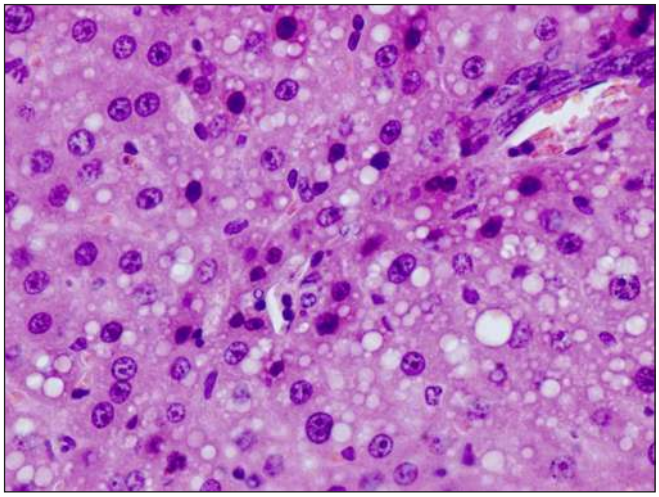
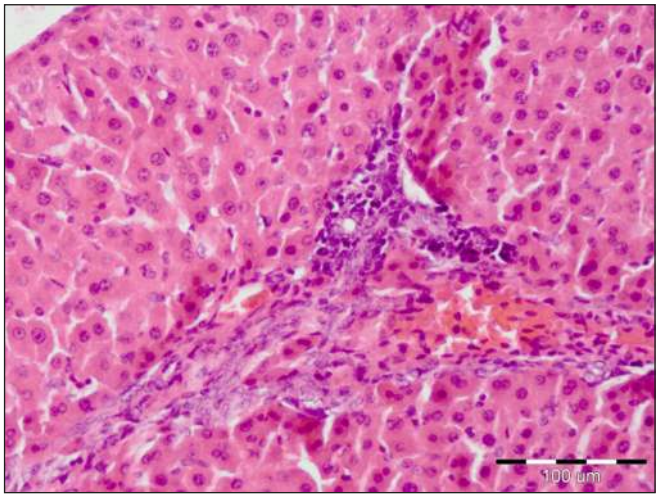


Fig. 3. Plasmatic parameters in dams and their offspring.



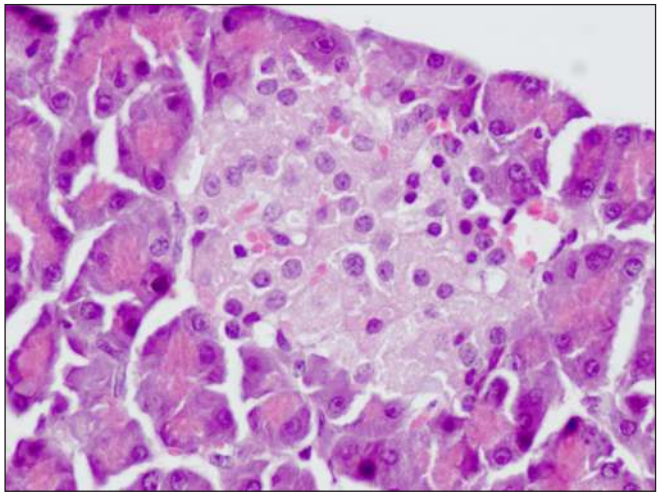
Many active Kupffer cells, isolated dilated sinusoidal capillaries (passive hyperemia), leucocitosis in porto-biliary space. These characteristics harmonize with medium hepatopathy.

Fig. 4. Histopathological aspect of liver from Wistar rats fed with high fat diet. H&E stain (x200).



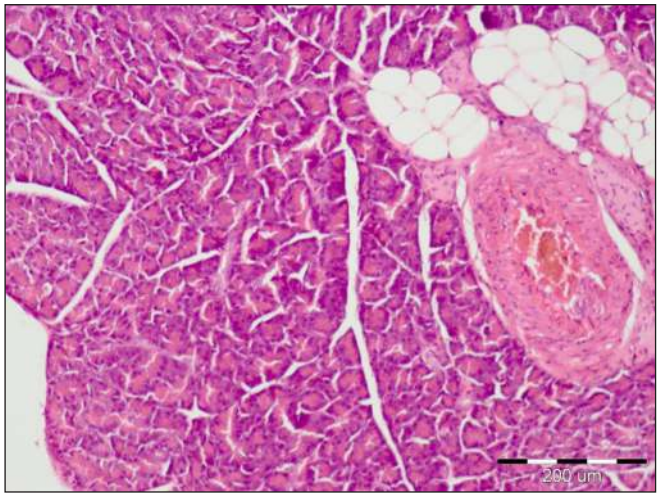
General architecture of liver is preserved, low glycogen storage in hepatocytes. Leucositosis around sinusoidal capillaries and occasionally in porto-biliary space. Kupffer cells moderately increased. Hyperemia of centrilobular veins. These characteristics harmonize with medium hepatopathy.

Fig. 5. Histopathological aspect of liver from offspring of Wistar rats fed with high fat diet. H&E stain (x100).



Minimal periacinar and perivascular infiltrate with mononuclear inflammatory cells. Cytoplasmic vacuolization in local cells in islets of Langerhans. Peripancreatic white adipose tissue with inflammatory infiltrate, mainly active macrophages, lymphocytes, mast cells, neutrophils.

Fig. 6. Histopathological aspect of pancreas from Wistar rats fed with high fat diet. H&E stain (x200).



Isolated foci of stromal lipid infiltrate, perilobular edema and infiltration with mononuclear cells at peripancreatic adipose tissue. Microscopical lesions identified at islets of Langerhans.

Fig. 7. Histopathological aspect of pancreas from offspring of Wistar rats fed with high fat diet. H&E stain (x100).

PO1.010

Diminished expression of the ghrelin receptor (GHSR-1a) in subcutaneous adipose tissue from obese patients

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Introduction: Ghrelin acting through GHS-R causes weight gain based on the increase in height of individuals and/or lean tissue, similar to GH administration.
We investigate the expression of receptor GHSR-1a in subcutaneous adipose tissue of severely obsese patients as compared to normal weight patients to better define the role of the ghrelin signaling system in the regulation of adipogenesis and adipose tissue inflammation.
Methods: The subcutaneous adipose tissue samples were collected from 6 obese female patients (OB group), referred for Laparoscopic Sleeve Gastrectomy (LSG) and from 2 normal weight females (NW group, control) with other abdominal surgery indications. Expression of GHSR-1a was assessed by means of immunohistochemistry and real-time PCR.
Results: The mean body mass index (BMI) was 45.02±6.31 kg/m^2 in OB group and 23.14±1.8 kg/m^2 in NW group. The age ranges of the two groups matched, with a mean of 42.05±9.91 years for OB group and 38.0±9.4 years for the NW group. The surface expression of GHS-1a receptor detected by immunostaining was decreased in obese patients as compared to normal weight patients. The abnormal immunostaining for GHSR 1a was associated with changes in adipocyte size. Also, the GHS-R1a gene expression was significantly lower in subcutaneous adipose tissue from obese patients as compared to normal weight patients.
Conclusion: These results may open new perspectives in the obesity therapy.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by "Grigore T. Popa" University of Medicine and Pharmacy Iasi, Romania, through the grants Ideas-Teams contract number 29032/28.12.2016 and number 30340/28.12.2017.

PO1.011

Comparisons of different indices of low muscle mass in relationship with cardiometabolic disorder

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This study aimed to evaluate the most valid index among various indices of low muscle mass in assessing cardiometabolic risks in a Korean population. Appendicular lean mass index (ALMI, kg/m^2), fat mass index (FMI, kg/m^2), FMI-adjusted ALMI (ALMfmi), ratio of ALM to weight index (ALMwt), ratio of ALM to body mass index (ALMbmi) and ratio of ALM to truncal fat index (ALMtrunkfat) were measured by dual energy X-ray absorptiometry in 17,870 participants from 2008 to 2011. We adopted all the aforementioned indices of low muscle mass expressed as sex- and age-specific standard deviation scores (Z-scores). Low muscle mass for age was defined as Z-score < -1. The prevalence of low muscle mass was approximately 16% across all indices. Low muscle mass defined by ALMI had low muscle mass and low fat mass, and ALMfmi had low

muscle mass at the same FMI. However, low muscle mass defined by ALMwt, ALMbmi and ALMtrunkfat had similar muscle mass with high FMI. The receiver operating characteristic curve in metabolic syndrome showed that the ALMtrunkfat was 0.74 in male and 0.69 in female, indicating that ALMtrunkfat was the best discrimination index for metabolic syndrome. This study showed that ALMtrunkfat could be a useful indicator for screening cardiometabolic risk factors, particularly in normal or overweight Asian population.

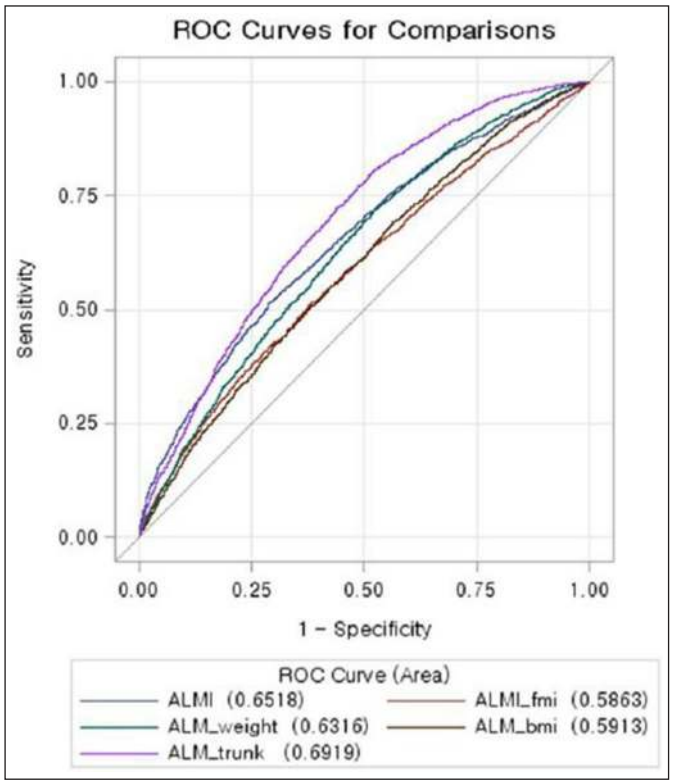

Fig. 1. Comparison of ROCs in metabolic syndrome among different indices of low muscle mass in female.

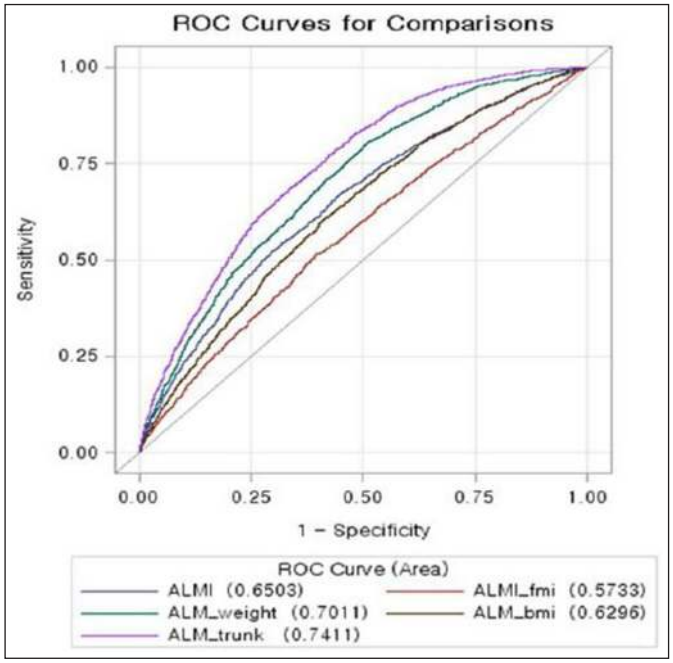

Fig. 2. Comparison of ROCs in metabolic syndrome among different indices of low muscle mass in male.

PO1.012

GLP-1 receptor expression in epicardial adipose tissue is associated with genes involved in fatty acid oxidation and white-to-brown fat differentiation

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Introduction: Epicardial adipose tissue (EAT) is a risk factor for cardiovascular diseases. Glucagon-like peptide 1 analogs (GLP-1A) were reported to induce beneficial cardiovascular effects and reduce EAT, possibly throughout targeting GLP-1 receptor (GLP-1R). Nevertheless, the role of EAT GLP-1R, GLP-2R and their interplay with EAT genes involved in adipogenesis and fatty acid (FA) metabolism are unknown. We aimed to analyze whether EAT transcriptome is related to GLP-1R and GLP-2R gene expression, and GLP-1 and GLP-2 plasma levels in coronary artery disease patients (CAD).
Methods: EAT was collected from 17 CAD patients undergoing coronary artery bypass grafting for microarray analysis of GLP-1R, GLP-2R and genes involved in FA metabolism and adipogenesis. EAT thickness was measured by echocardiography. GLP-1 and GLP-2 levels were quantified by enzyme-linked immunosorbent assay in CAD and healthy subjects (CTR).
Results: EAT GLP-1R was directly correlated with genes promoting beta-oxidation and white-to-brown adipocyte differentiation, and inversely with pro-adipogenic genes. GLP-2R was positively correlated with genes involved in adipogenesis and lipid synthesis, and inversely with genes promoting beta-oxidation. GLP-1 and GLP-2 levels were higher in CAD than CTR and in patients with greater EAT thickness.
Conclusion: GLP-1 analogs may target EAT GLP-1R and therefore reduce local adipogenesis, improve fat utilization and induce brown fat differentiation. As EAT lies in direct contiguity to myocardium and coronary arteries, the beneficial effects of GLP-1 activation may extent to the heart. The increased levels of circulating GLP-1 and GLP-2 and EAT GLP-2R may be compensatory mechanisms related to CAD and also EAT expansion, but the meaning of these observations needs to be further investigated.

Conflict of Interest: None.

Funding: The study was supported by funding from Fondazione E. A. Fiera Internazionale di Milano to Università degli Studi di Milano and Ricerca Corrente funding from Italian Ministry of Health to IRCCS Policlinico San Donato.

PO1.013

Ceramides accumulation in visceral but not subcutaneous adipose tissue contributes to the development of metabolic syndrome in women with morbid obesity

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Introduction: The primary role of adipose tissue as a storage place of fatty acids has been replaced by the fact that adipose tissue represents a key

driver for the development of metabolic dysfunctions, collectively referred as to metabolic syndrome (MetS) (1). It has been suggested that accelerated transmembrane transport of LCFA dependent on fatty acid transporters is responsible for lipids accumulation and eventually development of MetS. Therefore, this study determine the content and FA composition of lipids (CER, DAG, TAG and FFA) and the total, plasma membrane and mitochondrial expression of fatty acid transport proteins (FAT/CD36, FABPpm) in both visceral (VAT) and subcutaneous (SAT) adipose tissues of women with morbid obesity without metabolic syndrome (MetSx-) or with metabolic syndrome (MetSx+).

Methods: The study included 28 women suffering from obesity class 3 (BMI >40 kg/m^2) who underwent elective bariatric surgery. The patients were divided into two groups: morbid obesity MetSx- (n = 12) and MetSx+ (n = 16). The control material was collected from 16 lean women (BMI <25 kg/m^2) who underwent elective laparoscopic cholecystectomy. Lipid content and FA composition in each lipid subclass were estimated by gas liquid chromatography. Whereas for total, plasma membrane and mitochondrial expression of FA transporters, subfractionation with subsequent Western blot technique were used.

Results: We found a greater content of TAG in VAT of participants with obesity (MetSx-) (+46%, VAT of MetSx- vs lean, p<0.05, fig.1). However, only the subjects with metabolic syndrome had increased content of CER in VAT (+21%, MetSx+ vs lean, p<0.05), in contrast to SAT, where the total content decreased (-30%, MetSx+ vs lean, p<0.05). Consequently, we noticed an increase of palmitic and stearic fatty acids level in VAT of MetSx+ subjects (+69% and +34%, MetSx+ vs lean, respectively, p<0.05). This was accompanied by increased total and plasma membrane expression of FAT/CD36 in VAT of MetSx+ subjects (+41% and +22%, MetSx+ vs lean, respectively, p<0.001, fig.2). Accordingly, in the VAT, mitochondrial expression of FAT/CD36 and FABPpm was decreased in both groups of subjects with obesity (fig.2, 3).

Conclusion: Metabolic syndrome is associated with the accumulation of CER in VAT, possibly related to increased FAT/CD36 protein expression.

Reference

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Funding: This work was supported by the National Science Center (grant no. 2016/23/D/NZ3/01660) and Medical University of Bialystok (grants no. 133-40795L, 113-40698L and 153-40749L).

Agnieszka Mikłosz is supported by the Foundation for Polish Science (FNP).

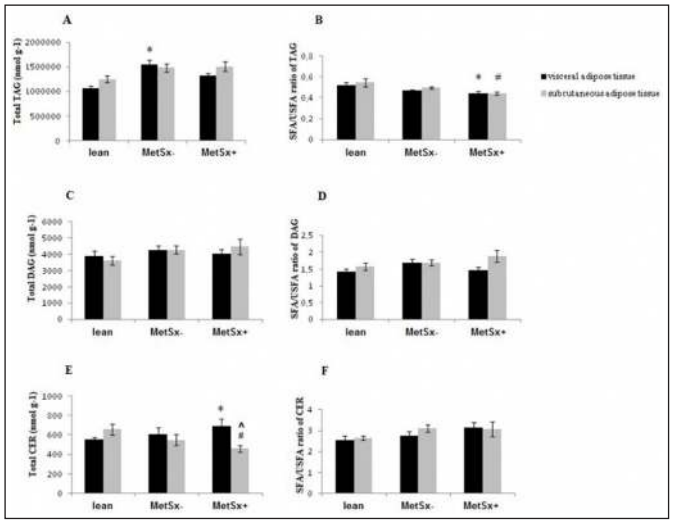

Fig. 1. Total content and the ratio of saturated to unsaturated (SFA/USFA) fatty acids of TAG (a), (b), DAG (c), (d) and CER (e), (f) in visceral (VAT) and subcutaneous adipose tissue (SAT) of lean, with obesity without metabolic syndrome (MetSx-) and with obesity with metabolic syndrome (MetSx+) subjects. Results are presented as mean ± SEM. Significant differences are shown as: * different from visceral adipose tissue of lean patients, *p<0.05; # different from the subcutaneous adipose tissue of lean patients, #p<0.05; ^ different from visceral adipose tissue of patients with obesity with metabolic syndrome, ^ p<0.05.

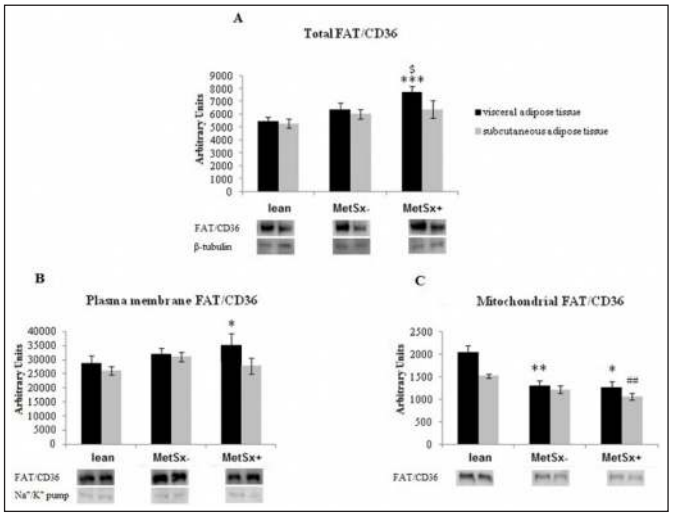

Fig.2. Total (a), plasma membrane (b) and mitochondrial (c) expression of FAT/CD36 protein in visceral (VAT) and subcutaneous adipose tissue (SAT) of lean, with obesity without metabolic syndrome and with obesity with metabolic syndrome subjects. Results are shown in arbitrary units and presented as mean ± SEM. Significant differences are shown as: * different from the visceral adipose tissue of lean patients, *p<0.05, ** p <0.01, ***p <0.001; # different from the subcutaneous adipose tissue of lean patients, ##p<0.01; $ different from visceral adipose tissue of patients with obesity without metabolic syndrome, $ p<0.05.

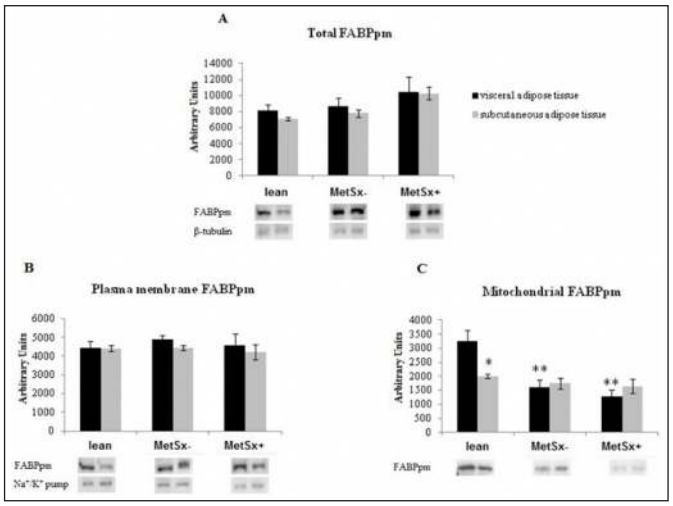

Fig. 3. Total (a), plasma membrane (b) and mitochondrial (c) expression of FABPpm protein in visceral (VAT) and subcutaneous adipose tissue (SAT) of lean, with obesity without metabolic syndrome and with obesity with metabolic syndrome subjects. Results are shown in arbitrary units and presented as mean ± SEM. Significant differences are shown as: * different from the visceral adipose tissue of lean patients, *p<0.05, ** p <0.01.

PO1.014

The relationship between CT-derived body composition, gender and post-operative complications in patients undergoing surgery for colorectal cancer

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Introduction: Colorectal cancer is the fourth most common cancer in the UK and the second most common cause of cancer death. Surgery is the primary modality of treatment but is not without complications. Post-operative complications have been linked to pre-operative loss of weight and lean tissue and also obesity. Given sex differences in body composition, a detailed examination of the relationship between body composition and post-operative complications may provide valuable information. Therefore, the aim of the present study was to examine the relationship between male/ female body composition and post-operative complications in patients undergoing surgery for colorectal cancer.
Methods: This study included 741 patients undergoing surgery for colorectal cancer. In addition to BMI, pre-operative CT scans were used to define the presence of subcutaneous adiposity, visceral obesity, sarcopenia and myosteatosis. Post-operative complications, in particular, surgical site infection and wound infection were considered as outcome measures.
Results: The relationship between body composition and the presence of infective complications differed between male and females. Male patients with greater subcutaneous adiposity had higher risk of surgical site infection and wound infection ($p<0.01$ and $p<0.001$ respectively). On multivariate analysis, Postoperative Glasgow Prognostic Score (poGPS) on Day4 (OR 2.11, 95% CI 1.53 -2.92, P = 0.001) laparoscopic surgery (OR 0.50, 95% CI 0.26-0.98, P = 0.044) and subcutaneous adiposity (OR 2.71, 95% CI 1.26-5.82, P = 0.011) remained significantly independently associated with overall surgical site infection. Subcutaneous adiposity remained significantly independently associated with wound infection (OR 3.93, 95% CI 1.33-11.57, P = 0.013). In female patients, however, no significant association was found between any body composition measure and complications.
Conclusion: This study showed that increased subcutaneous and visceral adiposity were associated with infective complications in male, but not female patients, following surgery for colorectal cancer. Therefore, it is important that sex be taken into account when evaluating the potential.

Conflict of Interest: All authors confirm no conflict of interest.

Sources of Support (scholarship): King abdulAziz university. Clinical nutrition department, Jeddah, Saudi Arabia.

PO1.015

Expanding adipose tissue in multiple symmetric lipomatosis: the role of adipose stem cells and insulin signaling

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Introduction: Multiple Symmetric Lipomatosis (MSL) is a rare disorder characterized by enlarging and symmetric lipomas, developing in subcutaneous adipose tissue (SAT), mostly in the neck and upper trunk. The mechanisms involved in lipomas formation are still unknown. As the distribution of lipomatous tissue (LT)is similar to brown AT localization, the main hypothesis believes that brown cells fail to completely differentiate, accumulating lipids due to mitochondrial dysfunctions, defective noradrenergic regulation or both. The PtenMyf5cKO mouse model was found to resemble human MSL phenotype. Since PTEN is involved in insulin cascade as an inhibitor factor, whose activity is negatively regulated by protein kinase CK2, we investigated whether an impairment of insulin signallingcould be associatedto MSL. CK2 is implicated in several cellular processes and described to regulate insulin pathway. Our work provides a fine characterization of LT and its precursors at a morphological, molecular and clonallevel. In particular, we investigated CK2expression and activity inLT and paired healthy SAT.
Methods: We collected paired samples of LT and healthy SAT of 5 patients affected by type I MSL duringlipectomy. H&E staining for adipocyte size analysis, UCP1 immunohistochemistry and qPCR for gene expression were performed in tissue biopsies; stromal vascular fractions (SVF) were ex vivocharacterized by cytometry, proliferation assay and limiting dilution analysis for adipogenic and clonogenic potential. Moreover, CK2 expression and activity was quantified by western blot and in vitro kinase assay.
Results: LT contains smaller univacuolated UCP1-negative adipocytes, expressing level of white-specific genes similar to SAT and negligible level of the brown marker UCP1. In LT-derived SVF, the number of ASCs (CD34+CD31-CD45-) are significantly higher than in SAT; LT preadipocytes show a shorter doubling time and higher clonogenic and adipogenic potential of clones than SATpreadipocytes. Interestingly, CK2 was found invariably upregulated in LT in comparison with healthy SAT of MSL patients.
Conclusion: LT exhibits the characteristics of a typical white AT, as confirmed by IHC and gene expression of white/brown markers. Both ex vivo flow cytometry and limiting dilution assay show that LT is enriched of adipogenic precursors in respect toSAT, with a higher clonogenicand adipogenicpotential. It could be hypothesized that, in MSL, LT could expand by hyperplasiaof adipogenic precursors that differentiatetowards the white adipogenic lineage, probably mediated by CK2 upregulation. Taken together the present work highlightsa newtherapeutic target for MSL.

Conflict of Interest: None Disclosed.

Funded by Italian Ministry of Health (RicercaFinalizzata 1526404).

PO1.016

Subcutaneous adipose tissue thicknesses, plasma carotenoid levels and inflammation marker in females of various energy status

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Introduction: The amount of adipose tissue is an important phenotypic characteristic since it influences the human metabolism in various ways. Adipose tissue quantity defines the individual's energy and nutritional status more nuanced than the body mass index (BMI) alone. Excessive amounts of body fat are known risk factors for inflammatory conditions in the organism. Interestingly, carotenoids, especially β-carotene, influence adipocyte biology by limiting adipocyte fat storage capacity and enhancing fat oxidation.[1] Moreover, carotenoids counteract inflammation due to their anti-inflammatory properties.[2] We aimed to assess the current status of subcutaneous adipose tissue (SAT) thicknesses, plasma carotenoid levels and inflammation marker in a cohort of females ranging from extremely lean to obese.
Methods: 107 females aged between 18-40 years of different BMI groups (anorexia nervosa AN, normal weight NM, overweight OW, obesity OB,

athletes AT) were included. SAT thickness was measured at eight sites by a standardized ultrasound technique[3]. The sum of these sites (DINCL) represents the SAT amount. Plasma β-carotene was measured by HPLC analysis. The laboratory markers of inflammation C-reactive protein (CRP) and interleukin 6 (IL-6) were determined in plasma in accordance with standard procedures.

Results: BMI values ranged from 13.24 to 46.89 kg/m². DINCL differed significantly between the groups ($p<0.001$) and correlated with the BMI ($rs = 0.942$, $p<0.001$), CRP ($rs = 0.617$, $p<0.001$), and IL-6 ($rs = 0.557$, $p<0.001$). β-carotene plasma levels were negatively correlated to *D*INCL ($rs = -0.563$, $p>0.001$), CRP ($rs = -0.537$, $p<0.001$), and IL-6 ($rs = -0.388$, $p<0.001$).

Conclusion: In our study population an increase in the SAT thickness was associated with higher levels of inflammation markers and lower levels of β-carotene. This is in accordance with previous findings of studies conducted in vitro and/or in vivo animal models. Further research in clinical settings is needed to investigate the impact of enhanced carotenoid levels on inflammatory conditions in individuals with increased adipose tissue volumes.

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4. Acknowledgement: Josef Smolle (Initiator of the ESAN-Study IC3490), Medical University Graz.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.018

Unravelling the role of FKBPL in obesity

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Background: FKBPL, an immunophilin protein, is best characterised for its role in angiogenesis and tumorigenesis. However, emerging data supports a role for FKBPL in protection from obesity. FKBPL haploinsufficient mice (Fkbpl +/-) developed obesity as they aged on a normal diet and this was further exacerbated by a high fat diet and accompanied by greater impaired glucose tolerance. The aim of this study was to evaluate the role of FKBPL in the development of obesity and to determine the associated mechanisms.

Methodology: FKBPL protein levels in serum and adipose tissue-conditioned media (ACM) were quantified by ELISA. The number of blood vessels in adipose tissues from Fkbpl +/- and Fkbpl +/+ were analysed by immunohistochemistry. Adipogenesis was interrogated using in vitro differentiation assays, The role of FKBPL in inflammation was assessed using mouse bone marrow derived macrophages (BMDMs).

Results: FKBPL levels were significantly lower in obese children compared to lean controls and became progressively lower with increasing BMI. Furthermore, there was a significant negative correlation with serum leptin levels in obese children. In adults, FKBPL secretion was also significantly decreased in adipose tissue from obese subjects compared to lean controls, whilst serum FKBPL was increased in an exercise intervention group. Collectively, this data supports our mouse studies, suggesting that reduced serum FKBPL is associated with both childhood and adult obesity. FKBPL-mediated effects on adiposity were observed with Fkbpl +/- mice demonstrating a significant increase in the number and size of adipocytes, indicating hypertrophic tissue expansion. FKBPL levels also increased dramatically during 3T3-L1 cell adipogenesis, suggesting that deregulation of FKBPL levels may be involved in the adipogenic process. Subcutaneous adipose tissue from Fkbpl +/- mice was significantly more vascularised than tissue from Fkbpl+/+ mice, suggesting promoting angiogenesis which supports fat expansion. Finally, FKBPL also appeared to have a role in inflammation, since rFKBPL reduced phosphorylation of p65 upon LPS stimulation of BMDMs. Furthermore, rFKBPL treatment also reduced mRNA expression of the inflammatory mediators in BMDMs.

Conclusion: FKBPL may have utility as a novel biomarker to prioritize individuals for a lifestyle intervention. FKBPL-based therapeutics could have potential in the preventative and therapeutic setting of obesity via multiple anti-obesity mechanisms.

Conflict of Interest: No conflict of interest declared.

Funding: National Children's Hospital Crumlin Research Project Grant and Department of Education NI PhD Studentship.

PO1.019

Obesity and DNA damage response: is there a connection?

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Introduction: Recent studies suggest that an excessive caloric intake could lead to the production of metabolic byproducts, such as reactive oxygen species and lipid peroxides, that can cause unrepairable DNA damage and thus of DNA damage response (DDR) chronic activation. DDR leads to a senescence associated secretory phenotype which, if persistent, may promote age-related diseases, such as cancer.

We investigated whether the DDR differently activated in obese and lean subjects and affected by diet- or bariatric surgery-induced weight loss.

Methods: We have studied 16 pairs of monozygotic (MZ) twins discordant for BMI of at least 3 kg/m2 (normal weight [NW] BMI: 23.3±2.2 kg/m2, overweight/obese ([OW/OB] BMI: 29.5±2.5 kg/m2) before and after the heavier had undergone diet-induced weight-loss, and 32 severely obese subjects ([sOB] BMI: 45.9±9.8 kg/m2) before, 6 and 12 months after bariatric surgery. We collected clinical, anthropometric and biochemical parameters and biological samples (blood, urine, feces, buccal wash, and, only from sOB, omental [OM] and subcutaneous fat [SC].

We are currently carrying out NMR-metabolic profiles of serum and fat tissue, phosphoproteomics analysis of DDR markers in isolated peripheral blood mononuclear cells (PBMCs) and in fat tissue by RPPA, secretomic analysis of adipose tissue, lipidomic analysis of erythrocyte membranes as well as, study of mitochondrial/nuclear DNA molecular ratio (mitDNA) in PBMCs.

Results: Preliminary data show that the OW/OB twins and sOB have increased VLDL, LDL, glucose, insulin, lactate, C reactive protein, IL6 levels and distinctive lipidomic profiles, which change after weight loss. A partial segregation of serum metabolomics is found in sOB before and after bariatric surgery-induced weight loss and is mostly due to different lipoprotein and lactate content. The correlation between the phosphorylation profile of the key players of DDR is greater in PBMCs from sOB than both NW and OW/OB twins at baseline, and in SC than in OM fat. At baseline OW/OB twins and sOB have a lower content of mitDNA than NW twins. Finally, OW/OB twins show a greater genomic instability (as micronuclei formation after lymphocytes irradiation) and altered DNA repair kinetics (comet assay).

Conclusion: Acquired obesity seems characterized by greater sensitivity to DNA damage, impaired ability of repairing DNA damage and persistent DDR activation. Final data by integrating several "omics" will allow to unravel the association between in DDR pathways alteration and

obesity and its complications, whereas the MZ model to understand the role of identified biomarkers irrespective of genetic background.

Conflict of Interest: None.

Funding: Research was funded by Ministero della Salute (RF-2013-02357791).

PO1.021

Adipocyte differentiation and inflammation relative to cardiovascular fitness

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Introduction: Included in the many benefits of cardiovascular (CV) exercise is increased insulin sensitivity through improved muscle metabolism and substrate utilisation. Less is known about the effects of exercise on adipose tissue metabolism. We investigated relative gene expression in adipocytes from three groups of men with significantly different fitness levels.
Methods: Adipose tissue biopsies were obtained from white European males aged 30 – 60 years. Messenger RNA expression was quantitated for ten adipose related genes. Expression of Tissue Necrosis Factor-α (TNF-α), Peroxisome proliferator-activated receptor gamma (PPAR-γ), Adiponectin, Leptin, Sterol Regulatory Element Binding Transcription Factor 1 (SREBF1), Insulin Receptor, Fatty Acid Binding Protein 4 (FABP4), Fibronectin type III domain-containing protein 5 (FNDC5), Uncoupling Protein - 1 (UCP-1) and Lipo-Protein Lipase (LPL), relative to control gene (PPIA) by TaqMan™ real time PCR. Gene expression was analysed in adipocytes from three independent cohorts of sedentary controls (n = 18), endurance-trained athletes (n = 20) and men at risk of Type 2 Diabetes Mellitus (T2DM) (n = 13). Cardiovascular fitness was assessed using a bicycle ergometer to estimate VO2 Max.
Results: Analysis using one-way ANOVA demonstrated that there were significant differences in the expression of Leptin (P = 0.001), SREBF-1 (P = 0.004), PPAR-γ (P = < 0.001) and TNF-α (P = 0.001) between the three groups of men, respectively for these genes. There were significant differences in TNF-α and PPAR-γ expression between the athletes and control groups only. Athletes had higher PPAR-γ expression compared with controls (115.0 ± 36.5 % vs 90.0 ± 21.2 %, P = 0.018), whilst their expression of TNF- α was significantly lower than the control group (0.13 ± 0.2 %, vs 0.37 ± 0.4 %, P = 0.004). These results were independent of age and body fat percentage.
Conclusion: Adipocyte PPAR-γ expression is significantly higher in athletes, whilst TNF- α expression is inversely correlated with fitness level, and is significantly lower in athletes compared with controls. TNF-α is a pro-inflammatory cytokine produced by various cell types and is involved in the pathogenesis of obesity and insulin resistance. PPAR-γ is a ligand-inducible transcription factor involved in the regulation of adipogenesis and adipose differentiation, lipid metabolism and inflammation. These results suggest improved adipocyte differentiation and reduced inflammatory changes in athletes, and demonstrate that exercise can impact on adipocyte function, in addition to muscle metabolism. Exercise interventions to prevent T2DM may exert positive benefits in part via improving adipocyte function.

PO1.022

Adipocyte gene expression changes in response to weight gain and weight loss in young lean European and South Asian men

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Type 2 diabetes (T2DM) occurs in South Asians (SA) at a younger age and lower BMI than in Europeans. Defects in adipose tissue expansion may contribute to the development of obesity. We hypothesised that hyperplasia and hypertrophy may result in different gene expression in adipocytes. The GlasVEGAs study determined the metabolic consequences of weight gain and loss in European (n = 22) and SA men (n = 17). On average, participants gained 6.3%[SD1.3%] bodyweight (WG) and then lost 6.5%[1.9%] (WL). Abdominal subcutaneous adipose biopsies were obtained at each time point and adipocytes isolated. Adipocyte diameter was measured from microscopic images and adipose tissue and lean mass distribution was acquired using a Siemens 3-Tesla MRI scanner. The expression of genes related to adipocyte metabolism were quantified relative to a control gene (PPIA) by rtPCR after pre-amplification and compared using a mixed model analysis. Mean adipocyte diameter increased after WG (71[8] vs 76[10]μm, p = 0.007) and decreased after WL (67[9]μm, p = 0.007) in Europeans, but was unchanged in SA (BL 85[12] vs WG 86[11] vs WL 74[11]μm, p = 0.14). At each time point, adipocyte diameter was greater in SA than EU (p<0.001). EU gained twofold higher visceral adipose tissue relative to total fat than SA (18[5] vs 9[6]% (total body fat percentage), p = 0.001). TNF-α, SREB-F1 and leptin expression were higher in SA than Europeans throughout the study, whereas insulin receptor-1 was lower at BL and after WG in SA than Europeans and unchanged after WL (p<0.05). SREBF1 increased after WG in both EU and SA, but after WL increased in Europeans and decreased in SA (p<0.05). Adiponectin and insulin receptor-1 expression decreased with WG (p<0.01) whereas leptin expression increased with WG (p = 0.001). To conclude, change in weight is associated with differences in adipocyte gene expression between Europeans and SA. This may contribute to the higher risk of T2DM in SAs.

PO1.023

The relationship between body mass index and bone mineral density of pre-menopausal Lebanese women

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Introduction: Extensive literature has been developed to explore epidemiologic, clinical and physiological linkage between body mass index (BMI) and bone mineral density (BMD). Some of the data have shown that a high BMI is correlated with high BMD (1) while others have suggested that excessive fat mass does not protect against decrease in bone mass (2). However, it is not clear whether the relationship between BMI and BMD is similar between different ethnic groups.
Methods: 119 Lebanese women (20 and 55 years) with varied BMI (18-49 kg/m^2) were screened. Anthropometric measures were collected. Bone mineral densities were measured by dual x-ray absorptiometry (DXA) using a Hologic 4500A device (Hologic, Bedford, MA, USA).
Results: Pearson's correlation showed that BMI was positively correlated with BMD of the thoracic spine (r = 0.255, P = 0.005), pelvis (r = 0.324, P = 0.000), left leg (r = 0.344, P = 0.000) and right leg (r = 0.312, P = 0.001). However, when subjects were grouped according to their adiposity levels it was clear that changes in BMD were highly apparent in the groups with BMI 30 and above.
Conclusion: Obesity, but not over weight or leanness, may have a protective effect against the development of osteoporosis and hip fracture. Thus, weight-bearing exercises that mimic obesity may be needed to improve BMD of lean and overweight subjects.

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Conflict of Interest: None Disclosed.

Funding: None.

PO1.024

Impact of mini-gastric bypass and sleeve gastrectomy on adiposity and blood pressure in diet-induced obese rats

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Background: Mini-gastric bypass (MGB) and sleeve gastrectomy (SG) constitute effective surgical procedures for the treatment of morbid obesity. The aim of the present study was to elucidate the effects of both types of bariatric surgeries on weight loss and cardiovascular parameters in diet-induced obese (DIO) rats.
Methods: Six-month-old male Wistar DIO rats (n = 90) were subjected to different interventions (sham operation, MGB, SG or pair-fed to the amount of food eaten by animals submitted to MGB and SG). Systolic blood pressure (SBP), diastolic blood pressure (DBP), mean blood pressure (MBP) and heart rate (HR) values were recorded in conscious and resting animals by non-invasive tail-cuff plethysmography before and 3 weeks after surgical procedures. Oral glucose tolerance tests and intraperitoneal insulin tests were also performed before and 3 weeks after both surgical procedures to evaluate changes in the metabolic profile of the experimental animals. Six weeks after the surgical and dietary interventions, rats were killed by decapitation after an 8-h fast.
Results: As expected, rats submitted to MGB showed a decrease in body weight (P<0.001) and whole-body adiposity (P<0.001), mainly due to significant reductions in perirenal (P<0.001), subcutaneous (P<0.001) and epididymal (P<0.001) fat depots. However, rats submitted to SG did not experience a significant reduction in body weight and adiposity. MGB was associated with an improvement of insulin sensitivity, as evidenced by lower glucose levels (P<0.05), insulinaemia (P<0.01) and HOMA index (P<0.01) as well as higher QUICKI index (P<0.001). MGB and SG exerted significant reductions (P<0.05) in SBP, with MBP also being decreased (P<0.05) in rats submitted to SG. Moreover, a decreased (P<0.001) heart weight was observed after both types of surgeries.
Conclusion: MGB exerts a higher beneficial effect on adiposity, metabolic profile and blood pressure values in diet-induced obese rats compared to SG.

Conflict of Interest: None Disclosed.

Funding: This work was supported by grants from the Fondo de Investigación Sanitaria-FEDER, Instituto de Salud Carlos III (ISCIII) (PI16/01217) and CIBEROBN, Spain.

PO1.025

Isocitrate dehydrogenase 1 (IDH1) inhibits brown adipocytes differentiation via α-ketoglutarate (α-KG)-mediated suppression of H3K4me3

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Brown adipocytes play important roles in the regulation of energy balance through uncoupling protein-1 (UCP-1)-mediated nonshivering thermogenesis. In recent, many studies have shown that brown adipose tissue (BAT) is a new therapeutic target for combating obesity and its associated diseases, such as type 2 diabetes in adult human. However, molecular mechanism underlying brown adipogenesis are not fully understood. Previously, we identified proteins that changed expression during brown adipocyte differentiation using 2DE analysis. In this study, we investigated the functional roles of isocitrate dehydrogenase-1 (IDH1) during brown adipogenesis. Ectopic expression of IDH1 leads to reduction in brown adipocyte differentiation, whereas depletion of IDH1 enhances differentiation. In addition, IDH1 increases intracellular α-ketoglutrate (α-KG) levels, thereby inhibiting brown adipogenic and thermogenic gene expression. Finally, ChIP analysis reveals that IDH1-induced α-KG reduces H3K4 trimethylation at the brown adipogenic genes promoters, but not at the white adipogenic promoters. Taken together, we suggest that IDH1 and α-KG are important factors for regulation of brown adipogenesis, and could be used a therapeutic target for obesity and metabolic diseases.

PO1.026

Changes in survivin gene expression after weight loss by energy restriction and exercise in adipose tissue of Zucker rats

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Introduction: Adipose tissue is the main fat reserve and source of metabolic fuel and its dysfunction is related to various pathologies, including cancer. The link between obesity and tumour development may be in an altered cytokine secretion profile that modifies the mechanisms of cell proliferation and/or apoptosis. Survivin is an inhibitor of apoptosis highly expressed in tumour cells, involved in the regulation of cell proliferation, regulated by adipokines and that can be used as a biomarker of cancer diagnosis and recurrence. Therefore, the aim of this study was to evaluate the levels of survivin expression in both visceral and subcutaneous adipose tissue from an obese animal model compared with normal weight and after a weigh loss treatment, as well as, its association with the inflammatory state promoted by adipose tissue dysfunction, characteristic of obesity.
Methods: Male, 8-week-old fatty Zucker rats (fa/fa, n = 40) and lean Zucker rats (Fa/fa, n = 10) were followed for 14 weeks. Throughout the last 4 weeks of the experimental period, a set of fatty rats underwent a weight-loss protocol based on energy restriction (30% less in quantity than their individual food intake, based on weight of food) and/or exercise (30 min/day at 20 m/min in rodent treadmill, 7 days per week). The treated animals were compared with an ab-libitum group. At the end of the experimental period, the expression of survivin in the subcutaneous (SAT) and visceral (VAT) adipose tissues was analysed using TaqMan real-time PCR.

Circulating levels of monocyte chemoattractant protein 1 (MCP-1) were evaluated in plasma by ELISA.
Results: The results obtained showed that survivin expression is higher in the adipose tissue of obese than lean animals, especially in VAT. Importantly, after a treatment of energy restriction to lose weight in obese animals, the survivin expression was downregulated. According to the differences observed between the groups of rats with respect to body composition, the transcript levels of survivin in VAT was positively correlated with body weight ($r = 0.73$: $p<0.001$), body fat mass ($r = 0.75$; $p<0.001$) and MCP-1 circulating levels ($r = 0.43$; $p<0.004$).
Conclusion: The current study shows that the expression of survivin is increased in obese adipose tissue with higher expression in VAT than in SAT and it is associated with the characteristic inflammatory status of obese individuals. A treatment to lose weight is able to reverse this feature. Therefore, our results highlight survivin as an important molecule with a potential role in the pathophysiology of obesity and its associated diseases.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by FIS and CIBERobn from ISCIII, co-financed by FEDER.

PO1.027

Pro-inflammatory adipose tissue macrophages are associated with HOMA-IR in morbidly obese subjects

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Introduction: Obesity is associated with a chronic, low-grade inflammation, characterized by infiltration of macrophages (Mϕs) in the adipose tissue. Mϕs undergo polarization from an anti-inflammatory M2 into a pro-inflammatory M1 state (1), with production of cytokines that contribute to the development of insulin resistance (IR) (2). In individuals with IR, inflammation and Mϕ infiltration appear to be more distinct in the visceral adipose tissue (VAT) than in the subcutaneous adipose tissue (SAT) (3). However, most of our knowledge on ATMϕs comes from animal studies, and confirmatory studies, including detailed Mϕ phenotyping, from human samples is warranted. In this study, we aimed to characterize Mϕ subsets in human SAT and VAT in relation to obesity-induced IR.
Methods: Matched SAT and VAT biopsies from patients undergoing bariatric surgery, classified as either IR or insulin sensitive based on their HOMA-IR values, were analyzed using 12-color flow cytometry. Using an established panel of antibodies, Mϕs (CD45+, CD3-, CD19-, CD56-HLA-DR+) were classified into M1 (CD11c+/CD206+) or M2 (CD206+).
Results: Total number of Mϕs was higher in SAT compared to VAT, whereas the number of M1 Mϕs were more frequent in VAT. The CD11c+/CD206+ M1 macrophages also expressed the pro-inflammatory marker C-C chemokine receptor 2 (CCR2) at higher levels than M2 Mϕs in both VAT and SAT. Similarly, the anti-inflammatory marker CD163 was highest in the CD11c-/CD206+ M2 Mϕs, corroborating the pro- and anti-inflammatory nature of these Mϕs, respectively. Patients with high HOMA-IR had a higher percentage of M1 Mϕs and a lower percentage of M2 Mϕs in their adipose tissue compared to patients in the low HOMA-IR group. Moreover, the M1/M2 ratio was positively correlated with BMI and HOMA-IR in VAT but not in SAT, in line with the understanding that VAT is the most important adipose depot for obesity-induced insulin resistance.
Conclusion: In this study, we have identified pro-inflammatory M1 Mϕs in visceral adipose tissue from morbidly obese subjects associated with HOMA-IR. Studies aimed at characterizing other markers for inflammation, such as crown-like structures, transcriptional changes and circulating CRP are ongoing and will be presented at the congress.

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Conflict of Interest: None.

Funding: Research relating to this abstract was funded by Norwegian Health Authorities (Helse-Vest RHF).

PO1.028

Epicardial adipose tissue in coronary artery disease: Role of GPIHBP1 and ANGPTL4 on LPL activity

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Introduction: Obesity is increasing worldwide, together with increased risk of cardiovascular diseases (CVD). Epicardial Adipose tissue (EAT) is a visceral AT, surrounding and infiltrating myocardium and coronary arteries, its volume is associated with increased risk of CVD. Lipoprotein Lipase (LPL) is the main enzyme involved in triglycerides (TG) hydrolysis from circulating TG-rich lipoproteins, supplying fatty acids to AT and contributing to its expansion.
Aim: To evaluate LPL expression and activity in EAT from coronary patients undergoing coronary by-pass (CABD) and non-coronary patients undergoing valve replacement (NoCABG), as well as its regulators levels: ANGPTL4, GPIHBP1 and PPARγ. We assessed VLDLR expression, as well as EAT LPL contribution to circulating VLDL characteristics.
Methods: We studied 58 CABG and 33 NoCABG patients. Anthropometric measures and serum metabolic profile were assessed before surgery. During surgery, EAT and Subcutaneous AT (SAT) biopsies were obtained. LPL activity was evaluated by a radiometric assay, and LPL, its regulators and VLDLR expression by western blot. Circulating VLDL were isolated by ultracetrifugation, and characterized in their lipid and protein content.
Results: EAT LPL activity was higher in CABG compared to NoCABG ($p<0.001$) and in EAT than SAT in both groups ($p<0.001$), without differences in LPL expression. ANGPTL-4 levels were lower in EAT from CABG compared to NoCABG ($p<0.001$), inversely associated with LPL activity ($p<0.001$); its levels were lower in EAT than in SAT ($p = 0.002$). GPIHBP1 levels were higher in EAT from CABG compared to NoCABG ($p = 0.001$), and lower in EAT than in SAT ($p = 0.04$). No differences in EAT PPARγ levels were observed between groups, but were higher in EAT than in SAT ($p<0.001$). EAT LPL activity was directly associated with GPIHBP1 and PPARγ levels ($p = 0.015$ and $p<0.001$). No differences were observed in VLDL composition between groups, although EAT LPL activity was inversely associated with VLDL TG content and TG/Protein index ($p<0.05$). There were no differences in VLDLR levels between groups, but its levels were higher in EAT than SAT ($p<0.001$).
Conclusion: This is the first time that LPL activity is reported in EAT, together with ANGPTL4, GPIHBP1 and PPARγ expression. The increase in its activity, with no changes in its expression, suggests that the enzyme regulation would be mainly post-translational. The higher EAT LPL activity in CABG could be partly responsible for the increase in EAT volume reported in coronary patients.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the National Agency of Technologic and Scientific Promotion (Grant: PICT 2016-0920) and the University of Buenos Aires (Grant: UBACYT 20020150100042BA).

PO1.029

Control of adipogenesis and thermogenesis by fatty acid metabolites

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Introduction: The increasing prevalence of overweight and obesity has reached "epidemic" proportions. Usually, this situation is induced by imbalance between entries and energy expenditure leading to increase of white adipose tissue (WAT) mass. The recent discovery of functional brown (BAT) and brite (brown-in-white), thermogenic adipocytes, in adult humans has led to the consideration of their use to increase energy expenditure in the treatment of overweight, obesity and associated diseases. Lipids and fatty acids stored into adipocytes are the main substrates for adaptive thermogenesis but are also involved in adipose tissue development and function. Differences in fatty acid composition of dietary fat and relative intake of ω6 to ω3 poly-unsaturated fatty acids (PUFAs) control the kind of metabolites synthetized and these are involved in several physiological and inflammatory processes. We aim to detect and characterize distinct metabolites which are associated with brite adipogenesis and thus potentially able to increase energy expenditure.
Method: To investigate their role in adipogenesis and thermogenesis, we used different samples: 1) human BAT and WAT biopsies sampled under PET-scan, 2) BAT and WAT of mice exposed to i) nutritional intervention with different ω6/ω3 ratio, ii) cold or iii) an agonist of β3-adrenergic receptor. We also used a unique cellular model, hMADS (human Multipotent Adipose-Derived Stem), which can be differentiated into white adipocytes then converted into functional brite thermogenic adipocytes. Lipidomic and transcriptomic profiles of these samples were performed.
Results: Human and mouse samples analysis allowed us the identification of few interesting metabolites, such as 9- and 13-HODE and 18-HEPE. Their content is positively correlated with UCP1 expression, the key marker of thermogenesis. Using hMADS cells, we characterized the effects of these compounds in terms of effects on gene expression of key markers, oxygen consumption and lipolysis. None of them induced direct conversion of hMADS cells into brite adipocytes. However, the use of a lipoxygenases pan-inhibitor induced a decrease in adipogenic and key brown adipocyte gene expression which was reversed when the medium was supplemented with HODE compounds. Curiously, 18-HEPE had opposite effect and induced a decrease in UCP1 expression.
Conclusion: These observations are in favor of 9- and 13-HODE and 18-HEPE playing directly and/or indirectly a role in the control of brown adipogenesis. Further studies are required to decipher the involved mechanisms.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by ANR-DFG.

PO1.030

Ginkgo biloba extract supplementation decreases energy intake in high fat diet obese rats but does not modify tissue fatty acid composition

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Introduction: Obesity is a complex disease of multifactorial aetiology, positively associated with metabolic disorders including hyperinsulinaemia, dyslipidaemia and others. Fatty acids are involved in cell signalling, homeostasis and membrane composition; however, chronic high saturated fat intake enlarges fat mass and disturbs tissue fatty acid composition. Supplementation with plant-derived polyphenols may provide therapeutic application for the amelioration of metabolic disorders. Antioxidant, anti-inflammatory, vasodilatory and anti-oedematogenic properties have been attributed to Ginkgo biloba extract (GbE). It has been described that GbE supplementation improves insulin sensitivity in adipose tissue of diet-induced obese rats. However, current understanding of the biochemical pathways modulated by GbE remains limited.
Methods: The Committee on Animal Research Ethics, Federal University of São Paulo (Application 271359) authorised this study. Male rats were fed from 2 to 4-months-old with a high fat diet (HFD) enriched with 28% lard and thereafter supplemented for 14 days with 500 mg/kg of GbE (HFD+GbE) or saline (HFD). Rats were euthanized and epididymal, retroperitoneal and mesenteric adipose tissues were removed. Total lipids were extracted using Chloroform/Methanol, methylated and analysed by Gas Chromatography with Flame Ionization Detector (GC-FID).
Results: GbE supplementation decreased both food and energy intake comparing to HFD (8.8%, $p = 0.01$). However, no differences were observed in body weight gain and adipose tissue mass. No significant alterations on tissue fatty acid composition were observed.
Conclusion: Supplementation with plant-derived polyphenols may provide therapeutic application for obesity, important for patients with weak adherence to lower calorie diets and positive lifestyle interventions. The current study suggests that GbE supplementation for two weeks reduces food and energy intake via signalling pathways not associated with adipose tissue fatty acid composition. Future studies are needed to further elucidate the effects of GbE supplementation for longer periods of time and its impact on the central nervous system.

Conflict of Interest: None Disclosed.

Funding: The authors are grateful to Universidade Federal de Sao Paulo, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brazil (CAPES) - Finance Code 001 and PSDE 19/2016 - grant number 88881.133658/2016-01, São Paulo Research Foundation (FAPESP, Brazil, grant number 2014/18929-9) and the University of Worcester for funding.

PO1.031

Impact of protein intake and high-fat diet on body composition and muscle lipid infiltration in relation to aging in rats: insights into sarcopenic obesity

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Introduction: Trajectories of body composition changes during the aging process are characterized by ectopic lipid infiltration and impaired muscle anabolic response. To which extent protein intake can modulate protein anabolism in the presence of excess energy and high-fat feeding, and the interference of aging, has not been thoroughly understood. We hypothesized that the anabolic efficiency of dietary protein in skeletal muscle may affect age-related alterations in body compartments within the context of high-fat diet.The aim of the study was to investigate changes in body composition, with emphasis on sarcopenia and excess fat, and intramuscular lipid infiltration in response to two levels of protein intake combined to two levels of fat intake.
Methods: Two groups of sixty adult and forty-nine old male Wistar rats were randomly divided into four groups: isocaloric standard diet (12% protein, 14% lipid, as STD12); isocaloric standard (high-protein) diet (25% protein, 14% lipid, STD25); hypercaloric high-fat (normal-protein) diet (12% protein, 45% lipid, HFD12); and hypercaloric high-fat (high-protein) diet (25% protein, 45% lipid, HFD25). The nutritional intervention lasted 10 weeks. Body weight was measured on a weekly basis, and body composition was assessed by magnetic resonance (Echo-MRI) at baseline (T0), week 5 (T1), and week 10 (T2). Lipid content in tibialis anterior (TA) muscle was assessed by chromatography.
Results: Rats in the high-fat diet groups self-limited their food intake, so that energy intake was not different among the groups. Regarding changes in body compartments, a time effect ($p<0.05$) for the increase in body fat was reported in all diet groups at all time-points regardless of age group. In adult rats and old rats body fat was increased at T1 and T2 in

the HFD12 group compared to the STD12 and STD25 group (diet effect, p<0.05), but not in the HFD25 group. Fat-free mass in the old HFD25 group was lower than STD25 group (diet effect, p<0.05). Regardless of dietary interventions, TA muscle weight was lower in old groups compared to adult groups (all p values<0.01). An age effect was detected in all groups when total hindlimb muscle weight was considered (all p<0.05); a diet effect was observed in adult HFD12 (18.96±2.06 g) and HFD25 (19.12±2.0 g) groups compared to the adult STD25 group (15.52±2.02 g), p<0.05. Only old rats in the HFD12 group exhibited increased intramuscular triacylglycerols in TA (age effect: p = 0.02; diet effect: HFD12vs.STD12: 2.04±1.74 vs. 0.83±0.49 ug/g, p = 0.02).
Conclusion: In isocaloric conditions, high-protein intake combined with high-fat diet limited lipid infiltration in the skeletal muscle, but did not ameliorate age-related anabolic resistance and sarcopenia in old rats fed a high-fat diet.

PO1.032

Generation and validation of immortalized human paired subcutaneous and omental adipocyte models to study obesity

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Introduction: Major adipose depots include subcutaneous (SC) and intra-abdominal (visceral) fat, the latter comprising the omental (OM) and mesenteric depots. Visceral fat accumulation increases the risk of diseases such as type 2 diabetes mellitus, heart disease and cancer. Primary cell cultures can be useful for studying metabolic and other functional differences between different adipose tissue depots. However, (prolonged) culturing may decrease the proliferative and differentiation capacity of primary cells. We here sought to develop immortalized human adipocyte cell models to study functional differences between SC and OM adipose depots, and to assess their in vivo relevance.
Methods: Stromal vascular fractions (SVFs) were isolated from paired SC and OM biopsies obtained during bariatric surgery of severely obese subjects. Mature adipocytes were lysed for RNA extraction directly after tissue fractionation (n = 12 pairs of SC and OM adipocytes), while isolated SVFs were cultured and immortalized using the retroviral vector pBabe-hygro-hTERT (n = 6 pairs). Virus packaging was performed in Phoenix-Ampho cells. The SVFs were transduced at 60-70% confluence until 90% confluent and were later selected using growth medium containing Hygromycin. The immortalized cells, along with non-immortalized controls, were then differentiated by a standardized protocol. Gene expression in isolated or in vitro differentiated mature adipocytes was measured by microarrays and qPCR, respectively.
Results: A panel of genes was identified to have >5-fold differential expression between the freshly isolated SC and OM adipocytes. The immortalized cell lines were characterized for their proliferative and adipogenic capacities. Although the OM adipocytes showed markedly slower proliferation, cells from both depots differentiated. We are in the process of measuring the "in vivo" depot-selective gene panel in the "in vitro" differentiated adipocytes (both immortalized and non-immortalized), as well as to compare epigenetic states to evaluate the degree of contained chromatin conformations "in vitro".
Conclusion: Our models provide insight into the in vivo relevance of comparing in vitro differentiated primary human SC and OM adipocytes, to support the potential usefulness of these new cell models for downstream applications. Such applications include functional studies following single nucleotide substitutions and other forms of genotype- and genome editing.

PO1.033

The relationship between resting metabolic rate and free-living daily energy intake is moderated by body fat percentage in women with overweight and obesity

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Introduction: Previous research has demonstrated that resting metabolic rate (RMR) exerts influence over daily energy intake (EI). However, whether the degree of body fatness influences the association between RMR and daily EI has yet to be investigated. The aim of this study was to examine whether body fat percentage moderated the association between RMR and free-living daily EI.
Methods: Body composition (air displacement plethysmography), RMR (indirect calorimetry) and 7-day free-living daily EI (online food diary – myfood24.org) were assessed in 46 women with overweight or obesity prior to starting a weight loss trial (body mass index = 29.2 ± 2.4 kg/m2; age = 34.7 ± 10.7y; body fat percentage = 46.5 ± 6.0%). Moderation analysis was conducted to assess the influence of body fat percentage on the relationship between RMR and EI. Goldberg cut-offs (free-living daily EI / RMR) were calculated and compared between low (n = 16; body fat percentage = 36.0 ± 2.6%), medium (n = 15; body fat percentage = 41.8 ± 0.7%) and high (n = 15; body fat percentage = 46.9 ± 3.5%) body fat percentage tertiles to examine whether underreporting affected any associations observed.
Results: A positive association was observed between RMR and free-living daily EI (r = 0.292; p = 0.049), and this association was moderated by body fat percentage (p = 0.036). The conditional effect of body fat percentage on RMR was significant at the lowest (-1SD; p = 0.0047) and medium (mean; p = 0.024) levels of the moderator, but not at the highest (+1SD; p = 0.940). Individuals in the lowest body fat percentage tertile presented a stronger association between RMR and free-living daily EI (r = 0.678; p = 0.004) in comparison to the highest tertile, who showed no association between RMR and EI (p = 0.647). There was no association between Goldberg cut-off values and body fat percentage (p = 0.998), or differences in Goldberg cut-off values between tertiles (p = 0.202), suggesting that the moderation effect was not influenced by underreporting.
Conclusion: Consistent with previous research, RMR was associated with free-living daily EI, but these data further suggest that the association between RMR and EI might be moderated by body fat percentage. As the association between RMR and EI was stronger in leaner individuals, the accumulation of body fat may be detrimental to an individual's ability to accurately match EI to energy requirements.

Conflict of Interest: None Disclosed.

Funding: This work was funded by a Research Fellowship awarded to Kristine Beaulieu by the European Society for Clinical Nutrition and Metabolism (ESPEN). We are grateful for in-kind support from LighterLife who supplied product and expertise during the larger trial (NCT03447600).

PO1.034

The relationship of hormones and adipokines with eating behavior among men with android and gynoid fat distribution

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Introduction: It is knownthat eating behavior (EB) is regulated with hormones thatcontrol the activity of metabolic processes, and adipokines.

Their disturbances contribute to the development of obesity. However, there is android type obesity with pronounced metabolic disorders, associated with risk factor for cardiovascular diseases, type 2 diabetes. Gynoidtypeobesity has features of a metabolically healthy obesity. The aim of the study was to determine the features of the hormonal and adipokine regulation of EB in android and gynoid types of obesity.

Material and Methods: A total of 99 men were examined, the mean age of 49.4 ± 10.4 (M ± SD) years. The control group consisted of 12 men with normal body weight. The overweight and obese men were divided into two main groups - with android type of fat distribution (ATFD), which was set at the waist-hip ratio (WHR) ≥0, 95; and the gynoid type of fat distribution (GTFD) with the WHR<0.95. The serum levels of hormones - insulin, testosterone, and adipokines - leptin, adiponectin, were measured by enzyme immunoassay test, the types of EB were determined with DEBQ questionnaire.

Results: The men of the main groups compared to the men in the control group showed significantly more pronounced manifestations of emotional, compulsive, external and restrained EB.Men with GTFDmore often had emotional EBcompared to men with ATFD, and men with ATFD had more often external EBcompared to men with GTFD. Men with GTFD compared to men with ATFD had higher serum levels of testosterone and adiponectin, while men with ATFD compared to men with GTFD had higher leptin and insulin levels. The higher expression of emotional EB among men with GTFD was positively correlated with leptin level ($r = 0.40$, $p < 0.05$). External EB in men with ATFD directly correlated with insulin levels ($r = 0.36$, $p < 0.005$) and inversely correlated with testosterone and adiponectin levels ($r = -0.37$, $p < 0.005$ and $r = -0.28$, $p < 0.05$) respectively.

Conclusion: These results suggest that hormonal and adipokine regulation of EB differs in men with GTFD, predominance of the subcutaneous fat depot and in men with ATFD accompanied by an increase in visceral fat depot. The emotional EBdisorders in GTFD may be associated mainly with the development of leptin resistance.External EB among men with ATFD can be due to development of insulin resistance.

PO1.035

Acute effects of a hallucinatory meal on appetite regulation: a randomized cross-over trial

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Introduction: The regulation of appetite is crucial to control food intake and consequently body weight. Hypnosis has long been recognized as an effective tool for producing behavioral change and successfully used to modulate gastrointestinal functions. The aim of this pilot study was to assess subjective appetite and several hormones involved in appetite regulation after both hallucinatory and real meals.

Methods: Healthy women in menopause and able to develop hallucinations during hypnotic sessions were recruited. Two meals, hallucinatory breakfast (HB) and the real one (RB), were randomly tested in a crossover design. On test days, breakfast meal, consisting of 100g of white bread with 30g of ham and cheese, was served or hallucinated. Subjective appetite by visual analogue scale (VAS) was assessed at baseline and then each 30 min for 4 hours and half. Blood samples were taken before and at 20', 60', 90' and 180' min after meal for the following measurement: glucose, insulin, ghrelin, glucagon like peptide-1 (GLP-1), peptide YY (PYY), neuropeptide Y (NPY) and orexin-A (OX-A).

Results: Eight women with a mean age of 53 ± 2 years and an average BMI of 22.5 ± 3.3 kg/m² participated and completed the study. Repeated measures ANCOVA, adjusted for baseline values and BMI, showed that postprandial satiety sensation increased ($p = 0.001$) and hunger decreased ($p = 0.038$) after the HB. As expected, RB meal resulted in significantly higher glucose and insulin concentrations than the HB meal ($p<0.001$), while postprandial FFA levels were reduced ($p<0.001$). Compared with HB, the RB increased postprandial response for both GLP-1 and PYY at time points 20', 60', 90' and 180 min ($p = 0.03$, $p = 0.05$, $p = 0.01$, $p = 0.01$; $p = 0.006$, $p = 0.003$, $p = 0.004$, $p = 0.008$; respectively), whereas ghrelin did not significantly differ between breakfasts. Postprandial NPY increased at time points 90' ($p = 0.004$) and 180 min ($p = 0.001$) as well as OX-A at 60' ($p<0.001$) and 180 min ($p = 0.03$) after the RB meal compared to HB.

Conclusion: HB increased satiety and decreased hunger sensation compared to RB, resulting in a lower postprandial NPY response. However, further studies are needed to verify the possible link between hypnosis and appetite regulation.

PO1.036

A comparison of the satiating properties of medium-chain triglycerides (MCT) and conjugated linoleic acid (CLA) in lean compared to overweight and obese participants

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Introduction: Fats with the potential to beneficially affect appetite have gained popularity in recent years. To date, research has focused on medium-chain triglycerides (MCT)[1], although conjugated linoleic acid (CLA) may also have greater satiating properties than traditional long-chain triglycerides (LCT)[2]. The aim of this study was to examine potential differences in the satiety response between lean and obese individuals following MCT and CLA.

Methods: Fifteen lean (BMI: 22.7 ± 1.9 kg/m²) and fourteen overweight or obese (30.9 ± 3.9 kg/m²) individuals participated in a randomised single-blind cross-over study. Overnight fasted participants were fed smoothie breakfasts containing either 23.06 g vegetable oil (CON), 25.0 g MCT oil (MCT), or 6.25 g CLA and 16.8 g vegetable oil (CLA) on separate test days. Test days were a minimum of 72 h and a maximum of 10 days apart, and participants completed a 24 h standardisation protocol before each trial. Energy intake at a single item ad libitum lunch was measured 3 h after breakfast, diet diaries were completed for the rest of the day (D1) and the following 24 h (D2), and appetite was measured via visual analogue scales every 30 min for the 3 h period.

Results: Energy intake ($p \geq 0.182$) at all time points and subjective appetite measures ($p \geq 0.393$) were similar between lean and overweight or obese participants, therefore, results are presented for all participants combined. MCT led to decreased energy intake compared to CLA at lunch ($p = 0.033$), but not compared to CON. There was a lower energy intake following MCT over D1 compared to CON ($p = 0.031$) and CLA ($p = 0.026$). MCT also resulted in significantly lower intake compared to both CON ($p = 0.005$) and CLA ($p = 0.005$) across both days combined. There were no main or interaction effects on appetite measures, although MCT lead to stronger feelings of nausea compared to CON or CLA ($p = 0.003$).

Conclusion: MCT did not decrease energy intake at single subsequent eating episode, but appeared to decrease energy intake over a 48-hour period compared to LCT, regardless of weight status. Conversely, CLA did not decrease energy intake. These results suggest a potential use of MCT in weight management strategies due to the negative energy balance it begets, however MCT also led to increased feelings of nausea in some individuals.

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Conflict of Interest: None.

Funding: TM is funded by the Nigel Groome Scholarship. This study was also funded by the TANITA Healthy Weight Trust-in-aid.

PO1.037

Food-specific and general impulsivity before and after bariatric surgery: an eye-tracking study

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Introduction: A proportion of patients does not benefit from bariatric surgery and maintains to show disinhibited eating behavior and increased calorie intake postoperatively. Preliminary evidence suggests that impulsive behavior, particularly towards food, may account for these adverse effects. However, experimental studies comparing changes in impulsivity after bariatric surgery via neuropsychological parameters with an adequate control group are lacking. This longitudinal study aimed to assess both food-specific and general impulsivity in bariatric patients (n = 30, EG) from pre- to one year post-surgery in comparison to a body mass index-, sex-, and age-matched control group (n = 30, CG) without surgical weight loss treatment.
Methods: Various facets of impulsivity (e.g., self-control, reward sensitivity, risk-taking behavior), body weight, and psychopathology were evaluated at pre- and one year post-surgery using eye-tracking, computerized neuropsychological tests (e.g. Visual Search Task with food and non-food stimuli, Cards and Lottery Task for general risk-taking behavior), and self-report questionnaires in the EG and CG. To test inter-group and intra-group differences, repeated measures analyses of variances were conducted.
Results: Eye-tracking results indicated no significant inter- and intra-group differences for initial fixation and gaze duration on food versus non-food stimuli. Food-specific impulsivity mirrored by shorter reaction times in the Visual Search Task at one-year follow-up decreased, while general risk-taking behavior assessed via the Cards and Lottery Task significantly increased from pre- to post-surgery in the EG. In addition to these changes, significant post-bariatric decreases in excess weight and psychopathology were found in the EG. For the CG, no pre- to follow-up changes were observed in any of the investigated variables.
Conclusion: The results indicate that automatic attention processes towards food (reaction times in computer task) may change after bariatric surgery, while controlled attention (gaze duration during eye-tracking) remained unchanged, suggesting that patient's food-specific self-control increases post-operatively. Whether these changes are affected by improvements of patient's psychopathology warrants further study. In accordance with previous research, reduced anxiety and depression levels may account for increases in general risk-taking behavior post-surgery. Future research should examine the long-term stability of reduced food-specific impulsivity after bariatric surgery and its predictive value for weight- and health-related outcomes.

PO1.038

Electroencephalography-based activity in children with overweight and obesity and its associations with general and food-specific impulsivity: a pilot study

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Introduction: Comorbidity rates between childhood obesity and attention-deficit/hyperactivity disorder (ADHD) are very high. Although higher levels of impulsivity were evidenced as a potential risk factor for the development and maintenance of childhood obesity, neuropsychological and neurophysiological indicators of general and food-specific impulsivity and their association with children's weight status are poorly understood. In this context, resting-state electroencephalography (EEG) activity is a reliable neurophysiological marker of impulsivity and an established measure in ADHD research, but rarely used in studies on childhood obesity.
Methods: This pilot study examined EEG frequency band profiles during eyes-closed and eyes-open resting state (5 minutes each) in n = 12 children with overweight or obesity versus n = 22 normal-weight controls (8-13 years) and their association to child- and parent-reported and experimentally assessed impulsivity of children (e.g., risk-taking behavior via the Youth Version of the Balloon Analogue Risk Task, approach-avoidance behavior towards food via an Approach-Avoidance Task). Left-handedness, ADHD, or other serious mental or physical comorbidities were exclusion criteria for participation.
Results: Children with overweight and obesity versus normal weight showed significantly increased delta and decreased alpha band activity during eyes-closed resting state. Across the total sample, EEG slow-wave band activity (delta and theta) was particularly linked to parent-reported impulsivity and greater risk-taking behavior, but not to approach behavior towards food, after controlling for children's age and weight status.
Conclusion: The results on EEG profiles in children with overweight and obesity are comparable to findings in ADHD research indicating cortical hypoactivation in these children. The identification of specific EEG patterns in children with excess weight may provide a new basis for developing neurophysiological diagnostic and treatment approaches for childhood obesity. Future studies with larger samples and longitudinal designs are needed to replicate the present findings and test their stability over time.

PO1.039

Phosphorus alteration in Diabetic neuropathy: unveiling novel and mechanistic pathways

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Introduction: Neuropathy is a common complication among diabetic patients. It is associated with myelin alterations, axonal atrophy, reduced nerve conduction velocity as well as abnormal electrophysiological recordings resulting from dysregulated metabolism of glucose and lipids. However, recent findings indicate that phosphorus was able to improve lipid and glucose dysmetabolism. Therefore a study was conducted to investigate the impact of phosphorus on peripheral nerve dysfunction of an animal model of type 2 diabetes. We hypothesized that increased phosphorus intake during diabetes will ameliorate diabetes-induced nerve injury through decreasing ROS production.
Methods: Adult (8-12 weeks) male mice (~40g) were divided into 5 groups: one control, and 4 high fad diet groups (with no diabetes, type 2 diabetic, phosphorus, type 2 diabetic + phosphorus) containing 54.8% of energy from fat. Diabetes was induced by a single 50 mg/kg body weight intra-peritoneal injection of Streptozotocin for 3 days successively. Phosphorus was mixed with the high fat diet at 0.9% concentration and mice were maintained on their respective diet for 3 months. Peripheral myelin protein levels and Nox1 in sciatic nerves and hippocampus were determined. Dihydroethidium (DHE) staining was used for the detection of intracellular ROS in sciatic nerves. Sensorimotor function was assessed via three behavioral tests: the Raised Beam Walking test, Rotarod and Hind Paw Withdrawal test.
Results: Diabetes resulted in an increase in oxidative stress and Nox1 and Nox 4 upregulation in the sciatic nerves as compared to controls and these were associated with myelin gene alteration (MPZ, PMP22). Myelin injury in diabetic animals were validated by behavioral tests whereby abnormal sensorimotor function and neuromuscular endurance was observed. Diabetes-induced Nox1 and Nox4 levels were associated with increased ROS production that mediated injury at the behavioral and molecular levels. Phosphorus administration to diabetic animals was shown to repair behavioral deficits as well as myelin protein alterations, as reflected by restored thermal perception as well as sensory and motor coordination.

Conclusion: We present evidence that diabetes-induced ROS production through the over-expression of Nox1 and Nox4 leads to behavioral deficits. These were paralleled with peripheral myelin protein alterations that are known to be essential for myelin sheath functionality and physiology. The resulting injury was validated at the behavioral level where sensorimotor deficits were observed. Finally, phosphorous administration was shown to normalize ROS production, reduces Nox1 and Nox4 upregulation and restores myelin protein and gene expression levels.

PO1.040

Prediction of resting energy expenditure in adults with mild to severe obesity using raw-BIA variables

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Introduction: Many predictive equations for Resting Energy Expenditure (REE) have been developed so far, but no recommendation was found in literature for subjects with severe obesity. The aim of the present study was to develop and validate new predictive equations for REE in a large cohort of patients with mild to severe obesity by using raw variables from bioimpedance analysis (BIA).
Methods: This was a retrospective analysis of data collected between 2005 and 2017 from consecutive adult outpatients. The study population was split into 3 subgroups classified by BMI (Group 1 = 30-39.9 kg/m^2; Group 2 = 40-49.9 kg/m^2; Group 3 >50 kg/m^2). The new predictive equations were generated using two models: Model 1 used age, weight, height and BMI, and Model 2 used the previous variables along with bioimpedance-index (BI-index) and phase angle (PhA).
Results: A total of 2225 consecutive outpatients with obesity (males, n = 797; females, n = 1428) were recruited and randomly assigned to the calibration (n = 1680; males (n = 602): age = 34.2±11.8 y; weight = 129±24 kg and BMI = 42.6±7.7 kg/m^2; females (n = 1078): age = 35.2±12.7 y; weight = 109±22 kg; and BMI:42.0±8.1 kg/m^2) and validation groups (n = 545; males (n = 195): age = 34.1±11.7 y; weight = 129±23 kg and BMI = 42.2±7.4 kg/m^2; females (n = 350): age = 35.1±12.7 y; weight = 108±22 kg; and BMI = 41.6±8.0 kg/m^2). REE was directly correlated with all anthropometric and raw BIA variables, while the correlation with age was inverse. Body weight had the strongest correlation in males (r = 0.783) and females (r = 0.825).
Model 1:
Males: REE(kcal/d) = 13.4 × Weight - 2.64 × Age + 865; (R^2 = 0.621; SEE = 259 kcal).
Females: REE (kcal/d) = 14.0 × Weight - 2.50 × Age + 912; (R^2 = 0.688; SEE = 208 kcal).
Model 2:
Males: REE (kcal/d) = 11.5 × Weight – 3.32 × Age + 6.15 × BI-index + 46.1 × PhA + 313; (R^2 = 0.647; SEE = 250 kcal).
Females: REE (kcal/d) = 12.3 × Weight - 2.10 × Age + 4.96 × BI-index + 42.7 × PhA +143; (R^2 = 0.707; SEE = 201 kcal).
Our findings showed that all new predictive equations were reliable to measure REE in both sexes according to BMI categories, without showing differences between Models. Additionally, accuracy at individual level was high for specific group-equation especially in people with BMI>50 kg/m^2 (~ 80%).
Conclusion: New predictive equations based on raw-BIA variables were as accurate as those based on anthropometry. Interestingly, those specifically developed for BMI categories improved REE prediction in subjects with BMI>50 kg/m^2. Further studies are required to verify the application of those formulas and the role of raw-BIA variables for predicting REE.

PO1.041

Adaptive thermogenesis in brown adipose tissue is affected by constitutive serotonergic tone: study on Wistar-Zagreb 5HT rat model

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Introduction: A biogenic amine serotonin (5HT) acts in the brain as anorexigenic transmitter, but systemic up-regulation of 5HT is associated with increased adiposity, suggesting that central and peripheral 5HT affect energy status in an opposite manner. In addition to regulating energy metabolism in white adipose tissue, peripheral 5HT influences adaptive thermogenesis in brown adipose tissue (BAT), an organ with a large ability to convert chemical energy into heat. Due to BAT potential to stimulate energy expenditure, its activation has been suggested as anti-obesity treatment.
Methods: To better understand the role of 5HT in adaptive BAT thermogenesis we use Wistar-Zagreb 5HT rats, an animal model consisting of two sublines with constitutionally altered 5HT homeostasis (high-5HT and low-5HT subline), developed by selective breeding toward extreme activities of peripheral (platelet) 5HT transporter. Rats from the high-5HT subline have increased body weight and moderate obesity phenotype accompanied with lower BAT weight and lower skin temperature above BAT in comparison with low-5HT animals.
Here we compared BAT thermogenesis in groups of rats from two 5HT-sublines which were either kept under usual temperature conditions (22°C) or intermittently subjected to cold environment for five weeks (8°C, 4 hours/day, 5 days/week). During this period we have periodically measured their food intake, body temperature (by rectal probe) and temperature above the intrascapular BAT (by infrared thermography). At the end of experiment, we determined BAT mass and evaluated BAT protein (by ELISA) and mRNA (by RT-qPCR) levels of the key protein in dissipating energy into heat (uncoupled protein-1, UCP1). In addition, mRNA levels of several transcription factors involved in brown adipogenesis were measured.
Results: Results show that rats from the high-5HT subline (i.e. hyperserotonergic animals) have higher increase in food intake, BAT weight and skin temperature above BAT in response to low ambient temperature as compared to rats from the low-5HT subline. High-5HT rats also showed higher increase in UCP1 expression at both, protein and mRNA levels. No differences in response to cold-activation of BAT between 5HT-sublines were shown with regard to expression levels of Ppara, while alterations in Cebpb mRNA (decrease) and Pparg1a mRNA (increase) levels were present only in the low-5HT animals.
Conclusion: Our findings obtained in an original rodent model demonstrated that individual differences in serotonergic tone affect the adaptive response of BAT to low ambient temperature. They also validate Wistar-Zagreb 5HT rats as a potential novel model in obesity research.
Funding: Research was funded by Croatian Science Foundation, grant no IP-2014-09-7827.

PO1.042

Impact energy flux on sleeping energy expenditure and fat oxidation

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Background: There is evidence that body weight control is improved when physical activity and energy intake are both high (high energy flux).
Methods: In a randomized controlled crossover trial, 9 participants (BMI 22.9 ±2.3 kg/m^2) underwent three 24h-interventions with different levels of energy flux (EF): (i) low, PAL = 1.3 (ii) medium, PAL = 1.5 and (iii) high

EF, PAL = 1.7 each at three levels of energy balance: equal energy balance (EB), caloric restriction (CR) and overfeeding (OF) (100%, 75% and 125% of individual energy requirement with 50% CHO, 35% fat, 15% protein) in a caloric chamber (3 x 3 days in total). Different levels of energy flux were accomplished by walking on a treadmill. Sleeping energy expenditure (SEE) and 24h-fat oxidation (n = 7) were determined.

Results: SEE was higher with medium EF (during EB and OF) and high EF (during OF) compared to low EF (all $p<0.05$). Fat oxidation as a percentage of TEE was higher with high EF compared to low EF during EB and OF (both $p<0.05$) but not during CR.

Conclusion: A high energy flux improved fat balance during energy balance and overfeeding and increased sleeping energy expenditure during overfeeding. By contrast, there was no impact of energy flux during caloric restriction. A high energy flux may therefore have a beneficial effect on body weight control especially during overeating.

Conflict of Interest: None Disclosed.

Funding: No funding.

PO1.043

Influence of acute moderate-intensity running on coronary heart disease risk markers in healthy male smokers and non-smokers

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Introduction: Cigarette smoking is a strong and independent risk factor for coronary heart disease (CHD) and is associated with impaired postprandial metabolism[1]. Previous studies suggest that postprandial metabolism and other CHD risk markers can be improved with acute exercise in non-smokers[2], but less is known about responses in cigarette smokers. This study compared the effect of acute moderate-intensity running on CHD risk markers in the postprandial state in male smokers and non-smokers.

Methods: Twelve healthy male cigarette smokers and 12 healthy male non-smokers (Table 1) completed two, 2-day trials (control and exercise) in a random, crossover design. On day 1, participants rested for 8.5 h in both trials except a 60 min treadmill run was completed from 6 to 7 h in the exercise trial. Exercise intensity and gross energy expenditure (mean (SD)) were 65 (7)% of maximum oxygen uptake and 2.87 (0.54) MJ respectively. On day 2, participants rested and consumed standardised breakfast and lunch meals (3.58 MJ, 57% energy from fat) over an 8 h postprandial period. Thirteen venous blood samples and nine resting arterial blood pressure measurements were taken at pre-determined intervals.

Results: Smokers exhibited higher postprandial TAG concentrations than non-smokers (95% CI of the mean ratio difference (95% CIr) 25 to 143%, ES = 0.96, P = 0.002) (Figure 1A). No between-group differences were observed in postprandial glucose, insulin and non-esterified fatty acid (NEFA) concentrations or systolic and diastolic blood pressure (all $P \geq 0.219$). Exercise reduced postprandial TAG concentrations (95% CIr -18 to -11%, ES = 0.27, $P < 0.001$) (Figure 1A), insulin concentrations (95% CIr -23 to -4%, ES = 0.15, P = 0.010) (Figure 1B), systolic blood pressure (95% CI of the mean absolute difference (95% CIa) -5 to -2 mmHg, ES = 0.23, $P < 0.001$) and diastolic blood pressure (95% CIa -3 to -1 mmHg, ES = 0.23, P = 0.001), whereas postprandial NEFA concentrations were higher after exercise than control (95% CIa 0.02 to 0.07 mmol·L-1, ES = 0.33, $P < 0.001$). Non-smokers demonstrated a greater exercise-induced reduction in postprandial TAG concentrations than smokers (-20% vs -9%, respectively; trial-by-group interaction P = 0.002) (Figure 1A).

Conclusion: Apparently healthy male cigarette smokers exhibited higher postprandial TAG concentrations than healthy male non-smokers. Acute moderate-intensity exercise reduced postprandial concentrations of TAG and insulin along with resting systolic and diastolic blood pressure in smokers and non-smokers, but the small-to-moderate reduction in postprandial TAG concentrations was greater in non-smokers.

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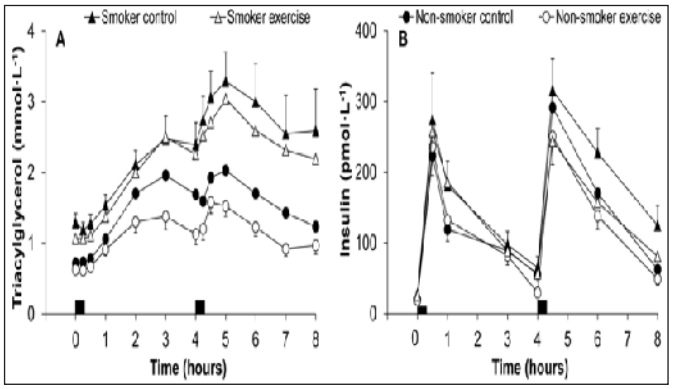

Fig. 1. Mean (SEM) postprandial plasma triacylglycerol (panel A) and insulin (panel B) concentrations in the exercise and control trials for apparently healthy male cigarette smokers (n = 12) and healthy male non-smokers (n = 12). Black rectangles indicate consumption of breakfast and lunch meals.

Tab. 1. Physical and physiological characteristics.

	Smokers (n = 12)	Non-smokers (n = 12)	95% CIa	Effect size
Age (years)	23.3 (4.1)	24.4 (3.7)	-4.4 to 2.2	0.28
Body mass index (kg·m-2)	24.9 (3.0)	24.1 (2.0)	-1.4 to 2.9	0.30
Body fat (%)	18.0 (5.7)	16.8 (5.2)	-3.4 to 5.8	0.22
Maximum oxygen uptake (mL·kg-1·min-1)	43.7 (4.6)	46.7 (5.3)	-7.1 to 1.3	0.59

All values are mean (SD). a 95% confidence interval of the mean absolute difference between the groups. There were no significant differences between groups.

PO1.044

Effect of acute eccentric exercise on appetite-related hormones and food preferences in men

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Introduction: The aim of this study was to examine the effect of acute eccentric exercise on appetite-related hormones and food preferences and food intake.

Methods: Twelve moderately active men were recruited to participate in the study (age 24.2 ± 5.5 yrs; BMI 23.4 ± 3.3 kg/m^2). Three different conditions were implemented; no exercise (CON), flat running (FR) and downhill running 'inclination –12%' (DHR). Appetite-related hormones (n = 11), subjective appetite sensations (n = 8), food preferences (n = 8) and ad libitum food intake (n = 12) were measured at pre-, post-, and 24-hr post-exercise.

Results: Ghrelin concentration was significantly lower 24-hr post-exercise compared to the pre- and post-exercise (p = 0.001). There were no effects of time, condition and time*condition interaction on study factors including pancreatic polypeptide (PP) (p = 0.75, p = 0.83, and p = 0.66 respectively), subjective hunger (p = 0.35, p = 0.38, and p = 0.78 respectively), fullness (p = 0.48, p = 0.21, and p = 0.49 respectively), desire to eat (p = 0.62, p = 0.79, and p = 0.52 respectively), explicit and implicit fat bias (p = 0.68, p = 0.49, and p = 0.57 respectively), explicit and implicit taste bias (p = 0.58, p = 0.69, and p = 0.10 respectively), and energy intake (p = 0.50, p = 0.52,p = 0.59 respectively).

Conclusion: There was no significant effect of acute eccentric running exercise on appetite-related hormones, subjective appetite sensations, food preferences and food intake, compared with concentric running exercise.

PO1.045

The influence of high-fat diet and swimming on blood pressure and intracranial pressure of Wistar rats

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Introduction: Intracranial Pressure (ICP) alterations can be detected by different invasive and non-invasive methods. Morphological changes in the ICP curve, especially the P2/P1 ratio may be related to the onset of pathologies such as intracranial hypertension and stroke. However, little is known about the effects of high-fat diet (HF) and exercise on ICP. The objective of this study was to evaluate the effects of HF associated or not with exercise on ICP, heart rate (HR) and blood pressure (BP).
Material and Method: 24 Male Wistar rats were kept in a collective cage with food and water ad libitum, on a 12:12 h light–dark cycle at 23±1°C. Experimental groups received chow diet provided by Agromix (Jaboticabal, Brazil) or high-fat diet previously standardized by our research group. The high-fat diet has 4.66cal/g and 20% of fat and chow diet has 3.85cal/g and 4.80% of fat (IKA-5000; MA-061). Initially the animals were assigned in two sedentary groups (n = 12) according with diet: Chow diet (C) and high-fat diet (HF). After 12 weeks the animals were distributed in four groups (n = 6) according kind of physical activity—sedentary (S) and exercised (E) (swimming 3 sessions of one hour per week, during 8 weeks). The Institutional Animal Ethics Committee approved all animal procedures (No.3161311018). The ICP, BP, HR were non-invasively measured using respectively, Braincare® 2.0 and tail plethysmograph. Evaluations were done at 8, 12 and 20 weeks. For ICP, the P2/P1 ratio was used. Descriptive statistics and frequency of the morphology of ICP and BP were performed; Shapiro-Wilk test to verify the homogeneity of the samples; and ANOVA One-Way with Tukey's post hoc for comparison between groups.
Results: We observed a decrease in the BP of the CE compared with HF8 and HF12 ($p<0.05$). No difference was found between groups for HR and ICP. However, we observed in the animals fed with high-fat diet the appearance of a potentially pathological curve of ICP in two cases (33.3%) in twelve weeks and BP above 140 mmHg in three animals (50%) in eight and twelve weeks. All results can be observed in Table 1.
Conclusion: The results suggest that high-fat diet was able to promote alterations in the morphology of the ICP curve, preceded by increases in BP. The training was able to reduce the BP of the hypertensive animals grade I, and bring the normality of ICP.

Tab. 1. Noninvasive variables during trial period.

Groups	BP (mmHg)	HR (bpm)	ICP (AU)
HF8	143 ± 10	372 ± 67	0.68 ± 0.11
HF12	136 ± 11	354 ± 32	0.79 ± 0.31
HFE20	127 ± 13	349 ± 34	0.68 ± 0.17
HFS20	133 ± 11	380 ± 58	0.60 ± 0.21
C8	127 ± 7	402 ± 30	0.49 ± 0.12
C12	130 ±16	342 ± 31	0.64 ± 0.18
CE20	111 ± 18 *	363 ± 29	0.49 ± 0.13
CS20	131 ± 7	365 ± 59	0.52 ± 0.18

HF: high-fat diet; CD: chow diet; E: exercised group; S: sedentary group; 8, 12 and 20: time of course until euthanasia (weeks); BP: blood pressure; HR: heart rate; ICP: intracranial pressure; AU: arbitrary unit ANOVA One-Way between groups. *Difference between CE20 versus HF8, and HF12 ($p<0,05$).

PO1.046

Synergic effects of exercise and dipeptide carnosine on body composition, whole-body and muscle metabolism in the elderly

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Introduction: Adaptive response to regular exercise in the elderly can be severely limited. On the other hand, favourable effects of exercise can be enhanced by a dietary supplement carnosine, which has been shown to improve glucose metabolism in sedentary obese patients and muscle functional capacity in athletes.
Methods: This was a randomized placebo-controlled double-blind intervention trial. Study population (F/M: 47/14, age: 66.9±4.8 yrs, BMI: 27.0±4.6 kg/m^2) was divided into 4 groups: exercise+carnosine, exercise+-placebo, stretching (active control)+carnosine, stretching+placebo (n = 19/19/12/11). Effects of the three-month of supervised aerobic-strength training (3x1h/week), with or without an oral carnosine (2 g/day) supplementation were evaluated. Body composition (DEXA), whole-body glucose metabolism (euglycemic hyperinsulinemic clamp) & metabolic substrate preference (indirect calorimetry), muscle strength (dynamometry) and 10m walking speed were assessed. Muscle energy metabolism was determined by high resolution respirometry (Oroboros) in muscle fibers ex vivo; muscle carnosine content by 1H-MRS (Siemens).
Results: After 3-month exercise intervention, proportion of fat mass was lower in the carnosine group compared to placebo. Trunk lean body mass was increased by training, without additional effect of carnosine. Exercise intervention induced an increase in Steady State RQ during the clamp, and tended to increase metabolic flexibility (ΔRQ = SS RQ-fasting RQ). Complex II (succinate dehydrogenase) and complex I (NADH:ubiquinone oxidoreductase) respiratory capacity increased with exercise and these effects were more pronounced in muscle fibers of individuals supplemented with carnosine. Training-induced increase in muscle carnosine content was greater in carnosine-supplemented individuals. Muscle carnosine content correlated negatively with total body fat ($p<0.0002$), positively with lean body mass ($p<0.04$), as well as with the maximal voluntary contraction of knee extension and flexion ($p<0.02$), handgrip strength ($p<0.0001$) and maximal walking speed ($p<0.02$). Moreover, exercise-induced change in HOMA-IR ($p<0.004$) and insulin sensitivity index ($p<0.02$) correlated with muscle carnosine content.
Conclusion: Some effects of exercise on body composition, muscle and whole-body energy metabolism were enhanced by carnosine supplementation. It can be assumed that carnosine has a potential to enhance adaptive capacity to regular exercise in seniors.

PO1.047

Effects of high-intensity interval training vs. moderate-intensity continuous training upon microvascular endothelial function and vascular oxidative stress in diet-induced obese rats

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Introduction: High-intensity interval training (HIIT) has been suggested to elicit greater improvement on several cardiometabolic risk markers in comparison to moderate-intensity continuous training (MICT). However, it remains unclear if HIIT improves microvascular endothelial function or could exacerbate vascular oxidative stress and impairments on endothelial function which are triggered by obesity per se. This study examined the effects of HIIT and MICT upon microvascular reactivity and biomarkers of oxidative stress in diet-induced obese rats.
Methods: Wistar rats (n = 32) were randomly assigned to standard chow (SC) or high fat diet for 12 weeks prior to be assigned into 4 groups: control (SC); obese (OS); obese + MICT (OM); obese + HIIT (OH). OM and OH performed treadmill running for 6 weeks at speeds corresponding to 65% oxygen uptake reserve (VO2R), and 85%VO2R interspersed with 60%VO2R (4x3 min.), respectively. The duration of exercise bouts was controlled by energy expenditure (4.8±0.1 kcal) to perform isocaloric exercise bouts. At the end of intervention, all groups had assessed: % body fat (DEXA); microvascular reactivity in hindlimb muscles (Laser Doppler Perfusion Imaging); Glutathione peroxidase (GPX), Superoxide dismutase (SOD) and carbonyl protein in aorta. Data were analyzed by Kruskal-Wallis (post-hoc Dunn tests).
Results: After training, all groups fed a high fat diet exhibited higher body weight compared to SC (P<0.0001), but MICT and HIIT reduced %body fat in both OM and OH vs. OS (-10.2% and -13.6% P = 0.01) and only this group had higher % body fat vs. SC (18.1%; P = 0.0016). Improvements upon microvascular reactivity was higher with HIIT than MICT in exercised groups vs. OS (OH: 21%; P = 0.01 and OM: 16.6%; P = 0.23). Moreover, only OS had lower vasodilatatory response vs. SC (-13.5%; P = 0.02), since no significant differences were found between OM (3.1%; P>0.99) or OH (7.9%; P = 0.85) vs. SC. All groups fed a high fat diet increased vascular carbonyl protein vs. SC (P = 0.004), but only OH and OM increased activity of SOD (OM: P = 0.001; OH: P = 0.04; OS: P = 0.11) and GPX (OM: P = 0.02; OH: P = 0.001; OS: P>0.99), where additional differences were found between OH vs. OS (P = 0.006).
Conclusion: Our results suggest that HIIT does not jeopardize microvascular endothelial function in obese rats, since it was demonstrated a greater improvement on vasodilation and vascular GPX activity in these rats, in comparison to rats subjected to MICT.

Conflict of Interest: None Disclosed.

Funding: This research was supported by CAPES, CNPq and FAPERJ.

PO1.048

Modulation of inflammatory cytokines after an acute session of moderate intensity continuous exercise and high intensity interval exercise in rats fed with high-fat diet

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Introduction: Obesity is an endemic pathological condition that affects millions of people and is a risk factor for the development of cardiovascular diseases. Because of metabolic disorders, a typical inflammatory condition can occur. Considering that physical exercise causes anti-inflammatory effects and can prevent the worsening of obesity and associated comorbidities, such a study is necessary.
Objective: This study aimed to demonstrate the modulation of serum concentrations of Interleukin-10 (IL-10), Interleukin-8 (IL-8), Interleukin-6 (IL-6), Adiponectin and C-Reactive Protein (CRP) in acute response.
Material and Methods: 48 Wistar rats were previously divided in C (n = 23) and H (n = 23) groups. Experimental groups received chow diet (C) provided by Agromix (Jaboticabal-Brazil) and high-fat diet (H) previously standardized by our research group, during 9 weeks for development of exogenous obesity. The high-fat diet has 4.66cal/g and 20% of fat (IKA-5000; MA-061) and chow diet has 3.85cal/g and 4.80% of fat. At the 10th week, the animals were divided into 8 groups (CM2, CI2, HM2, HI2, CM6, CI6, HM6 and HI6): according with diet (C or H), kind of exercise (M or I) and time for evaluate acute effect (2 or 6 hours after the single exercise session. In the moderate intensity group (M) the rats swam for 40 minutes in 80% of critical load. In high intensity interval exercise (I) the rats swam 14 intervallic shots of 1 minute, with 1 minute passive intervals (total 28 minutes) in 140% of critical load. After two weeks of adaptation to water, the critical load was determined. The euthanasia and collection of the blood samples were performed 2 or 6 hours after the exercise session. Serum cytokine concentrations were measured by the ELISA method. The study approved by CEUA no2934201217.
Results: The high-fat diet was effective in increasing the body mass in the H group in relation to the C (540.7g±79.1 versus 686.7g±107.4; p<0.05), without significant changes in the inflammatory profile. Among the cytokines IL-8 was the only one that presented significant difference in relation to controls (HM2 197.07±195.3 versus CM2 163.68±54.14; pg/ml; p = 0.002). The increase in IL8 observed in HM2 may suggest the beginning of an atherogenic process due to the development of obesity, once the cytokine has angiogenic properties.
Conclusion: The serum concentration of cytokines in acute response to the exercise in obese animals presents a behavior similar to the control animals, regardless of the type of exercise, with the exception of IL-8.

PO1.049

Shortening the biliopancreatic limb length could prevent undernutrition risk while maintaining glucose homeostasis improvement: demonstration in a rat model of one anastomosis gastric bypass

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Introduction: The one anastomosis gastric bypass (OAGB) is associated with similar metabolic improvements and weight loss than the Roux-en-Y gastric bypass. However, this bariatric procedure is still controversial; suspected to result in undernutrition and at potential risks of biliary reflux leading possibly to esophageal or gastric cancer. Reducing the size of the biliopancreatic limb in this surgery could be essential to maintain positive outcomes and prevent side effects.
Methods: Wistar rats were operated on OAGB with a short (15cm OAGB-15, n = 13) or a long (35cm OAGB-35, n = 13) biliopancreatic limb or sham surgery (n = 8). Body weight and food intake were monitored weekly over 30 weeks and rats underwent oral glucose and insulin tolerance tests after 10 and 28 weeks. Macronutrient absorption was determined by fecal analyses. After sacrifice, histology was performed on formalin-fixed esophagus and gastro-jejunal anastomosis. Statistical analyses used non-parametric ANOVA tests
Results: Compared with sham rats, OAGB-15 and OAGB-35 rats reduced their food intake but only during the first 4 weeks. Fecal losses of calories

were greater after MGB-35 than after MGB-15 or sham surgery but malabsorption tend to decrease overtime. Consequently, OAGB-35 rats displayed a significant reduced weight over 30 weeks whereas OAGB-15 rats cached up sham weight after 12 weeks. All OAGB-operated rats displayed an improved glucose tolerance and better insulin sensitivity compared to sham rats, these effects were independent of rat weight and maintained after 28 weeks.
Conclusion: In rats, a long biliopancreatic limb led to a major nutrient malabsorption. However glucose homeostasis was similarly improved in OAGB-15 and OAGB-35 rats suggesting that shorting the biliopancreatic limb can improve metabolic parameters without major influence on weight. The impact of biliopancreatic limb length on esophageal or gastric lesion in the long term is currently under investigation and will also be presented.

Conflict of Interest: None Disclosed.

Funding: This work was supported by Inserm and University Paris Diderot. MS and LRP received fundings from Fondation pour la Recherche Médicale, MS received a prize from Association Francaise de Chirurgie. MLG received funding from Société Francophone du Diabète, SFNEP and Institut Benjamin Delessert.

PO1.050

Effects of obesity and weight loss on microRNA expression in the human colorectal mucosa

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Background: Colorectal cancer (CRC) is the 3rd most common cancer worldwide (1). Obesity, and its lifestyle determinants, physical inactivity and poor diet, increase CRC risk (2). However, the effects of weight loss by bariatric surgery on CRC risk are unclear. Epigenetic mechanisms involving microRNAs that lead to dysregulated gene expression may mediate the effects of obesity and weight loss on CRC risk (3-5). We hypothesised that microRNAs are i) aberrantly expressed in obese individuals compared with healthy non-obese individuals and ii) modulated by significant weight loss following bariatric surgery.
Methods: Obese patients listed for bariatric surgery and age- and sex-matched healthy non-obese adults (Controls) were recruited at North Tyneside General Hospital. Rectal mucosal biopsies were collected at baseline and six months post-surgery from obese participants and at baseline only from Controls. Next Generation Sequencing, quantitative PCR and bioinformatics analysis were used to quantify microRNA expression in colorectal mucosal biopsies.
Results: Data were available for 20 control participants and for 22 obese participants with matched pre- and post-surgery samples. Compared with non-obese individuals, obese individuals showed differential expression of 112 microRNAs ($p< 0.05$). Weight loss, (mean 28.5kg) following Roux-en-Y gastric bypass, resulted in differential expression of 60 microRNAs, when compared to the expression levels at baseline ($p< 0.05$). A total of 36 identical microRNAs differed significantly in both i) the obese with non-obese and ii) the pre- and post-surgery comparisons. These differentially expressed microRNAs are implicated in pathways linked with inflammation, obesity and cancer. A total of 1654 microRNAs were identified when comparing the Control and the post-surgery group and there were no significant differences in expression levels between the two groups.
Conclusion: The pattern of microRNA expression in macroscopically-normal human colorectal mucosa differed substantially between obese and non-obese individuals. However, six months after Roux-en-Y gastric bypass, the pattern of microRNA expression was similar to that in non-obese Controls. This suggests that surgically-induced weight loss may normalise microRNA expression and so reduce CRC risk.

Conflict of Interest: No conflict of interest.

Funding: This work was supported by the Newcastle University Centre for Ageing and Vitality (supported by the Biotechnology and Biological Sciences Research Council and Medical Research Council L016354), UK NIHR Biomedical Research Centre for Ageing and Age-related disease award to the Newcastle upon Tyne Hospitals NHS Foundation Trust and by Northumbria Healthcare NHS Foundation Trust.

PO1.051

The influence of fucoidan on triglyceride digestion in duodenum

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Introduction: Obesity in countries with different economic capabilities has status of chronic pandemic disease. It is influenced by inappropriate eating behaviour and food rich in lipids. In some countries it is a popular recommendation to use inhibitors of pancreatic lipase to reduce triglyceride (TG) absorption. It must be noted, that designing and developing effective natural forms with multitarget healing properties becomes very popular in Europe, therefore it's important to find and test the most physiological agent for this goal. Our research aim was to study fucoidan effect on lipid digestion in intestines.
Methods: Fucoidan is a sulphated polysaccharide, which was isolated from brown algae – Fucus vesiculosus collected in Jurmala, Latvia. It was purified by dialysis membranes with specific molecular weight cut and the structure was confirmed using spectrometer test. It contained 21% of sulphate group and 7% of admixture of hexose sugars. The influence of fucoidan on pancreatic lipase was detected by the hydrolysis of TG in 3.5% milk to free fatty acids in physiological conditions (with bile, pH 7.5) in doses from 1.0ml to 3.0ml, measured by commonly used 0,1N NaOH titration method.
Results: Fucoidan in doses 1.0ml, 2.0ml and 3.0ml in physiologic conditions showed inhibitory effect on pancreatic lipase for 13.3%, 11.3% and 6% respectively. In test without bile, with extract dose of 3ml, inhibitory effect was obvious – 30.7%.
Conclusion: The obtained data show, that fucoidan, by promoting excretion of indigested lipids in stool, could be used in perspective for obesity correction. Extract which is prepared from domestic raw is economically cost effective. Using the experience of previous studies it was proven, that fucoidan activate salivary amylase (detected by hydrolysing starch), and pepsin (detected by hydrolysing casein), therefore assisting the digestion of other nutrition elements can minimize the loss of energetic sources.
Acknowledgment: COST CA 15135 MuTaLig programme.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.052

Ghrelin inhibits apoptosis, autophagy and pyroptosis in human hepatocytes: role in obesity-associated NAFLD

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Introduction: Obesity is related to elevated circulating concentrations of TNF-α, a proinflammatory cytokine that promotes hepatocyte cell death. We sought to investigate the potential beneficial effects of acylated and desacyl ghrelin in the progression of nonalcoholic fatty liver disease (NAFLD) to nonalcoholic steatohepatitis in obesity through the suppression of TNF-α-induced hepatocyte cell death.
Methods: Plasma ghrelin isoforms and TNF-α were determined in 158 individuals, and hepatocyte cell death was assessed in liver biopsies from 76 patients with morbid obesity undergoing bariatric surgery with available liver echography and pathology analysis. The effect of acylated and desacyl ghrelin on basal and TNF-α-induced apoptosis, autophagic cell death and pyroptosis was evaluated in vitro in human HepG2 hepatocyte cell line.
Results: Plasma TNF-α and the acylated/desacyl ghrelin ratio were augmented, whereas desacyl ghrelin levels were diminished in obese patients with NAFLD. Obese patients with type 2 diabetes exhibited an upregulation of hepatic MBOAT4 mRNA as well as greater hepatic apoptosis, pyroptosis, and defective autophagy. Six months after bariatric surgery, lower acylated/desacyl ghrelin levels and improved hepatic function were observed. In HepG2 hepatocytes, acylated and desacyl ghrelin treatment suppressed TNF-α-induced apoptosis, shown by lower caspase-8 and caspase-3 cleavage as well as TUNEL-positive cells, and pyroptosis, evidenced by reduced caspase-1 activation and high-mobility group box 1 expression. Moreover, acylated ghrelin inhibited TNF-α-activated hepatocyte autophagy, revealed by a decreased LC3B-II/I ratio and higher p62 accumulation via AMPK/mTOR.
Conclusion: Ghrelin constitutes a protective factor against hepatocyte cell death. The increased acylated/desacyl ghrelin ratio in obese patients with NAFLD might represent a compensatory mechanism to overcome TNF-α-induced hepatocyte apoptosis, autophagy and pyroptosis.

Conflict of Interest: None.

Funding: Supported by FIS-FEDER (PI16/00221 and PI16/01217) from the Instituto de Salud Carlos III and MINECO-FEDER (BFU-2015-70454-REDT and BFU2016-76711-R). CIBEROBN is an initiative of the Instituto de Salud Carlos III, Spain.

PO1.053

The effect of Juçara (*Euterpe edulis* Mart) pulp supplementation in different concentrations on inflammatory profile and intestinal permeability in the colon of obese mice

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Introduction: Obesity is a worldwide public health problem mainly caused by the consumption of a hyperlipidic and hypercaloric diet, that increases intestinal permeability, leading to metabolic endotoxemia generated by lipopolysaccharide (LPS) translocation. LPS is a toll-like receptor-4 (TLR4) ligand which activate the NFκB pathway and induce the transcription of inflammatory cytokines and, consequently, promotes an increase in systemic low-grade inflammation and metabolic diseases. Healthy eating and inclusion of foods rich in polyphenols can prevent and aid in the treatment of obesity and its complications. Juçara, fruit from the Atlantic forest, is very similar to the açaí (Amazon region), which has high levels of bioactive compounds.
Methods: The 60 days-old male Swiss mice were randomized in 4 groups: Control diet (AIN-93) (C); hyperlipidic and hypercaloric diet (modified AIN-93) (HC); hyperlipidic and hypercaloric diet plus 0,5% of juçara (HJ0,5%) and hyperlipidic and hypercaloric diet plus 2% of juçara (HJ2%). Diet and water were provided ad libitum. Treatments carried on for a total period of 16 weeks. After euthanasia serum was analyzed for LPS levels and colon was collected for analyses of inflammatory cytokines by ELISA. Inflammatory pathway and proteins of gut permeability were analysed by Western blotting. Statistical analysis was performed by one way analysis of variance (ANOVA) followed by Tukey post hoc test. The level of significance was $p \leq 0.05$.
Results: Hyperlipidic and hypercaloric diet promoted an increase in serum LPS compared with control animals, however, supplementation with Juçara did not show difference in obese animals. Proinflammatory cytokines and TLR-4 were significantly lower in the colon of the HJ0.5% and HJ2% as compared to HC animals. Claudin and occludin did not present statistically significant differences among groups.
Conclusion: Juçara was able to reduce the concentration of proinflammatory cytokines in the colon of obese animals compared to obese animals that did not consume the fruit.

Conflict of Interest: None Disclosed.

Funding: Supported by Fundação de Amparo a Pesquisa do Estado de São Paulo (FAPESP 2017/19508-7), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and Conselho Nacional do Desenvolvimento Científico e Tecnológico (CNPq).

PO1.054

Gastrointestinal physiology in obesity

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Introduction: Over the years, obesity has become a major public health concern as its prevalence has more than doubled. Nowadays, more than 1.9 billion adults are overweight, defined as a body mass index (BMI) >25 kg/m^2, and more than 600 million are obese, defined as BMI >30 kg/m^2 (1). With respect to the development of obesity, the gastrointestinal tract plays a crucial role as it controls food consumption, digestion and absorption of nutrients. Nonetheless, the physiology of the gastrointestinal tract have been observed to differ in patients with obesity (2). However, findings remain contradictory due to differences in study design, study methods and study population. Therefore, the gastrointestinal physiology was investigated in normal weight (NW) and obese (OB) subjects.
Methods: Gastrointestinal motility and pH were investigated in age and gender matched NW and OB subjects. After an overnight fast of 12 hours, subjects were asked to swallow a calibrated telemetric capsule, SmartPill©, with 150 mL water. Subjects remained fasted for an additional 4.5 hours, after which they resumed normal habits.
Results: Five subjects with obesity (BMI: 41.4 ± 4.0 kg/m^2; Age: 27.6 ± 1.9) and five age and gender matched subjects with normal weight (BMI: 21.5 ± 1.8 kg/m^2; Age: 22.0 ± 0.7) were studied. No significant differences were observed in gastric empting time (NW: 42.6 ± 55.6 min; OB: 43.6 ± 42.6 min; P = 0.97), small bowel transit time (NW: 253.2 ± 28.4 min; OB: 210.4 ± 41.3 min; P = 0.07), colonic transit time (NW: 1422.0 ± 858.4 min; OB: 876.6 ± 366.9 min; P = 0.26) and whole gut transit time (NW: 1720.0 ± 845.8 min; OB: 1129.0 ± 349.3 min; P = 0.24). For the gastrointestinal pH, a significant difference was observed in the pH of the small bowel (NW: 7.3 ± 0.1; OB: 6.5 ± 0.4; P = 0.01), but no differences were observed in the pH profile of the stomach (NW: 2.6 ± 2.3; OB: 1.0 ± 0.3; P = 0.18) or the colon (NW: 6.6 ± 0.5; OB: 6.8 ± 0.8; P = 0.64).

Conclusion: Based on the limited sample size, our results indicate that there is no difference in gastrointestinal motility, reflected by the gastrointestinal transit times, between NW and OB subjects. However, the pH profile of the small intestine differs between NW and OB subjects, which has been, to the best of our knowledge, investigated for the first time.

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Conflict of Interest: No conflict of interest.

Funding: Research relating to this abstract was funded by KU Leuven.

PO1.055

Involvement of intestinal exosomes in the regulation of different pathways and target genes

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Introduction: The gut communicates with other organs through a number of gut-derived molecules, such as different hormones and lipid molecules. But intestinal epithelial cells also release membrane vesicles (exosomes) into the extracellular environment, which transfer molecules to neighboring or distant cells. These exosomes have been implicated as mediators in cell-cell communications to modulate physiological and pathological procedures. The aim of this study was to investigate the possible pathways and target genes of the miRNA that contain the intestinal exosomes from morbidly obese subjects.
Methods: In this preliminary study, intestinal exosomes were isolated from plasma of 5 morbidly obese subjects. Total exosomes were isolated by ultracentrifugation and after, intestinal exosomes were isolated with Dynabeads®. miRNAs of these intestinal exosomes were isolated and analyzed by NGS and the miRNA Enrichment Analysis and Annotation Tool (miEAA).
Results: For this study, we selected the 20 miRNAs with higher copy number. Those miRNAs revealed that these miRNAs have a prominent role in the pathways involved in the regulation of p53, cell cycle, cancer, EGF and FGF receptor signaling, leptin signaling, apoptosis, DNA damage response, metabolic pathways, Jak STAT signaling and insulin signaling. Those miRNAs had mainly the following genes as targets: BCL2, FNDC3B, AGO2, MYC, NDE1, SCD, WNK1 and YWHAZ. Those miRNAs mainly affect to liver, lung, bodily secretions and T-lymphocytes. The main Gene Ontology (GO) annotations involved were those related to cell cycle checkpoint, mitotic cell cycle, toll like receptor signaling pathways, myd88 signaling pathway, regulation of transcription DNA dependent, signal transduction, transcription factor binding, regulation of cell proliferation, insulin receptor signaling pathway, protein ubiquitination, protein kinase binding, regulation of apoptotic process and protein heterodimerization activity.
Conclusion: Intestinal exosomes seem to be involved in the regulation of processes related to cancer, regulation of DNA and cell cycle, and insulin signaling.

Conflict of Interest: None Disclosed.

Funding: This work was supported in part by a grant from the Instituto de Salud Carlos III (PI15-01845) (Spain) ("A way to make Europe"). This study has been co-funded by FEDER funds.

PO1.056

A lower level of duodenal chemokines is associated with an increase of insulin resistance in subjects with morbid obesity

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Introduction: The intestinal immune response could play an important role in obesity-related comorbidities. We aim to study the profile of duodenal chemokines of morbidly obese subjects (MO), its relation with insulin resistance (IR) and the intake of metformin, and with the evolution of MO after sleeve gastrectomy (SG).
Methods: Duodenal levels of 9 chemokines were analyzed in 14 non-obese and in 54 MO who underwent SG: with lower IR (MO-lower-IR), with higher IR (MO-higher-IR), and with type 2 diabetes treated with metformin (MO-metf-T2DM).
Results: MO-lower-IR had significantly higher levels of chemokines involved in the recruitment of macrophages and T-lymphocytes, and total (CD68 expression) and M1 macrophages (ITGAX expression) when compared with non-obese subjects, but with a decrease in M2 macrophages (MRC1 expression). In MO-higher-IR, the levels of these chemokines decreased and were similar to those found in non-obese subjects. In MO-higher-IR and MO-metf-T2DM, there was a decrease of CD68 expression while ITGAX and MRC1 were similar with regard to MO-lower-IR. Moreover, we found an association between CXCL8 and the evolution of body mass index after SG.
Conclusion: There is an association between a lower level of duodenal chemokines and an increase in IR in MO. The duodenal immune response may be an efficient protective mechanism against luminal changes.

Conflict of Interest: None Disclosed.

Funding: This work was supported in part by a grant from the Instituto de Salud Carlos III (PI12/00338) (Spain) ("A way to make Europe"). This study has been co-funded by FEDER funds.

PO1.057

Jejunal leptin expression and its association with the improvement of BMI and HOMA-IR after bariatric surgery

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Introduction: Several studies have shown that leptin is also produced by the gastrointestinal tract. Obesity and insulin resistance are commonly accompanied with elevated circulating leptin levels but until today, it is unknown if leptin expression in small intestine is altered in these states. The aim of this study is to evaluate the expression of jejunal leptin in morbidly obese subjects in insulin resistance states and the effect of metformin in its expression. Also, the association between jejunal leptin expression levels and the evolution of morbidly obese patients after bariatric surgery is analysed.
Material and Methods: The study was undertaken in 40 morbidly obese subjects who underwent a Roux-en-Y gastric bypass (RYGB). Patients were classified in subjects with low homeostasis model assessment of insulin resistance (HOMA-IR) value (MO-low-IR), subjects with high HOMA-IR (MO-high-IR) (both groups without treatment for T2D) and subjects with T2D who were only receiving metformin treatment (MO-metf-T2D). Patients were studied at baseline and 1, 3, 6 and 12 months after RYGB. During RYGB, jejunal biopsy samples were obtained to evaluate leptin mRNA expression levels.
Results: Leptin mRNA expression levels were significantly higher in MO-low-IR subjects than in MO-high-IR and MO-metf-T2D ($p = 0.001$ and $p = 0.003$ respectively). After adjusting by BMI at baseline, leptin mRNA expression levels correlated negatively with the improvement of BMI at 3 and 6 months after RYGB ($r = -0.449$; $p = 0.036$ and $r = -0.433$; $p = 0.035$ respectively), and with the improvement of HOMA-IR at 3 months after RYGB ($r = -0.665$; $p = 0.002$). To strengthen the independence of these associations as predictors of improvement of BMI and HOMA-IR after RYGB, multiple regression analysis models were constructed. After adjusting by age, sex and BMI at baseline, the improvement of BMI at 3 and 6 months after RYGB was associated to leptin mRNA expression levels ($p = 0.002$; $\beta = -0.787$; $R^2 = 0.434$; $p = 0.049$; $\beta = -0.420$; $R^2 = 0.386$ respectively). The improvement of HOMA-IR at 1 and 3 months after RYGB was associated to leptin mRNA expression levels ($p = 0.004$; $\beta = -0.879$; $R^2 = 0.458$; $p = 0.002$; $\beta = -0.749$; $R^2 = 0.565$, respectively). No other significant associations were found.
Conclusion: Jejunal leptin mRNA expression is increased in MO-low-IR patients compared with MO-high-IR and MO-T2D-metf. A lower jejunal leptin expression is associated with a better evolution of insulin resistance and a great reduction of BMI after RYGB.

Conflict of Interest: None Disclosed.

Funding: This study has been co-funded by FEDER funds and supported in part by a grant from the ISCIII (PI15-01845) ("A way to make Europe"), Ministerio de Economía y Competitividad (FJCI-2015-24543) and Consejería de Salud de la Junta de Andalucía (PI-0334-2016).

PO1.058

Expression profile of adiponectin in obese pakistani youth

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Obesity in adolescents and young adults has increased significantly in recent years resulting in the development of chronic diseases. Obesity induces adipocyte dysfunction, secretion of adipokines and activation of macrophages leading to inflammatory cytokine production.
The aim of the present study was to investigate the Adiponectin gene expression in young subjects of different BMI groups. Study subjects included 300 over weight, obese males and females with an age ranging from 17 to 30 years. 100 Comparable control subjects with normal BMI were included. The data was stratified into normal-weight, overweight, Obese I and obese II groups. Anthropometric parameters including age, BMI, waist circumference, WHR, systolic and diastolic blood pressure were assessed. The metabolic and inflammatory parameters including glucose, Insulin, Lipid profile, Leptin, Adiponectin, Resistin, C-reactive protein and interleukin-6 in serum were measured by chemistry analyzer and ELISA. RNA extraction was done by TRIZOL method and cDNA synthesis was done by using cDNA synthesis kit. The expression of target gene was compared with GAPDH on Real time PCR using gene specific primers. Serum levels of insulin, leptin, resistin, CRP, IL-6 were significantly higher in overweight and obese subjects as compared to control subjects ($p<0.01$). Adiponectin was significantly low in obese groups ($p<0.01$). In correlation analysis, Adiponectin showed a significant inverse relationship with BMI, WC ($r = -0.262$, $p<0.008$),($r = -0.310$,$p<0.002$)$p<0.01$ and with WHR ($r = -0.199$,$p = 0.046$) $p<0.05$ respectively. Adiponectin was significantly correlated with fasting insulin($r = -0.282$, $p = 0.004$) $p<0.01$ in obese group. The expression of adiponectin gene was significantly influenced by obesity.

PO1.060

The effect of macronutrient composition on adipose tissue inflammation and -metabolism in a murine model of diet-induced obesity

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Introduction: Upon obesity, both the AT-mass and the amount of pro-inflammatory cells in AT increase, resulting in an increased adipokine secretion and a pro-inflammatory state. Furthermore, a western diet (WD) modulates the gut microbiome which increases intestinal permeability. This facilitates the translocation of endotoxins and even entire bacteria into the blood stream, further contributing to this pro-inflammatory state. Even though it is evident a WD, high in fat and carbohydrates (CHO), can cause this inflammation, it is still unclear which macronutrient, fat or CHO, plays the most important role. Therefore, we are currently investigating the effect of different CHO-types on immunometabolism.
Materials and Methods: 10-week-old wild-type, male C57BL/6JRj mice were kept on a diet high in sucrose (HCD), high in saturated fat (HFD), a WD or a control diet (SFD) for 15 weeks. Body weight and food intake were monitored weekly and after 15 weeks the AT-inflammation and –metabolism were analyzed. Male, NUDE, 5-week-old mice were kept on a HCD, a HFD or a WD for 5 weeks after injection with 3T3-F442A cells. Hereafter, de novo formed fat pads were analyzed. To differentiate within CHO, the C57BL/6 model was used, with different diets: a HCD, a high-fructose diet (HFRD), a high-sucrose-high-fructose (HCFD) diet, a high-starch diet (HSTD) and the WD.
Results: mice kept on HCD had significantly lower body weights, AT-masses and smaller adipocytes as compared to both mice on WD and on HFD. An insulin tolerance test revealed less insulin-resistance in HCD-mice as compared to both WD- and SFD-mice. Expression analysis

of immune cell markers (F4/80, CD3, CD4, CD8, MCP-1) showed less inflammation in mesenteric AT of HCD-mice.
De novo formed fat pad vascularization was significantly higher in the WD than in the HCD or HFD.
Body weight of HCD-mice again was significantly lower than that of WD-mice. The HSTD induced an even lower body weight. Both a HFRD and a HCFD induced a very similar body weight, higher than a HCD and a HSTD, but lower than a WD.
Conclusion: In contrast to a WD, a HCD did not induce obesity, AT-inflammation or an impaired metabolic profile. Additionally, short-term exposure to a WD induced more vascularization as compared to a HCD or HFD, indicating that processes for efficient AT-expansion are already initiated. Finally, when differentiating between CHO-types, a HSTD induced a lower body weight than a HCD and both a HFRD and a HCFD induced a higher body weight than a HCD suggesting that different CHO-types have different effects on obesity-development. Analyses for the effect of different CHO-types on immunometabolism are still ongoing.

Conflict of Interest: The authors declare no conflict of interest.

Funding: internal source.

PO1.061

Effect of zinc deficiency on adipose tissue development and behavior in high-fat fed mice

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Introduction: Modern western diets are characterized by being rich in saturated fats, which is a clear risk factor for obesity and also restrictive with respect to the supply of micronutrients such as zinc. Moreover, mutual interaction between zinc deficiency and obesity has been proven1. Numerous animal and human studies led to the conclusion that in the case of dietary zinc insufficiency, individuals are more prone to show behavioral alterations2.The current study was designed to investigate the role of zinc in a high-fat-diet-induced obesity and adipose tissue hypertrophy in mice and evaluate to what extent this might be linked to behavioral disturbances.
Methods: In vivo studies were performed with 8-week-old mice fed with either standard diet (SD); high-fat diet (HFD); or zinc-deficient high-fat diet (HFD-ZD) for another 8 weeks. Serum samples from animals were analyzed for total zinc and leptin levels. In addition, adipose tissues were evaluated for total weight as well as adipocyte size and cell numbers. Behavioral tests including elevated plus maze, suspension tail, forced swimming and splash test were done at the end of the feeding period in order to evaluate anxiety-related behaviors and depression-related behaviors.
Results: HFD-induced obesity could be verified by changes in animal weight, macrophage infiltration and adipose tissue parameters. Here the increase in leptin levels was proportional to the increase in adipose tissue mass in HFD mice. With respect to zinc deprivation, the most interesting aspect was that animals on HFD-ZD showed a significant decrease in adipocyte volume compared to HFD. Regarding to the behavioral tests, the SD and HFD fed animals showed no statistically significant difference. However, the animals under HFD-ZD conditions showed abnormalities when monitored for grooming behavior in splash test.
Conclusion: Taken together, by proving alterations in adipose tissue weight, leptin levels, hypertrophy and expansion of white adipose tissue as well as macrophage infiltration data demonstrate obesity in mice fed with a high-fat diet. In addition, these data suggest that, at least in mice, obesity in combination with zinc deficiency to a certain extent decelerates impulses for self-care and motivational conduct. Fairly long-term, those effects can lead to the development persistent in neurobehavioral disorders of relevance for humans as well.

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Conflict of Interest: None Disclosed.

Funding: This study was supported by grants from CAPES 15/2017, CAPES-DS and FAPESC nº 3655/2013.

PO1.062

Identification of cell surface markers on human adipose tissue macrophages

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Introduction: During development of obesity, macrophages (Mϕs) infiltrate the adipose tissue (AT) where they are thought to undergo polarization from an anti-inflammatory M2 into a pro-inflammatory M1 state [1]. Previously, we have defined M1 and M2 macrophages in AT from obese individuals and have shown that the ratio between M1 and M2 macrophages correlates with HOMA-IR. However, in recent years the concept of dividing adipose tissue macrophages (ATMs) into the classical pro-inflammatory M1- and anti-inflammatory M2 has been challenged. Recent papers describe distinct macrophage subtypes related to inflammation, metabolic dysfunction and insulin resistance in adipose tissue [2],[3]. These macrophages secrete pro-inflammatory cytokines similar to classical M1 macrophages, but they display surface markers not usually found on M1 macrophages.
Method: We aimed to identify possible novel subtypes of macrophages in human adipose tissue using the kit LEGENDScreen™ from BioLegend. This flow cytometry based method allows screening for 361 cell surface markers. The stromal vascular fraction (SVF) obtained from subcutaneous adipose tissue was pre-stained with a backbone antibody panel prior to the LEGENDScreen™ staining. The pre-staining allows for gating on the ATMs to be able to investigate which surface markers they express.
Results: We were able to identify cell surface markers expressed on ATMs from human subcutaneous adipose tissue and these data will be presented at the conference. The cell surface markers might be distinct for macrophages found in adipose tissue and might be important for development of obesity-associated adipose tissue inflammation. Additionally, they could also be important for development of insulin resistance.
Conclusion: We identified cell surface markers expressed on macrophages from human subcutaneous adipose tissue. These cell surface markers might define distinct subtypes of adipose tissue macrophages. Further work is necessary to investigate if these subtypes of macrophages could be involved in development of obesity-associated AT inflammation or insulin resistance.

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Conflict of Interest: None.

Funding: Research relating to this abstract was funded by Norwegian Health Authorities (Helse-Vest RHF).

PO1.063

Amino acid profiles in a pediatric Caucasian cohort of morbidly obese children and adolescents with non-alcoholic fatty liver disease

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Introduction: Elevated circulating levels of branched chain amino acids (BCAAs; valine, leucine and isoleucine) are known to be related to the risk to develop insulin resistance in children and adolescents as well as to progression of non-alcoholic fatty liver disease (NAFLD) in adult patients. Moreover, altered amino acid profiles independent of obesity and insulin resistance were recently found in American children and adolescents of mixed ethnicity with NAFLD. Aim of this study was to evaluate amino acid profiles and correlations to liver fat content and cardiometabolic markers in a Caucasian cohort of morbidly obese children and adolescents.
Methods: From a morbidly obese population aged 9 to 19 years (n = 60), clinically thoroughly characterized including magnetic resonance imaging to quantify liver fat content, plasma amino acid concentrations were measured by high-performance liquid chromatography-coupled tandem mass spectrometry.
Results: In children and adolescents with NAFLD significantly higher levels of plasma BCAAs and tryptophan and lower levels of serine were determined. BCAAs correlated positively with triglycerides and negatively with high density lipoprotein cholesterol as cardiometabolic biomarkers. Also insulin resistance as assessed by HOMA-IR correlated with BCAAs, especially leucine, tryptophan and negatively with serine.
Conclusion: Elevated circulating BCAAs and tryptophan are associated with NAFLD also in morbidly obese Caucasian children and adolescents. BCAAs could be an important link between obesity, NAFLD and other metabolic pathways involved in lipid and glucose metabolism and may act as important biomarkers for cardiometabolic risk.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the "FH Kids" project (to Susanne Greber-Platzer).

PO1.064

Characteristics of the renin-angiotensin-aldosterone system in carriers of polymorphic variants of the VDR gene with arterial hypertension and obesity

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Background: Identifying genetic markers of predisposition to hypertensive disease was mainly limited to the study of the genes of the renin-angiotensin-aldosterone (RAAS) cascade responsible for maintaining long-term blood pressure. It is established that the VDR gene encodes an intracellular receptor that is able, in particular, to bind the active forms of vitamin D, indirectly affecting the levels of systolic and diastolic pressure.
Aim: to study the renin-angiotensin-aldosterone-system (RAAS) in patients with polymorphic variants of the vitamin D receptor gene (VDR), arterial hypertension (AH) and obesity.
Materials and Methods: We included in this study 98 patients with stage II-III AH and obesity (33 men, 65 women, mean age 61.1±9.9 years and BMI 43.3±5.0 kg/m^2). The VDR gene study included genotypes TaqI, BsmI, FokI. After identification of TaqI, BsmI, FokI VDR gene sites we carried out measurements of levels of RAAS markers. The content of renin, aldosterone, angiotensin II was determined by enzyme immunoassay.
Results: Renin is the initiator of the launch and conversion of angiotensin II, and then aldosterone, the results obtained in patients with hypertension and obesity are of fundamental importance in order to distinguish this group for carrying out targeted pharmacotherapy with the use of drugs that inhibit this hormone. In addition, clinical observations suggest that the T / T genotype carriage of the TakI VDR genotype was observed in patients with a BMI> 35.0 kg/m^2, which seems to be a consequence of the formation of their cardio-metabolic syndrome. We revealed an associative relationship between the presence of allele G of the BsmI site, C/C homozygosity of FokI site of VDR gene and presence of AH in patients with obesity. An increase of renin level was noted only in the homozygous T/T genotype of FokI, no differences in the concentration of aldosterone and angiotensin were detected between any of the studied genotypes.
Conclusion: Polymorphic alleles and genotypes of the VDR gene can be used as predictors of AH development in obese patients with subsequent characterization of the state of the RAAS system.

PO1.065

LatchOn: a protocol for a multi-centre, randomised controlled trial of perinatal support to improve breastfeeding outcomes in women with overweight and obesity

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Introduction: Breastfeeding rates in Ireland are among the lowest worldwide. At hospital discharge, 58% of infants are breastfed, with only 48% exclusively breastfed. At 3 months of age, 35% are fed any breastmilk. Women with a high BMI are at increased risk of poorer breastfeeding practices, with lower initiation rates and duration of breastfeeding observed in this population. This is a particular concern in Ireland, given than 50% of women have a BMI of >25 kg/m^2 at their first antenatal appointment.
Methods: This is a protocol for a multi-centre, randomised controlled trial of perinatal breastfeeding support among women with a BMI >25 kg/m^2, using a previously-tested, multi-component intervention. The primary outcome is any breastfeeding at 3 months. Primiparous women attending the study site hospitals with a singleton pregnancy and BMI >25 kg/m^2 will be invited to participate. The intervention will target mothers and their support partners and spans the perinatal period from late pregnancy to six weeks postpartum. Intervention components include group antenatal education for prospective mothers and their support partners, individual education in the immediate postnatal period, professional support to six weeks postpartum and weekly phone calls in the postpartum period from an International Board Certified Lactation Consultant. The intervention will target attitudes toward breastfeeding, breastfeeding self-efficacy, and subjective norms around infant feeding with the aim to normalise the behaviour. Hospital discharge data, validated questionnaires and qualitative interviews will be used to measure outcomes and intervention effectiveness. Ethical approval has been sought and we aim to start recruitment in February 2019.
Results: We anticipate that the intervention will be well-accepted and feasible to carry out within an Irish cohort based on results from the pilot trial among 100 women. Furthermore, essential formative qualitative work has been conducted to inform the intervention design and to ensure that it is contextually appropriate. Three stakeholders groups were included: mothers with a BMI >25 kg/m^2, partners and healthcare professionals.
Conclusion: The proposed intervention will be invaluable to policymakers as it will provide insights into what specific interventions (e.g. antenatal group education, antenatal individual education, postpar-

tum support) are effective in improving breastfeeding rates for women with a raised BMI and will highlight the measures that would be most cost-effective to implement nationally.

PO1.066

Pediatric obesity and autism

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Background: One-third of children and adolescents in the United States are either overweight or obese. The prevalence of obesity in children with neurodevelopmental conditions, including autism spectrum disorder (ASD), is higher than its prevalence in normal children. A wide range of additional risk factors for unhealthy weight gain in this population contribute to this finding such as limited physical activity, medications, food selectivity, behavioral problems, genetic predisposition, and co-occurring medical conditions.
This study aims to determine the prevalence of obesity with special consideration to severe obesity in a sample of children with ASD.
Method: A retrospective chart review of 500 children age 2-18 years with a diagnosis of ASD was conducted at the University of Texas at Houston's Autism Center. Analysis of the demographic characteristics and anthropometric measurements of the children was done. Body Mass Index (BMI) percentiles were calculated; Centers for disease control and prevention criteria for BMI for gender and age were used to define obesity and severe obesity (≥ 95th and ≥ 99th percentiles, respectively). Data from 2015-2016 NHANES was used for comparison. Associations between obese status and participant characteristics; age, gender and ethnicity/race were estimated using logistic regression analysis.
Results: The mean age of the children was 58.8±27.6 months; 75.7% were males. The prevalence estimate of obesity was 19.9%, including 12.7% with severe obesity in comparison to 18.5% for obesity and 5.6% for severe obesity among children in the general population from NHANES. While the prevalence of obesity in our sample was comparable to its prevalence in general population, severe obesity prevalence was significantly higher (P<.001). By Race/ethnicity, higher odds of obesity were found among Hispanic population (OR = 2.44, p = .003, 95% CI: 1.36- 3.37). Also, we found higher odds of obesity in older children (>6 years) (OR 1.98, P = .005, 95% CI: 1.22-3.22).
Conclusion: There is a high prevalence of obesity and severe obesity in children with ASD. Prevalence is higher among older age group and Hispanic ethnicity. Further assessment of the contributing factors is needed for establishing prevention programs targeting the unhealthy weight problem in this population.

PO1.067

A Body Shape Index (ABSI) is an independent predictor of cardiovascular risk factors in obese children

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Introduction: A Body Shape Index[1] (ABSI), Triponderal Mass Index[2] (TMI) and Fat Mass Index[3] (FMI) have been recently associated with cardiovascular risk in adults. A cross-sectional study was conducted to evaluate the relationship between ABSI, TMI and FMI and cardiometabolic risk in Caucasian obese children and adolescents aged ≥ 8 years.
Methods: Consecutive obese children (according to World Health Organization) presenting to the Paediatrics Clinic at San Paolo Hospital in Milan Italy have been enrolled. Anthropometric parameters, body composition (by bioelectrical impedance, TANITA) and blood pressure have been measured. Fasting blood samples have been analysed for lipids, insulin, glucose and transaminase levels. A multivariate logistic regression analyses with body mass index (BMI) and ABSI z-scores, TMI and FMI as predictors to examine the association with above-threshold cardiometabolic risk markers [systolic and diastolic hypertension, Homeostatic Model of Assessment-Insulin Resistance (HOMA-IR) ≥95° percentile, hypertriglyceridemia, triglycerides/high density lipoprotein cholesterol (TG/HDL) ratio ≥2.2, altered alanine aminotransferase level (ALT)] and obesity-related conditions (metabolic syndrome according to international Diabetes Federation criteria) have been performed.
Results: Two hundred and two (89 boys and 113 girls) obese children, mean (SD) age 10.8 (1.8) years, have been evaluated.
In multivariate logistic regression analysis, ABSI z-score was significantly and independently related to 5 out of 7 cardiovascular risk factors; TMI and FMI to 2, and BMI z-score to only 1. Higher ABSI z-score predicted hypertriglyceridemia (OR, 95% CI: 1.58, 1.17-2.13), TG/HDL ratio ≥2.2 (1.48, 1.11-1.97), HOMA-IR ≥95° percentile (1.53, 1.12-2.08), altered ALT level (1.64, 1.13-2.36) and metabolic syndrome (2.2, 1.35-3.57).
Conclusion: In obese children, ABSI is an anthropometric index independently associated with cardio-metabolic risk markers linked to glucose metabolism and blood lipid profile. TMI and FMI were independent predictors of hypertension. In conclusion, ABSI could be evaluated, in addition to BMI, for assessing the cardiometabolic risk in the clinical management of obese children.

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Conflict of Interest: None declared.

Funding: No funding.

PO1.068

Does a high birth weight have a lasting impact on early childhood child body composition? Findings from the ROLO Kids Study

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Introduction: The environment during pregnancy and early fetal development is vital for child health and research indicates that weight at birth can have an important impact on an individual's health later in life. With rates of childhood obesity estimated to be as high as 21% in some European countries, it is vital that early risk factors are identified so that interventions can be developed. This research aimed to investigate if infants with a high birth weight (> 4kg) remained larger than normal birth weight babies up to 5 years of age.
Methods: 387 5-year old children (53% with macrosomia (birth weight >4kg), 47% normal birth weight) were followed up from the longitudinal birth cohort ROLO Kids study in the National Maternity Hospital, Dublin. Birth weight was previously recorded and at the 6 month, 2 year, and 5 year follow-up child height, weight, anthropometric and skinfold measurements were collected. Body Mass Index (kg/m^2) and centiles were calculated. Student t-tests and Mann-Whitney U tests were used along with multiple linear regression to control for confounders.
Results: Children with a birth weight >4kg had consistently higher weights, lengths, and BMI centiles, along with increased head and chest circumferences, compared to normal birth weight children at 5 years of age (P<0.01 for all, see figure). After controlling for child sex, intervention group, smoking during pregnancy, maternal education status, and maternal BMI, children with macrosomia were 0.61kg heavier than non-macrosomic infants at 5 years of age (95% CI: 0.04 – 1.18, P<0.05).

Conclusion: Children born with a high birth weight remain heavier and larger into childhood. These individuals are at a higher risk of obesity which highlights the need for monitoring and potential interventions, both during pregnancy and in infancy, to curb the current childhood obesity crisis.

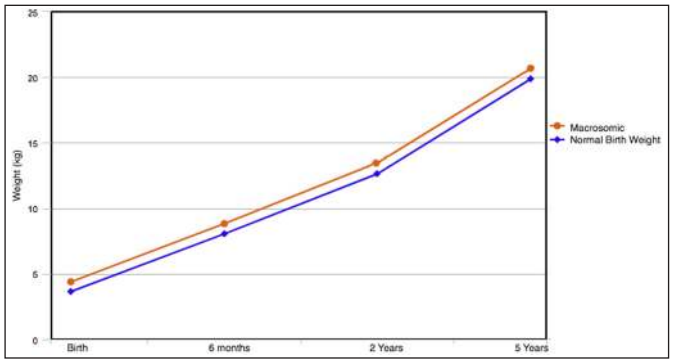

Fig. 1. Weight status at birth, 6 months, 2 years, and 5 years of age of children born macrosomic (>4kg) and normal birth weight in the ROLO Kids study.

PO1.069

The effect of maternal obesity and gestational weight gain on the offspring weight profile

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Introduction: Maternal obesity and excessive gestational weight gain are associated with childhood obesity among offspring through multiple mechanisms: epigenetic, metabolic, hormonal and psychosocial. This effect seems to progress into adulthood, with childhood overweight/obesity leading to an increased risk of obesity in adults as well as other metabolic and cardiovascular diseases.
This study aims to analyse the offspring weight evolution of obese pregnant women and determinate the association between maternal pre-pregnancy BMI and the gestational weight gain with the child BMI according to the percentile table of the Centre of Disease Control and Prevention for the sex and age.
Methods: Retrospective cohort study with a total of 42 offspring from obese women (BMI ≥30 kg/m^2) followed during gestation at endocrinology/obstetrics outpatient clinic from January 2010 to December 2011. Statistical analysis in SPSS, v.23 was performed to evaluate the relation between maternal pregnancy BMI (obesity class I, II and III) and maternal gestational weight gain: low (<5 kg) adequate (5-9 kg) and excessive (> 9 kg), with the offspring anthropometric data, from birth until 6 years old.
Results: The mean birth weight was 3381.9±1.819g. At 12 months, 45.2% of the children (n = 19) were above P75 for weight and 26.2% of them (n = 11) above P95. At 3 years old, 42.9% of the children (n = 18) were obese and 7.2% (n = 3) were overweight. These values increased to 50% of obese (n = 21) and 14.3% (n = 6) with overweight at 6 years old. The higher the pregnancy BMI, the higher was the tendency for childhood obesity, however, without statistical significance (p = 0.834 at 12 months, p = 0.427 at 3 years old and p = 0.797 at 6 years old). Regarding the gestational weight gain, the higher the maternal weight gain, the higher the child's weight, with statistical significance for the children's weight at 12 months (mean children's weight at 12 months 10.05 kg at a weight gain <5 kg, 10.84 Kg in the weight gain of 5-9 kg and 10.95 kg in the weight gain> 9 kg (p <0.05).
Conclusion: The prevalence of overweight and obesity in the offspring of obese pregnant women tends to increase throughout the paediatric life. Maternal pre-conceptional obesity and excessive gestational gain are positively associated with overweight and childhood obesity.

PO1.070

The influence of mother-child interactions on preschoolers' eating and weight

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The overall aim of our program of research was to conduct an in depth mixed-methods investigation of associations between bidirectional mother-child mealtime interactions and other maternal and child risk factors for unhealthy eating and weight gain during childhood. The findings of a systematic review of the literature into observational approaches used to evaluate mother-child mealtime interactions revealed that: 1) cross-sectional associations between reported and observational measures of parent feeding practices have not always been significant; and 2) observational measures have not evaluated parent-child factors from a bi-directional perspective and do not inform us about the optimal parenting dimensions (control and responsiveness) for socializing healthy child eating and weight development. Using a mix of observational and self-reported qualitative and quantitative data from a longitudinal study of 79 mother-child dyads (tracked over 12 months), we sought to address these important gaps in the literature. Our data showed that observed restriction and child difficult temperament were associated positively and inversely, respectively, with child BMI. In dyads experiencing higher mutual mother-child responsiveness and positive affect scores, mothers expressed lower levels of control relating to food issues to bring about child compliance and children expressed a higher degree of willingness to comply with these maternal directives. Qualitative interview data revealed that maternal feeding practices are variable from one meal to another, are shaped by both parent and child influences, and that mothers place a higher emphasis on nurturing positive parent-child mealtime interactions than on what children eat during meals. Importantly, our findings suggested that maternal reports may not always correspond with observed maternal feeding practices because the measures do not capture the influence of bi-directional parent-child interactions on maternal feeding. In summary, the findings of our program of research have emphasised the importance of capturing a holistic picture of how mothers and their preschool children experience feeding in order to gain a more in-depth understanding of associations between bidirectional parent-child mealtime interactions and other maternal and child risk factors of unhealthy eating and unhealthy weight gain related behaviours during early childhood. In this presentation, the findings of this longitudinal study, including the mutually responsive orientation coding system that was used to measure mother-child interactions in the homes of participants while they were preparing a meal and then feeding their child, will be presented.

PO1.071

Finding intermediate DNA methylation biomarkers of early life exposures and subsequent obesity

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Introduction: Early life exposures have been associated with childhood adiposity, however the pathways remain unclear. DNA methylation is a hypothesised mechanism, and methylation differences have also been associated with adiposity. However, there is limited evidence linking exposures with both methylation and adiposity. Thus our aim was to investigate the associations between early life factors, blood DNA methylation, and subsequent overweight/obese (OW/OB).
Methods: Methylation data from the Avon Longitudinal study of Parents and Children were used to estimate associations between early life exposures and methylation (in childhood and late adolescence) at individual CpG loci. Exposures included maternal age, rapid weight gain (RWG), adversity and antibiotic exposure in the first year. Epigenome-wide

association studies (using methylation data at ages 7.5 and 17.7) were carried out for each exposure with independent surrogate variable analysis, both with and without adjustment for cell type proportions. Methylation variation was evaluated using an analysis of variance test with Bonferroni correction for multiple comparisons.
Results: RWG was associated with a 1% increase in methylation for two distinct CpG loci in childhood (5% false discovery rate correction). Methylation (childhood) at these loci was significantly higher in those who experienced RWG and were also OW/OB. Validation of these targets in other populations is ongoing. No other early life exposures demonstrated significant associations with DNA methylation.
Conclusion: This study identified small increases in methylation at two CpG loci in childhood in association with RWG. These could be a potential biomarkers of RWG and subsequent adiposity pending further investigation.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by a BBSRC PhD studentship.

PO1.072

The excess weight of 0 to 7 year-old children. Risk factors

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Introduction: Obesity prevalence has almost tripled in the last four decades. On average 2.8 million people die annually as result of complications of obesity. Childhood obesity has severe consequences across life such us early beginning of chronic illnesses (diabetes mellitus, cardiovascular diseases…). Social and economic conditions have influence in health, especially in children and mothers. The aim of this study was to investigate the weight trends of the children in Gipuzkoa from birth to 7 years of age, taking into consideration the influence of parental anthropometric and sociodemographic characteristics.
Methods: Four hundred and fifty mother-child pairs of the INMA Gipuzkoa cohort took part in this study. Based on Body Mass Index measurements at birth, and at 1, 4 and 7 years, excess weight (EW), overweight and obesity, was defined as ≥90 percentile at birth, and ≥85 percentile at remaining ages. The anthropometric variables of children and parents, type of breastfeeding, food questionnaire at age 4, parental smoking habits during pregnancy and socioeconomic variables were analyzed. A logistic regression model was used.
Results: At birth 11% of children had EW, 49% at age 1, 36% at age 4 and 38% at age 7 (see graph). Heavy birth-weight and rapid growth during the first year were associated with EW in subsequent years. Boys at ages 4 and 7 showed a lower risk of EW than girls. Breastfeeding was not significantly associated with EW. EW increased with the satiated consumption of proteins and carbohydrates at age 4 and of carbohydrates and saturated fats at age 7. Parity increased the risk of EW at birth. Parental BMI was associated with children's EW at all ages. The low educational level of the father and the non-native origin of the mother were associated with EW at birth and at age 4, respectively. The risk of EW increased among father smokers, but not among mother smokers. The prevalence of EW is very high in children.
Conclusion: EW prevalence rising in the last years is a consequence of the obesogenic environment. Parental BMI, non-healthy food, parental low educational level and smoking habits increase risk of obesity during childhood. Effective measures should be taken to address this important health problem.

Funding: Research relating to this abstract was funded by: Institute of Health Carlos III (FIS-PI06/0867, FIS-PI09/00090 and FIS-PI13/02187), CIBERESP, Health Department of the Basque Government (2005111093, 2009111069, 2013111089 eta 2015111065) and Council of Gipuzkoa (DFG06/002, DFG08/001 eta DFG15/221).

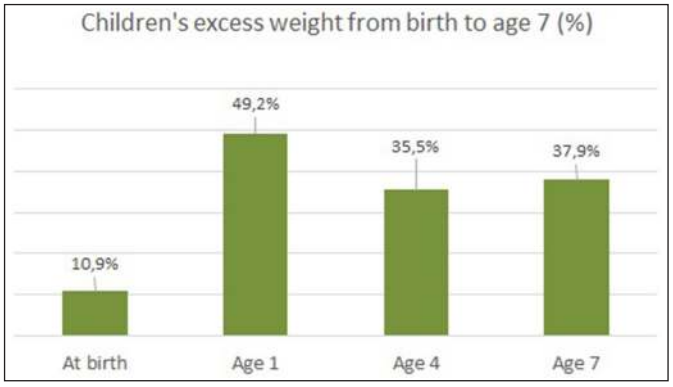

Fig. 1. Children's excess weight from birth to age 7 (%).

PO1.073

Development of body weight in Czech adolescents: 8-year follow-up study

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Introduction: The prevalence of overweight and obesity and cardiometabolic risk factors among Czech adolescents aged 13–17 years was initially studied in 2009 in two cohorts of the Childhood Obesity Prevalence And Treatment (COPAT) project: 1,500 adolescents within the epidemiologic study [randomly selected participants regardless of their body mass index (BMI)] and 600 adolescents treated for overweight/obesity. A follow-up examination was done after 8 years.
Methods: In 2018 all COPAT participants were re-called and a detailed examination (anthropometry, clinical, blood sampling and personal questionnaire) was offered. In order to evaluate the weight status, the Czech references for BMI specified for sex and age were applied for adolescents and standard cut-offs were used for adults. The aim of the study was to evaluate body weight status 8 years after the initial project.
Results:
• 247 (11 %) participants agreed to be re-examined at a mean follow-up of 8 years: 151 women (median age: 22.7 years; median BMI: 23.8 kg/m^2) and 96 men (median age: 23.8 years; median BMI 25.4 kg/m^2). From the total, 191 participated in the initial epidemiologic study and 56 in the intervention study.
• Overweight (BMI = 25.0-29.9 kg/m^2) / obesity (BMI ≥30 kg/m^2) were recorded in 23/21 % of women and 33/22 % of men in 2018.
• A half of normal weight adolescent girls at baseline (BMI < 90th percentile) and 42 % boys were also categorized as normal weight at adulthood.
• 9 % normal weight girls and 21 % boys at baseline were found to be either overweight or obese adults.
• Only 5 % of girls and 2 % of boys who were overweight or obese at baseline reduced their body weight to normal weight, however, an additional 11 % of baseline obese girls and 6 % of boys lowered their body weight to overweight status.
Conclusion: An 8-year follow-up examination revealed weight gain in overweight/obesity category in 14 % of the subjects. By contrast, only 4 % of individuals managed to reduce their body weight over time and currently are considered as normal weight. Additional analyses in respect to other studied variables will be carried out in the near future.
Supported by AZV 17-31670A, MH CZ-DRO (Institute of Endocrinology – EÚ 00023761).

PO1.074

Human adenovirus 36 in children with type 1 diabetes: metabolic and glucose control in a 3-year follow-up pilot study

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Introduction: Human adenovirus 36 (Adv36) increases adiposity, insulin sensitivity and reduces hepatic lipid accumulation in humans. Adv36 infection is also associated with better glycemic control via E4orf1 protein that increases glucose uptake in in pre-adipocytes, adipocytes and myoblasts and reduces an output of glucose from liver cells. The aim of our study was to assess the prevalence of Adv36 antibody positivity in children with type 1 diabetes (T1DM) at baseline and at 3-year follow-up. Additionally, lipid profile, liver function tests, body mass index (BMI), insulin dose requirements and glycated hemoglobin (HbA1c) were evaluated based on the Adv36 antibody status during the follow-up.
Methods: Adv36 antibodies were assessed using the competitive enzyme-linked immunosorbent assay method in 105 consecutively collected children with T1DM at baseline (53 □/50 □, age median 12.2 years, BMI z-score 0.51; duration of diabetes 4.7 years) and 3 years after initiation of the study. Anthropometric (body weight, body height, BMI) and laboratory (lipids, liver function tests, thyroid gland antibodies and HbA1c) parameters were investigated. Diabetes control was studied based on the insulin dose requirements and HbA1c level. Orthogonal projections to latent structures (OPLS) were applied for statistical analysis.
Result: The prevalence of Adv36 seropositivity was at both times 20.4 %. The Adv36 antibody status over 3 years was as following: 1) 66 children (32 □/34 □) remained negative for Adv36 antibodies; 2) 16 initially Adv36 seronegative children (9 □/7 □) became positive after 3 years; 3) 16 Adv36 seropositive children (7 □/9 □) became seronegative, and 4) 5 children (2 □/3 □) remained Adv36 seropositive over time. Our analyses demonstrated that diabetics that presented with Adv36 negative antibodies at baseline and seropositive after 3 years had initially higher concentrations of HbA1c and alanine aminotransferase, however at the follow-up of 3 years these diabetics presented with lower concentration of HbA1c and diminished anti-human thyroglobulin antibodies. The explained variability in OPLS model was 33.3 %. No association of Adv36 status was found with other studied variables.
Conclusion: This is the first study that analyzed Adv36 status in children with T1DM. We found a tendency to a better glycemic control in those diabetics that during the follow-up period of 3 years changed their Adv36 antibody status from seronegative to seropositive. No relationship of Adv36 antibody status to body weight was revealed in diabetic patients. We may assume that Adv36 infection may have a positive impact on the glucose metabolism also in individuals with T1DM.
Supported by AZV 17-31670A, MH CZ-DRO (Institute of Endocrinology – EÚ 00023761).

PO1.075

Adherence in childhood obesity treatment: barriers to treatment

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Introduction: Childhood obesity is a serious condition with high prevalence rates and lifelong consequences. Evidence-based intervention is recommended, with Multidisciplinary Obesity Treatments (MOT) as a golden standard. However, long-term outcomes still can be improved. Two pathways are promising, but never have been properly combined: intervening at the level self-control as an underlying mechanism of behaviour change by adding an e-health Executive Function (EF) training to MOT, and investigating adherence as an ecologically valid measurement of effectivity. The aim of this study was to analyse adherence of EF-training, and exploring the contribution of home context barriers as conceptualized in the Barriers to Treatment Model (Kazdin et al. 1997).
Method: We investigated a sample of 33 youngsters between 14 and 18 (M_age = 16), suffering from severe obesity (M_ABMI = 201%). While in an inpatient program (Zeepreventorium vzw), they participated in an additional e-health EF-training both during (intensive phase) and after (booster phase) MOT. Significant differences in barriers between a high and low adherence group were expected on the Barriers to Treatment Participation Scale (BTPS), which was extended with a fifth subscale to cover specific technology requirement issues.
Results: Showed that leaving MOT was the critical point of drop-out. Although no significant group differences were found in perceived barriers, there were several interesting findings. First, the low adherence group consistently had a higher weight status, and small to medium effect sizes suggest that they lost less weight over time. Second, in-depth analysis of the BTPS-items showed that the low adherence group more frequently experienced practical obstacles and issues referring to training in the home context.
Conclusion: Leaving the inpatient treatment centre and a high weight status can be considered additional risk factors for dropping out of obesity EF-training. It appears that youngsters who need intervention the most – those with the highest weight – experience the most difficulties, for example because of the decrease in monitoring and supervision. Adherence remains a difficult challenge in the treatment of obesity, even when interceding in the underlying mechanisms via e-health as such an innovative intervention modality.

Conflict of Interest: None .

Funding: Research funded by FWO.

PO1.076

Developing, implementing and evaluating the Choosing Healthy Eating for Infant Health (CHErIsH) intervention to prevent childhood obesity in primary care: A feasibility study

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Introduction: Childhood obesity is a global public health challenge. How parents feed infants is implicated in the aetiology of childhood obesity. Parents of infants engage frequently with healthcare professionals in primary care, providing unique opportunities for delivery of infant feeding interventions. The aim of this feasibility study is to develop, implement and evaluate an infant feeding intervention to prevent childhood obesity in primary care.
Methods: Intervention development was informed by establishing a comprehensive evidence base on existing interventions, and parent and healthcare professional experiences of infant feeding and interventions. Interviews and focus groups were conducted with parents and healthcare professionals on experiences of infant feeding and related interventions. Findings from the evidence base were then used with the Behaviour Change Wheel to develop the infant-feeding intervention. A healthcare professional-level implementation strategy was also developed using the evidence base and Behaviour Change Wheel to support implementation of the intervention in primary care. Outcome measures, including an

infant feeding core outcome set, were selected and developed to examine the feasibility of the intervention.
Results: The Choosing Healthy Eating for Infant Health (CHErIsH) intervention consists of brief verbal infant feeding messages, paper based and online resources, and study magnets and infant bibs. The intervention is delivered at infant vaccination visits in primary care at 2, 4, 6, 12 and 13 months. The healthcare professional-level implementation strategy includes incentivised training, supporting resources and online materials, and electronic intervention-delivery prompts. Data collection to inform examination of the feasibility of the CHErIsH trial is conducted when infants are less than 2 months, 6 months, and 13 months old. Data collection includes measures of infant feeding, biomarkers, intervention fidelity, and economic outcomes.
Conclusion: The CHErIsH intervention and implementation strategy represent robust and comprehensive approaches to targeting infant feeding to prevent childhood obesity in primary care. Findings from the feasibility trial will inform future development and refinement of infant feeding intervention development, implementation and evaluation.

Conflict of Interest: The authors have no conflicts of interest to disclose.

Funding: This research was supported by a Health Research Board Interdisciplinary Capacity Enhancement Award (HRB ICE-2015-1026).

PO1.077

Preventing adolescent obesity through an interdisciplinary game-based mhealth system (TeenPower)

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Introduction: The prevalence of obesity among children and adolescents have risen dramatically in the last decades. Therefore, fighting obesity is urgent and must be linked to comprehensive health promotion strategies, with particular interest to vulnerable groups such as children and adolescents. Intervention programs that use technology like the smartphone or the Internet are associated with amore rational use of health services by helping patients and caregivers in the decision-making process. This paper describes the design and development of an interdisciplinary and innovative mHealth program directed to promote healthy behaviours and prevent adolescent obesity, using interactive and collaborative technologies and taking advantage of a virtual therapeutic community with a game-based approach.
Methods: This study is designed as a nonrandomized controlled trial with a three-arm structure. Twelve to sixteen years old participants will be recruited from Portuguese schools, with access to the internet and smartphone/tablet devices. The intervention group will be invited to engage in the TeenPower mHealth program and divided into two subgroups:Group A (additionally engaged in a structured school-based intervention protocol) and Group B (only engaged in the mHealth program). The mHealth app includes educational resources, self-monitoring, social support, interactive training modules and motivational tools. The control group will only follow the structured school-based intervention protocol. The intervention length will be 3 months.
Results: The primary outcomes measured at 3 months are: change in BMI, in physical activity level, in nutrition habits, and in lifestyle. The secondary outcomes are app usability and user experience. The validation of the platform will assess the following factors: technology acceptance and system usability; reliability in assessing the adolescents' lifestyle and behaviour change, effectiveness of the system in encouraging lifestyle change, system compliance to stakeholders needs.
Conclusion: The intervention program will foster the inclusion of ICTs in the promotion of salutogenic behaviours and obesity prevention, creating technological interfaces that allow the customization of intervention parameters and streamline the monitoring and follow-up processes. Along with the therapeutic aim, the project will produce more knowledge regarding adolescents' behaviours and skills, that will help to direct future interventions.

Conflict of Interest: The authors declare no conflict of interest.

Funding: Research relating to this abstract was supported and co-funded by the FEDER (European Regional Development Fund), under the Portugal 2020 Program, through COMPETE 2020 (Competitiveness and Internationalization Operational Program).

PO1.078

An obesity treatment in preschoolers: 12 months results from a randomized controlled trial

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Background And Objectives: Early obesity treatment seems to be most effective, but few treatments for preschoolers exist. This study examines the effectiveness of a parent-only treatment focusing on parenting practices with and without booster sessions (Booster or No-Booster) and standard treatment (ST).
Methods: Families with preschoolers with obesity were recruited from 68 child care centers in Stockholm County and randomized to a parent-only program with or without boosters or to ST. Treatment effects on primary (body mass index (BMI) z-score) and secondary outcomes (BMI, waist circumference) during a 12-month period were examined with linear mixed models. The influence of socio-demographic factors was examined by three-way interactions. The clinically significant change in BMI z-score (-0.5) was assessed with risk ratios.
Results: 174 children (Booster, n = 44, No-Booster, n = 43 and ST, n = 87) (mean age 5.3 (SD 0.8) years, BMI z-score 3.0 (SD 0.6), 56% girls) and their parents (60% foreign background, 39% university degree) were included in the analysis. Twelve months post baseline children in the parent-only program had a greater reduction in their BMI z-score, 0.30 (95% CI –0.45 to –0.15), compared to ST, 0.07 (-0.19 to 0.05). Comparing all three groups, improvements in weight status were only seen for the Booster group, –0.54 (95% CI –0.77 to –0.30). Father foreign background decreased intervention effect, but only in the No-Booster group (p = 0.008). The Booster group was 4.8 times (95% CI 2.4-9.6) more likely to reach a clinically significant reduction of ≥0.5 in BMI z-score compared to ST.
Conclusion: A parent-only treatment with boosters outperformed standard care for obesity in preschoolers.
Clinical Trial Registration: Clinicaltrials.gov Identifier: NCT01792531, https://clinicaltrials.gov/ct2/show/NCT01792531

PO1.079

Pediatric obesity and lipid profile screening, does it happen?

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Background and Aim: All obese children with BMI 95% and higher should be assessed for comorbidities, including Hypertension, Dyslipidemia and Diabetes. The objective of this study was to investigate the lipids screening rate in obese child in our general pediatric clinic population.
Study Design: We performed a retrospective chart review on longitudinal collected data evaluating anthropometric measures (i.e. Measured BMI) and Lipids screening assessment. We included all children that visited all pediatric clinics in our practice for the proposed well child/health maintenance visit during the 2014. A total of 7350 clinic visits were analyzed. We reviewed whether or not these patients had a lipid profile screening completed on or before that clinic visit. Profile that were completed at a later year visit were not taken into account. "Obesity" was defined as BMI >or = 95th percentile by using Sex –specific Centers for Disease Control and Prevention 2000 growth charts in the U.S.A.
Results: A total of 1263 (17 %) cases of the 7350 visits had a measured BMI in the obese range. Of those 212 for a 17 % had a completed lipid profile screening.
Obesity prevalence stratified by age groups was: 2-5 year 13 % (330/2556), 6-11 year 19 % (455/2450) and 12-18 year 20 % (478/2344).
In these obese group lipid screening was completed on 3% (9/330), 16% (75/455), and 27% (128/478) on each group respectively.
Discussion: Despite current guidelines recommending lipid profile screening be completed in obese children, the screening rate was very low level in our clinics reaching a maximum of 27 % in the teenager obese group with age range between 12-18 years.
We have used this study to put more emphasis on education and awareness of importance of early diagnosis of dyslipidemia in the pediatric clinic population.

PO1.080

Do adolescents with severe obesity benefit from a multidisciplinary weight-management program?

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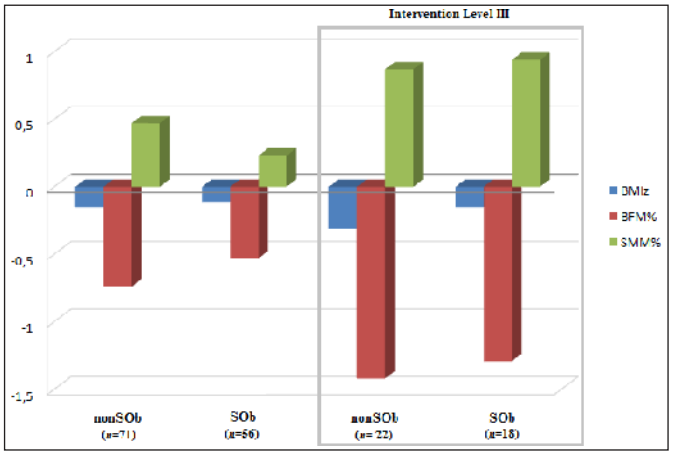
Introduction: Severe obesity (Sob), although affecting a small proportion of overweight adolescent, is increasing in prevalence and is associated with immediate and long-run health consequences. Current management of SOb is limited in effectiveness, and quite often unavailable. There are no licensed drugs for the treatment of obesity in adolescents; Bariatric surgery, although effective, is expensive and little is known about long-run outcomes; Multidisciplinary weigh-management programs have shown modest improvements in body mass index (BMI), with a risk of weight regain. The aim of this study was to analyze differences at six months on BMI and other health outcomes between adolescents with and without SOb in a sample of adolescents recruited for the multidisciplinary weight-management, non-randomized controlled trial, PAC-MAnO (Clinicaltrials.gov/NCT02941770).
Methods: Data from 127 adolescents (54.3% Girls; 85.8% Caucasian), exposed to different levels of intervention (intensity I-III), who have completed six month assessments were analyzed. SOb was defined as a BMI z-score ≥ 3 according to WHO charts. Differences between adolescents with and without SOb were analyzed using independent Mann-Whitney U nonparametric tests and independent sample t-tests.
Results: 44.1% of the adolescents were classified as severely obese (n = 56). Although not statistically significant, adolescents with SOb have shown in average a lower decrease in BMIz-score (d = .09, p = .696) and body fat mass (BFM%) (d = .07, p = .749); and a lower increase in skeletal muscle mass (SMM%) (d = .08, p = .535) compared to their non-SOb peers. When stratifying for intervention level, a more marked difference in BMIz-score was observed between groups (d = .26, p = .415) (Figure 1). However, although not statistically significant, adolescents with SOb have shown a higher decrease in trunk fat (d = .28, p = .567) and carotid intima-media thickness (cIMT) (d = .44, p = .306); and a higher increase in bone mineral content (d = .42, p = .377), even with lower levels of moderate to vigorous physical activity (d = .61, p = .275).
Conclusion: This study suggests that severely obese adolescents do benefit from multidisciplinary weight-management as much as their non-SOb peers. The provision of a more intensive intervention may positively impact central obesity, cIMT, and bone mineral content of adolescents with SOb, independently of BMI. Future studies including a larger sample are needed to further confirm these results.



BMIz - body mass index z-score; BFM% - body fat mass adjusted for total weight; SMM% - skeletal muscle mass adjusted for total weight; SOb – severe obesity. Intervention Level III corresponds to experimental group II of the PAC-MAnO project (see DOI: 10.1136/bmjpo-2017-000214). The adolescents included in this group II have appointments with a Pediatrician, Nutritionist and Exercise Physiologist every three months, and have the opportunity to participate in two sessions/week of physical exercise.

Fig. 1. Variations in BMI z-score, body fat mass and skeletal muscle mass by group.

PO1.081

An online telehealth nutrition intervention to support parents in child weight management - a randomised feasibility controlled trial

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Introduction: Innovative and effective child weight management interventions are needed to address the rising global prevalence of obesity. Web-based technology may enhance intervention by overcoming barriers including transportation, time or costs associated with attending clinic appointments. This trial examined the feasibility and preliminary efficacy of a 12-week online telehealth nutrition intervention to support parents in improving weight status and diet of their four to 11-year-old child.
Methods: Children (n = 46; age 9 ±2.3 years, 59% boys, 70% with overweight/obesity) and parents were randomised into either Telehealth, Telehealth+SMS, or Waitlist Control group. Telehealth and Telehealth+SMS received two online real-time video-consultations delivered by an Accredited Practising Dietitian, access to evidence-based nutrition information on a purpose-built website, and a Facebook support group.

Telehealth+SMS also received additional text messages mapped to behaviour change constructs. Outcomes assessed after 12-week intervention included: participation rates, changes in measured child body mass index, waist circumference, and diet assessed using the validated Australian Child and Adolescent Eating Survey.
Results: Of 46 families who enrolled, 44 (96%) and 36 (78%) families attended initial and second telehealth consultations, respectively. Retention rates at week 12 were: Telehealth (n = 11/16), Telehealth+SMS (n = 10/15), and Control (n = 15/15). Overall, 96% parents were satisfied with telehealth consultations, 89% indicated it was easy to use and would recommend the program to other parents, 93% agreed that the program had improved their family and child eating habits. Overall child anthropometry improved but were not statistically significant. Child diet improved in both intervention groups (Telehealth; Telehealth+SMS) compared to Control, with a decrease in total energy intake (-2835kJ, P = 0.027; -2291kJ, P = 0.078) and percentage energy from non-core foods and sugar-sweetened beverages (-10%E, P = 0.088; -11%E, P = 0.049) and increase in percentage energy from healthy core food (+9%E, P = 0.108; +11%E, P = 0.054). Child diet quality indicated by Australian Recommended Food Score increased (+4.9, P = 0.057) in Telehealth+SMS only.
Conclusion: An online telehealth nutrition intervention is feasible and acceptable. Preliminary findings and potential upscaling of the intervention in community and clinical settings warrants for a larger-scaled pragmatic randomised controlled trial that is powered to test intervention efficacy.

Conflict of Interest: None to be declared.

Funding: Research relating to this abstract was funded by nib foundation through Hunter Medical Research Institute, Australia.

PO1.082

The effects of a multidisciplinary, multicomponent, family-based childhood obesity treatment programme – comparing results in young children and adolescents

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Introduction: Pediatric obesity remains an ongoing serious health concern. Intensive, age-appropriate, culturally sensitive, and family-centred treatment programs are essential in childhood obesity management. The objective of this study was to investigate the effects of our outpatient multidisciplinary, multicomponent, family-based childhood obesity treatment, specifically comparing children with adolescents.
Methods: Anthropometric and metabolic measures were obtained at three timepoints from children (age 3-12) and adolescents (age 13-18) participating in our treatment program: at the start of treatment, after the intensive phase of treatment (3-4 months), at the end of treatment (9-12 months). BMI-SDS was the primary outcome parameter.
Results: 137 participants with overweight or obesity were enrolled, 95 children and 42 adolescents. BMI-SDS of the total group significantly decreased from baseline (3.3, SD 0.8) to both 3-4 months (3.1, SD 0.8; p<0.001) and 9-12 months (3.0, SD 0.8; p<0.001). Children showed significant larger BMI-SDS reductions than adolescents (-0.33 versus -0.09, p = 0.03) and more often a clinically relevant BMI-SDS decrease of ≥0.25 (48% versus 26%, p = 0.10). The prevalence of abnormal blood pressure, disturbances in glucose homeostasis, and metabolic syndrome decreased in the total group. The dropout rate was 30% in children and 41% in adolescents.
Conclusion: Our multidisciplinary intervention improved both anthropometric and metabolic measures. Children showed a more favorable effect than adolescents, confirming the importance of early start of treatment. The high dropout rate points to the need of a careful assessment of initial expectations including identification of barriers to follow-up, followed by individualized care.

PO1.083

Improved vitamin D adequacy and its associations with diet quality indices in a lifestyle intervention of children and adolescents with abdominal obesity

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Introduction: In addition to the current global childhood obesity epidemic, we are facing a global epidemic of vitamin D (VD) deficiency affecting young populations (1). In previously results of our team project, we observed that VD is the only micronutrient in which the 100% of the Dietary Reference Intake (DRI) is not fulfilled. We aimed to evaluate a lifestyle intervention on inadequate VD intake and its associations with lifestyle-diet quality indices in children with abdominal obesity.
Methods: 107 children were enrolled in an 8-week lifestyle intervention program (7-16 years, 62% females). Participants were randomly assigned to the Usual (n = 26) or Intensive (n = 81) care group. Usual and intensive care groups received usual paediatric recommendations or were advised to follow a moderate hypocaloric Mediterranean Diet, respectively. Dietary intake was collected with a semiquantitative 136-item Food Frequency Questionnaire. Intake adequacy and diet quality were evaluated using the DRI and the Diet Quality Index for Adolescents (DQI-A), the Healthy Lifestyle Diet-Index (HLD-I) and the Mediterranean Diet Quality Index (KIDMED), respectively.
Results: At baseline, VD intake was 5.06 μg/d for Usual and 5.13 μg/d for Intensive care group. Both groups achieved a significant reduction in Body Mass Index standard deviation score and a significant improvement in DQI-A and KIDMED. Intensive care group also improved HLD-I. Inadequate intakes were observed for VD in most participants (88% and 92% of Usual and Intensive care subjects, respectively) at baseline. VD was under the EAR in both groups. Intensive care subjects significantly improved their compliance (51% to 61%, p<0.001), therefore, percentage under the EAR was significantly reduced (−21%) after the intervention. Change in VD intake was associated with a change in KIDMED (p = 0.039). After the lifestyle intervention, those subjects in the highest tertile of lifestyle-diet quality indices (higher scores denoted better quality) presented lower VD inadequacy risk in comparison with those in the lowest tertile.
Conclusion: Paediatric subjects could improve diet quality and VD intake enhancing the compliance of the DRI through a dietary program including nutritional education. Furthermore, higher adherence to diet quality scores was found to be associated with lower inadequate VD intake risk.

Reference

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Conflict of Interest: The authors declare no conflict of interest.

Funding: The study was supported by a MERCK foundation grant and an OR-DESA-AEP grant. A.O-R and L.M-A acknowledge their fellowships from the "la Caixa" Banking Foundation.

PO1.084

Roux-en-Y gastric bypass on a sibling pair with MC4R mutation: response to a second operation after weight regain following sleeve gastrectomy several years previously

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Mutations in the melanocortin-4 receptor (MC4R) represent the commonest of rare monogenic forms of obesity in humans. Efficacy of

bariatric surgery is not well-established. Here we report seven-year weight and glycaemic outcomes in a sibling pair with obesity and diabetes due to this mutation (MC4R -/-, missense mutation T162I) who underwent laparascopic sleeve gastrectomy (LSG) before a genetic diagnosis was made. Response was not satisfactory and both had a second operation (Roux-en-Y gastric bypass-RYGB) several years later.

SA, a 12-year old Emirati male patient with diabetes (weight 143 kg; BMI 52 kg/m^2- >99th percentile, HbA1c 8.1%) underwent LSG and lost 18 kg in 6 months. His glycaemic control improved (HbA1c 6.1%, off metformin); however, he started to regain his lost weight, reaching a weight of 177 kg (BMI 60 kg/m^2) by 6 years post-surgery. RYGB was performed at 18 years of age. He lost 15kg (BMI 55 kg/m^2) in 1 year. He currently has an HbA1C of 5.6% off metformin, and is on vitamin D, iron, and multivitamins.

AA, is the older (age 14 years) sister of SA. She was also obese (weight 150 kg; BMI 60 kg/m^2- >99th percentile) and had diabetes with poor control (HbA1c 9.7%). She underwent LSG and lost 22 kg (BMI 53 kg/m^2) in six months. Her weight was consistently lower postoperatively with slight fluctuations near 130 kg, but her HbA1C varied widely. She had RYGB at age 20 years and lost 9 kg (BMI 47 kg/m^2) by three months post-RYGB; she maintained her weight loss up to 2 years later. Glycaemic control improved (HbA1c 7.4%); she is currently on sitagliptin, metformin and empagliflozin with vitamin D, B, and multivitamin supplementation.

These results suggest that MC4R may be of differential importance in short and long term response to bariatric surgery. More evidence is needed to establish the efficacy of different types of bariatric surgery in monogenic obesity.

PO1.085

Association between BMI change and number of days required to get children to attend a measurement session: The COPTR Study

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Introduction: Failure to obtain repeated assessments of subjects is common, especially in long-term trials involving low-income families. As retention rates decline, concerns about non-differential loss increases, but the resources to improve retention rates are not always available. The objective of this study was to determine if there was differential bias in changes in body mass index (BMI) in children who were measured within the pre-defined measurement period stated in the protocol, compared to those measured later.

Methods: The Childhood Obesity Prevention and Treatment Research (COPTR) Consortium evaluated the efficacy of 4 interventions to reduce childhood obesity. The 4 interventions were tested in a total of 1745 children in geographically separated locations in the United States. Two studies were in younger children and two were in older youth (2-5 vs 7-13 years at baseline). Follow-up measurements were collected annually over 3 years. Retention efforts at each measurement point were exhaustive, i.e., continued until deemed futile. A measurement was late (yes/no outcome) if it occurred after the end of a pre-defined period of 60 days and did not meet site-specific criteria. BMI change was standardized by dividing by the amount of time elapsed between measurements. Effect modification of the odds of being measured late by BMI change was examined according to study arm in models adjusting for age, site-ethnicity, sex, and parent employment status. We used repeated measures analysis to examine the average odds over the 3 measurements and also examined the average odds at the final study follow-up.

Results: Overall retention rates in COPTR were unusually high for a community-based obesity study (>90%). On average 11-12% of the measurements were late each year. For every 1-unit annual change in BMI, the odds of being measured late increased (OR = 1.07 CI: 1.04, 1.19), as did the odds of being late at year 3 (OR = 1.23 CI: 1.02, 1.47). Study arm did not modify either association (p>0.6 for both).

Conclusion: Annual BMI changes were greater in children measured after a pre-defined window, but this association was not different between children in an obesity reduction intervention and the control group. Thus, the late results were unlikely to bias analyses examining the difference in BMI change in the control compared to the intervention group, but failure to measure children who were difficult to retain may reduce the overall magnitude of the BMI change measured.

PO1.086

The effectiveness of the COPE Healthy Lifestyles TEEN Program in overweight and obese adolescents: Randomized controlled study

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Aim of the study,to evulation of effective nutrion and mental health developed for the prevention of obesity in adolescents and containing multiple behavior change initiatives COPE (Creating Opportunities for Staff Empowerment) Healthy Lifestyles TEEN (Thinking, Emotions, Exercise and Nutrition) program. COPE program aims to promote healthy lifestyle behaviors, to making healthy choices, to increase the level of knowledge of nutrition and physical activity,to acquirecognitive and behavioral skills, to bring issues to deal with stress and take responsibility for their own health, and thus aims to provide a healthy weight control in adolescents. Program consists of 15 sessions lasting each 40 min (one session per week-a total of 4 months). All sessions are including theoretical issues in the first 25-30 minutes, while the other 10-15 minutes contains the classroom or outside the classroom fun activities. The design of the study is the experimental design type with "pre-test-posttest control group, repeated measurement" in randomized groups. The population of the study consists of 2345 students studying in 6th grade of 10 secondary schools in Istanbul. The research consisted of two stages. In the first stage, the body mass index was calculated by making the height and weight scans of all students. In the second stage, five experiments and five control groups were determined among each overweight and obese students. Each group consisted of 25 overweight and obese adolescents and five normal-weight adolescents to prevent stigmatization. The COPE program was applied to the students in the experimental group and the students in the control group did not have any program because the curriculum courses included basic nutrition subjects. The data of the research will be collected in four pre-test, post-test, 6th and 12th month. Data were collected by "Socio-Demographic Characteristics Form", "Nutrition Knowledge Scale", "Activity Knowledge Scale", "Adolescent Lifestyle Profile Scale", "Healthy Lifestyle Choices Scale", "Beck Anxiety Scale", "Daily Food Consumption Form," "Beverage Consumption Form," BMI and skin measuring subcutaneous fat tissue thickness. 50.2% of adolescents were female, 48.8% were male; 80.8% were overweight and 19.2% were obese. There was a significant change in adolescents' BMI, nutritional knowledge level, physical activity knowledge level, healthy lifestyle behaviors, healthy lifestyle choices, anxiety levels and daily water consumption levels.Daily food consumption and subcutaneous fat thickness measurements of adolescents are not yet completed. In addition, the 6th and 12th month follow-up is ongoing. It

is planned to be completed until the congress date and to be presented at the congress.

Tab. 1. Effects of COPE Healthy TEEN Program of Outcome Variables of Adolescents.

Variables	Groups	Pre-intervention Mean(SD)	Post-intervention Mean(SD)	F--------- p
BMI	Intervention Control	26.70(1.99) 26.48(1.72)	25.56(2.35) 26.03(2.72)	45.831 0.000
Daily water consumption	Intervention Control	6.36(3.78) 6.89(2.78)	6.99(3.01) 6.81(2.56)	4.270 0.040
Nutrition behavior	Intervention Control	16.91(3.91) 17.83(3.87)	17.98(3.71) 17.64(3.78)	6.056 0.031
Activity behavior	Intervention Control	15.81(4.30) 16.03(4.34)	16.97(4.40) 16.21(4.36)	5.197 0.024
Stress behavior	Intervention Control	14.94(3.01) 15.14(2.89)	16.03(3.18) 15.34(3.03)	8.018 0.039
Nutrition knowledge	Intervention Control	9.91(3.53) 9.35(3.44)	12.25(3.48) 9.79 (3.17)	16.927 0.000
Activity knowledge	Intervention Control	6.98(2.91) 7.05(2.33)	7.52(3.09) 7.21(2.93)	4.798 0.030
Healthy Lifestyle Choices	Intervention Control	58.53(13.85) 58.91(13.34)	61.38(11.37) 58.98(14.24)	3.811 0.020
Anxiety	Intervention Control	32.53(13.65) 30.19(10.92)	28.88(10.36) 30.23(12.12)	3.658 0.019

F = Repeated Measurements ANOVA.

Content for Each of the COPE Program Sessions

Introduction of the ASGE-FABES program and goals
Healthy lifestyles; thinking, feeling, behavior triangle
Self-esteem and positive thinking/self-talk
Goal setting and problem solving
Stress and coping
Emotional and behavioral regulation
Effective communication; personality and communication styles
Barriers to goal progression and overcoming barriers; energy balance; ways to increase physical activity and benefits
Heart rate; stretching
Food groups and a healthy body; stoplight diet: red, yellow and green foods
Nutrients to build a healthy body; reading labels; effects of media and advertising on food choices
Portion sizes: "supersize"; influence of feelings on eating
Nutrition in schools
Snacks and eating out
Integrate skills and knowledge to develop a healthy lifestyles plan
Putting it all together: review of course content.

PO1.087

Childhood body size and risks of endometriosis

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Introduction: Endometriosis is a common, often chronic, inflammatory disease characterized by tissue resembling the endometrium that is located outside the uterus. Although the disease is associated with severe complications, little is known about its origins. Leanness and tallness in adulthood are suggested to increase endometriosis risk, whereas the evidence for associations with body size earlier in life is limited. Therefore, we examined whether childhood body mass index (BMI; kg/m^2) and height are associated with later risks of endometriosis, including its subtypes.
Methods: The study included 171,362 girls from the Copenhagen School Health Records Register, born 1930-1996. Weights and heights were measured at ages 7-13 years. Women were prospectively followed in the Danish National Patient Register for diagnoses of endometriosis. Cox regressions, stratified by birth cohort, were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs).
Results: During 40 years of follow-up, 3,634 women were diagnosed with endometriosis. There were indications, although not significant at all ages, that childhood BMI was weakly and inversely associated with risks of endometriosis, such that girls with the highest BMI had the lowest risk. At age 7 years, the HR was 0.96 (95% CI: 0.93-1.00) per BMI z-score. These associations were largely driven by the subtypes of ovarian and pelvic peritoneum endometriosis. Childhood height had non-linear associations with risks of endometriosis. Among girls with a height below average (< ~122 cm at 7 years), the shortest girls had a significantly lower risk of endometriosis (HR = 0.88 [95% CI: 0.82-0.93, per height z-score decrease at age 7 years). In contrast, there were no associations between height and endometriosis among girls with an above-average height.
Conclusion: Girls with a high BMI at school ages may have a decreased risk of endometriosis, whereas among girls with a below-average height, the shortest girls had the lowest risk of endometriosis. These findings suggest that early life body size may be important in the aetiology of endometriosis and thereby add to the current understanding of risk factors for this disease.

Conflict of Interest: None Disclosed.

Funding: Dr. Sofus Carl Emil Friis and wife Olga Doris' Fund.

PO1.088

Office blood pressure versus ambulatory blood pressure measurement in childhood overweight and obesity

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Introduction: Parallel to the childhood obesity epidemic prevalence rates of obesity-related co-morbidities such as elevated blood pressure (BP) are increasing. The added value of ambulatory blood pressure measurement (ABPM) in relation to office blood pressure (OBP) measurements in obese children is unclear. Furthermore, it is unknown how many overweight and obese children present with abnormal ABPM patterns. The objective of this study was to evaluate ABPM patterns in a population of overweight and obese children and adolescents, and to compare these patterns with regular OBP measurements.
Methods: Cross-sectional study in overweight and obese children and adolescents aged 4-17 years, using ABPM to determine the frequency of white coat hypertension, elevated BP, masked hypertension, and ambulatory hypertension, and to correlate these findings with OBP measurements.
Results: We included 82 boys and girls aged 4-17 years, with mean BMI Z-score of 3.3 (standard deviation 0.6). Using ABPM, 54.9% of them were normotensive (95% confidence interval 44.1-65.2), 26.8% had elevated BP, 9.8% ambulatory hypertension, 3.7% masked hypertension, and 4.9% white-coat hypertension. Twenty-four percent of the participants showed an isolated night-time BP load >25%, 40% of them lacked physiologic nocturnal systolic BP dipping. Twenty-two percent of those with normal OBP turned out to have either elevated BP or masked hypertension on ABPM.
Conclusion: This study shows a high prevalence of abnormal ABPM patterns in overweight or obese children and adolescents. OBP was often poorly correlated with a subject's actual ABPM pattern. This emphasizes the usefulness of ABPM as a diagnostic tool in this population.

PO1.089

Healthcare utilization in obese and overweight children: a systematic review and meta-analysis

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Introduction: Obese and overweight individuals are at an increased risk of developing a number of medical conditions. This obesity associated morbidity leads to an increased health service use. However, unlike adulthood obesity, not much is known about the healthcare burden of childhood obesity. The objective of this review was to analyse the association of obesity and overweight with health service utilization during childhood.
Methods: We included observational studies published in the English language, assessing the impact of overweight and obesity on health service use in children (0-18 year). MEDLINE, EMBASE, PubMed, Web of Science and CINAHL databases were searched for studies up to June 2018. All studies meeting inclusion were backwards and forwards reference searched to identify other relevant studies. Risk of bias was assessed regarding study design, participant recruitment, exposure measures, outcome measures, and confounders. Pooled Rate ratios (RR) and 95% confident intervals Due to insufficient data in certain studies to statistically analyse the effect size measurement, we also used a narrative approach to synthesise the findings from all included studies.
Results: Thirty-five studies were eligible for this review. These studies reported on different measures of health service utilization. Thirteen studies reported on outpatient visits, nine on emergency department (ED) visits, five on hospital admission, and four on hospital length of stay. Only seven of these studies reported sufficient data to be included in the meta-analysis. In comparison with healthy weight children, obese (pooled rate ratio (RR), 1.36 [95% CI, 1.15 to 1.60]) and overweight (RR, 1.17 [95% CI, 1.04 to 1.30]) children were significantly more likely to visit emergency departments. The increase in outpatient visits was barely significant for obese (RR, 1.09, [95% CI, 0.99 to 1.18]) and was non-significant for overweight (RR, 1.01 [95% CI, 0.97 to 1.06]) children. Using a narrative approach on all eligible studies, an increase in the ED and outpatient visits was evident for obese and overweight children with variability in strength of association across studies. The findings for other health service measures were mixed, with some studies reporting an increase while some reporting a decrease in health service utilization.
Conclusion: This review and meta-analysis identified an increased use of emergency and outpatient services in obese children. Children with obesity had 1 to 2 times the risk of using ED services compared to normal weight children. This review also identified that health service use is defined by different parameters and further research is required to better understand the association of childhood obesity with these broad range of parameters.

PO1.090

Cardiometabolic risk profile in a population of young adults with previous childhood obesity: metabolic legacy

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Childhood obesity (OB) predicts adult OB with a higher risk of OB-associated comorbidities during adulthood. Less is known about the impact of childhood OB on cardiometabolic risk factors and its role in early development of a cardiovascular (CV) risk profile. Aim of our study was:
- to determine the prevalence of overweight (OW)/OB
- to evaluate CV risk factors
- to determine the impact of childhood OB on risk profile, in young adults previously obese children.

We studied 46 adults (23M/23F, Age 20.7±2.2 yrs, mean±SD) from a database of prepubertal obese children (age 10.2±1.7 yrs) from the Pediatric Endocrinology Unit. All subjects underwent thorough metabolic evaluation: anthropometric features, blood pressure (BP), EKG, biochemical parameters, HOMA-IR, thyroid function, carotid Doppler ultrasonography (US), liver US, bioelectrical impedance analysis (BIA). 80% percent of subjects were OW (26%) or OB (54%), 26% showed metabolic syndrome (MS), and 53% presented with 1 or 2 criteria of MS; 72% percent had NAFLD including 33% of actual normal weight subjects. The degree of children OB (BMI SDs), correlates with adult BMI ($r = 0.34$, $p<0.01$), waist circumference (WC) ($r = 0.34$, $p<0.01$) and Intima media thickness (IMT) ($r = 0.28$, $p<0.05$). Actual BMI correlates with WC ($r = 0.84$, $p<0.0001$), Systolic BP ($r = 0.49$, $p = 0.0003$) and IMT ($r = 0.41$, $p<0.005$); SBP ($r = 0.533$, $p<0.0001$) and IMT ($r = 0.5$, $p = 0.0002$) showing a stronger correlation with WC. Thus, childhood OB predicts adult OB and is associated with early end-organ damage such as endothelial dysfunction (ED) and fatty liver only partially reversible with OB correction. In our population 80% of subjects already showed OB-related conditions, either alone or in combination, with a strong impact on cardio-metabolic outcome such as abdominal OB, hypertriglyceridemia, atherogenic dyslipidemia, hypertension, NAFLD, IFG, early ED. Childhood OB seems to be a strong predictive factor of increased cardiometabolic risk even in early adulthood.

PO1.091

Does educational attainment and life style factors influence the association between change in BMI from childhood to adulthood and type 2 diabetes? – a meta-analysis of Danish and Finnish cohorts

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Introduction: It is plausible, yet largely unexplored, that associations between changes in body mass index (BMI) and type 2 diabetes (T2D) vary by socioeconomic and lifestyle factors. We investigated the relationship between change in weight status from childhood to adulthood and development of T2D and whether these associations are independent of or modified by sex, educational attainment, smoking and leisure time physical activity across populations.
Methods: We analysed BMI at ages 7 and 12 years and in adulthood (20-71 years) from 10 independent cohorts including: the Copenhagen School Health Records Register combined with eight adult Copenhagen cohorts, the Northern Finland Birth Cohort 1966 and the Helsinki Birth Cohort study (N = 25,291 in total). In children, BMIs were categorised using age- and sex-specific cut-offs (≥/< 85th BMI percentile). In adults, BMIs were categorised as obese or non-obese (≤/>30.0 kg/m^2). We meta-analysed the associations between changes in BMI and T2D from Cox proportional hazards regressions.
Results: Children with a BMI ≥85th percentile at 7 years and adult obesity had an increased risk of T2D compared with children who had a BMI <85th percentile at 7 years and no adult obesity (hazard ratio for girls [HRgirls]: 5.23, 95% CI 4.29-6.38, I2 = 0.0%; HRboys: 3.79, 95% CI 2.70-5.33, I2 = 53.3%). In contrast, individuals with a BMI ≥85th percentile at 7 years who were non-obese as adults had no increased risk of T2D (HRgirls: 0.77, 95% CI 0.53-1.11, I-squared = 19.1%; HRboys: 0.94, 95% CI 0.66-1.35, I2 = 48.6%). Adjustment for education, smoking and leisure-time physical activity minimally changed the results and no heterogeneity across these factors were observed.
Conclusion: In the ten Danish and Finnish cohorts studied, a high BMI in childhood combined with obesity in adulthood is associated with increased risks of developing T2D, whereas a high childhood BMI combined with non-obesity in adulthood is not. These associations were not influenced by educational and life style factors suggesting that BMI affects the risk of T2D in the same way across levels of these factors.

Conflicts of Interest: None.

Funding: European Union's Horizon 2020 research and innovation programme under grant agreement n°633595, DynaHEALTH.

PO1.092

Obesity in adolescence: the correlation between abnormal uterine bleeding in the early years after menarche and polycystic ovary syndrome later in adolescence in these girls

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Introduction: The aim of this study is to assess the correlation between Abnormal Uterine Bleeding (AUB), in the 2 post-menarchal years and Polycystic Ovary Syndrome (PCOS) later in adolescence, in overweight and obese adolescent girls.
Methods: Prospective study of 37 overweight and obese adolescents (Group A) and 54 girls with Body Mass Index (BMI) and anthropometric parameters within normal range (Group B), who presented with AUB in the first 2 years after menarche. In all girls, anthropometric parameters, hormonological studies and ultrasound scan were measured, analyzed and performed respectively in every visit. All adolescents were followed-up, every 6 months, until the age of 21.
Results: 31/37 (83%) of Group A and 30/54 (55%) of Group B girls diagnosed with PCOS later in adolescence ($p<0.05$). No statistical significant difference was found between the two Groups at first attendance regarding hormonal parameters and ultrasound scan characteristics. At time of PCOS diagnosis, Group A girls had statistically significant higher levels ($p<0.05$) of Testosterone, Free Androgen Index, Fasting Glucose, Fasting Insulin, Luteinizing hormone/Follicle stimulating hormone ratio, as well as mean ovarian volume compared to Group B adolescents.
Conclusion: Overweight and obese adolescents with AUB early after menarche, have an increased risk to develop PCOS later in adolescence, even when compared with normal BMI adolescents who presented with the same menstrual irregularity. A thorough follow up is mandatory in these girls and early interventions where necessary, can prevent a variety of gynecological problems and future fertility issues.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.093

Childhood body size and bladder cancer hazard

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Introduction: Adult overweight is a well-established risk factor for bladder cancer (BC), whereas the relationship between adult height and BC is less investigated. Recent studies have shown that childhood body mass index (BMI; kg/m^2) and height are positively associated with the risks of several adult cancer forms but the potential relationship with BC is unknown. Thus, we investigated if BMI and height in childhood are associated with the hazard of adult BC.
Method: The Copenhagen School Health Records Register contains information on annual measurements of weight and height from 372,636 children, born 1930-1989 who attended school in Copenhagen. Weight and height were measured at ages 7-13 years and transformed into BMI and height z-scores. Using unique identification numbers, individuals were linked with the Danish Cancer Registry for information on BC diagnoses. Cox proportional hazard regressions were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs). Analyses were stratified by sex and birth cohort.
Results: 315,763 individuals (159,779 men) were included in the analyses. During a median of 35.3 years of observation time, 306 women and 839 men were diagnosed with BC. There were no statistically significant differences in the associations between childhood body size and BC hazards among men and women (all P≥0.18), thus results are presented for men and women combined. Childhood BMI was positively and linearly associated with adult BC hazard, and statistically significant at ages 10-13 years. At age 13 years the HR was 1.10 (95% CI: 1.02-1.18) per z-score. Childhood height was inversely and linearly associated with adult BC hazard, and statistically significant at all childhood ages. At age 13 years the HR was 0.94 (95% CI: 0.89-1.00) per z-score.
Conclusion: BMI in late childhood is positively associated with the hazard of BC. Further, shorter child heights are indicators of BC hazard, which opens new pathways for investigating the etiology of BC. Taken together, these results suggest that BC may have origins earlier in life than previously thought.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Dr. Sofus Carl Emil Friis and wife Olga Doris' Fund.

PO1.094

Early life body size and risks of systemic lupus erythematosus

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Introduction: Systemic lupus erythematosus (SLE) is a chronic autoimmune disease. Adult obesity may increase risks of SLE. SLE autoantibodies have been detected in patients many years prior to a SLE diagnosis, suggesting that etiological factors may influence SLE risks early in life. Child or adult height as a risk factors for SLE has not been investigated. However, there are suggestions of a genetic link between SLE and tall adult height. The evidence of an association between birth weight and SLE risks is inconsistent. We therefore investigated whether birth weight, childhood body mass index (BMI [kg/m^2]), and height are associated with later risks of SLE.
Methods: We used the Copenhagen School Health Records Register which contains annual weight and height measurements at ages 7 to 13 years on 406,308 children born from 1930–1996 who attended schools in Copenhagen. Information on birth weight was obtained from 1936 onwards. SLE diagnosis was obtained through linkage to the Danish National Patient Register using unique personal identification numbers. Cox hazard regressions were performed to estimate hazard ratios (HR) and 95% confidence intervals (CI).
Results: 346,545 children (175,494 boys) were included. During 40 years of follow-up there were 435 cases of SLE (69 men). As there were no significant interactions with sex, analyses are presented for sex combined. For birth weight there was no significant association with SLE. For childhood BMI there was a positive and significant, or borderline significant, association with SLE at all childhood ages. At age 13 years the HR was 1.13 (95% CI: 1.02-1.26) per BMI z-score and HRs were similar across all ages. For childhood height there were significant and positive associations with SLE at all childhood ages. At age 13 years the HR was 1.12 (95% CI: 1.01-1.23) per height z-score and HRs were similar across all ages.
Conclusion: These findings of positive associations between childhood BMI and height and SLE risk suggest that early life factors may be important in the etiology of SLE.

Conflicts of Interest: None.

Funding: University of Copenhagen Fund for Medical Students and University of Copenhagen Faculty of Health and Medical Sciences Fund.

PO1.095

MOdelling childhood obesity in Norway – the MOON study

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Introduction: decisions regarding the implementation of interventions, i.e., to prevent or treat childhood obesity, are often made without knowledge on long-term effects (and cost-effectiveness). In Norway we have unique access to longitudinal data that can be used to develop generic mathematical models to simulate the development (and consequences) of obesity. We aim at using such data to develop a model that can, in turn, enable estimates of the long-term effect of a range of interventions targeting childhood obesity. We will illustrate the model using a practical example.
Methods: we are building a Markov model, where a cohort of 2-years olds—in yearly cycles—are simulated to move between the health states 'Normal', 'Overweight', 'Obese grade 1', 'Obese grade 2' (as defined by IOTF). Through this, we can keep track of the proportion of children in the cohort that are classified in the different health states throughout their life span. Yearly transitions are estimated by parametric survival analyses, using data from four longitudinal data sets. Consequences of being in either of the health states are estimated from national life tables and literature (for obesity-related risk of mortality), and by linking the Nord-Trøndelag Health Survey to the Norwegian Patient Registry (for obesity related resource use and costs). Currently, few parents say yes to a low-threshold intervention offered by public health nurses targeting children who are in danger of developing obesity. In the model, we will illustrate the effect of increasing this coverage, simulating a coverage ranging between 10% - 100%.
Results: our data includes 100,000 participants with more than 250,000 height and weight measurements, covering the ages 2 – 99 years. The model is under development. In April, we will be able to illustrate the expected proportion who will develop overweight or obesity (graded 1 or 2) throughout their life span, among a cohort of 2-year old children (in 2018). We will also estimate the cohorts' expected costs and effects (mortality) attributable to overweight. We will show the expected results of increasing the coverage of a low-threshold intervention offered by public health nurses, and how this will affect the development of overweight and obesity in the cohort, and consequently, the expected effects on mortality and costs (cost-effectiveness).
Conclusion: Simulation models, such as the one we are developing, can systematize and synergize relevant knowledge regarding the evolvement and consequences of obesity into one framework, and as such have the potential to simulate long-term effects (and cost-effectiveness) from a range of interventions.

Conflict of Interest: None Disclosed.

Funding: Research funded by the Central Norway Regional Health Authority.

PO1.096

Trajectories of body mass index in childhood in relation to risk of coronary heart disease in adults with type 2 diabetes

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Introduction: Among adults with type 2 diabetes (T2D), coronary heart disease (CHD) is a serious comorbidity. In the general population, a high body mass index (BMI; kg/m^2) in childhood is related to later risks of CHD, but this association has yet to be elucidated among individuals with T2D. Therefore, we investigated if childhood BMI trajectories are associated with incident CHD (fatal or non-fatal) among adults diagnosed with T2D.
Methods: Individuals in this study came from the Copenhagen School Health Records Register, which includes measurements of childhood heights and weights at ages 7-13 years. We included children born 1937-1985 who were diagnosed with T2D in adulthood (7,775 women and 10,682 men). Diagnoses of T2D and CHD were obtained from national health registers (from 1977-2015) via a personal identification number. Three sex-specific BMI trajectories were identified using latent class growth mixture modelling with restricted cubic splines for age. These classes were included in Cox regression models stratified by birth cohort to estimate CHD hazard ratios (HRs) and confidence intervals (CI).
Results: The trajectories were largely similar in boys and girls. The "normal" and most common trajectory (86%) had a slow linear BMI increase. The "late gain" trajectory (7%) had a rapid increase in BMI from 9 years

onwards. The "early gain" trajectory (7%) had an early rapid increase in BMI until 10 years and little thereafter.
Men and women were observed for a median of 7.8 years and 6.2 years, respectively. 2,317 men and 1,277 women had a CHD event. Compared to the normal BMI trajectory, the late gain trajectory had a HR of 1.08 (95% CI: 0.91-1.28) in women and 1.31 (95% CI: 1.14-1.51) in men and the early gain trajectory had a HR of 1.26 (95% CI: 1.05-1.50) in women and 1.04 (95% CI: 0.87-1.25) in men.
Conclusion: A late gain BMI trajectory in childhood was associated with higher risks of CHD in men with T2D compared to a normal BMI trajectory, and an early gain trajectory was associated with higher risks of CHD in women with T2D.

Conflict of Interest: None Disclosed.

Funding: Novo Nordisk Foundation (NNF17OC0028338).

PO1.097

Tracing the effect of the melanocortin-4 receptor pathway in obesity: study design and methodology of the TEMPO registry

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Introduction: The hypothalamic melanocortin-4 receptor (MC4R) pathway plays a vital role in energy balance. Genetic defects in the MC4R pathway may result in severe early-onset obesity. The TEMPO registry (NCT03479437) aims to identify and enroll approximately 1000 participants with rare genetic forms of obesity that are potentially related to key genes, upstream or downstream, of the MC4R. In addition, the TEMPO registry will evaluate the burden of disease on participants, caregivers, healthcare providers, and the healthcare system.
Methods: The TEMPO registry is a voluntary, prospective, open-ended registry. Participants must meet both phenotypic and genotypic entry criteria. Participants aged ≥2 years with severe obesity, defined as BMI >40 kg/m^2 (for participants ≥18 years) or BMI that is >1.4 × the corresponding age/sex 95th percentile (in children 2-17 years) are eligible for inclusion. Participants must possess at least one of the following genotypes: 1) Bi-allelic (homozygous or compound heterozygous) POMC, PCSK1, or LEPR pathogenic or likely pathogenic variants, or encoding a subset of variants of unknown significance, leading to either clinical POMC or LEPR deficiency obesity; 2) Presence of pathogenic, likely pathogenic, or a subset of variants of unknown significance in at least 2 genes in the pathway (a composite genotype); 3) Presence of other high-confidence, high-impact genetic variations in the MC4R gene or other MC4R pathway genes carried by non-syndromic participants with severe obesity. Participants with recognized syndromic forms of obesity will be excluded. Data sources will include electronic surveys completed by adult and minor (aged 13-17) participants, caregivers for all minors, and healthcare providers. Surveys will be completed at study entry (baseline) and annually thereafter. Surveys will collect demographics, results of genetic testing, medical/family history, disease characteristics, resource utilization, eating habits/hunger episodes, quality of life, and burden of disease on participants, caregivers, healthcare providers, and the healthcare system.
Conclusion: The TEMPO registry will enable the identification of patients with rare forms of severe early-onset obesity resulting from rare genetic variants in the MC4R pathway. This registry will provide insights into the overall course and disease burden of genetic disorders presenting with these extreme obesity features.

PO1.098

The *causal* impact of childhood obesity on later human capital development and social outcomes: the economic and social value of health

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Introduction: Often, studies evaluate the numerous health impacts of childhood obesity, yet fail to document and measure the economic and social effects. The social and health effects of childhood overweight and obesity are difficult to economically evaluate due to endogeneity. This study is the first to systematically review the causal pathways linking childhood obesity to human capital development and social outcomes.
Methods: Three databases were used to conduct this systematic review of studies employing appropriate methods to control for the endogeneity of childhood obesity published in English after 1980 examining the effect on social and economic outcomes were included: educational achievement, labour market outcomes, social capital and social participation. Participants in studies had to be overweight with no other comorbidities, under 18 years of age and from countries with advanced economies.
Results: While there were over 200 studies evaluating the impact of childhood obesity on the outcomes of interest, only twenty-seven studies assessed the causal impact: 24 studies assessed causal impact on educational achievement, 3 studies on labour market outcomes and none assessed the causal impact on social participation or social capital. Studies used a range of methods to evaluate the causal impact including instrumental variables, difference-in-difference designs and fixed effects which explains some of the variability and magnitude of evidence. However, overall evidence suggest that childhood obesity has a negative impact on later economic and social outcomes.
Conclusion: This project is the first to examine the causal effects of childhood obesity on these outcomes and highlights the limited knowledge on the economic and social outcomes of childhood obesity. Evidence suggests that childhood obesity would have devastating impact on later human capital development and social outcomes, yet we lack the causal impact in which to declare clear understanding. Future research must account for confounding factors and reverse causality issues if we are to understand the pathways and mechanisms through which the social and economic impacts of childhood obesity are generated. In turn, this will give policy makers and other stakeholders the means to intervene more effectively and combat these effects in obese children.

PO1.099

Is creatinine might be a significant determinant related with obesity?

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It is reported that beige-fat cells have a thermogenic mechanism built around a creatinine-driven substrate cycle. We studied the association between creatinine and weight on overweight women in outpatient clinic. Therefore, we investigated whether creatinine was related with general and central obesity in general population.
We conducted 6,546 subjects 41.8+/- 22.9 years, 22.7 +/- 4.3 kg/m^2, Waist circumference 78.0 +/-14.3 cm, Women 55%) recruited and checked serum creatinine in 2016 Korea National Health Analysis Nutrition Examination Survey (KNHANES). Fasting plasma glucose, and total cholesterol, HDL cholesterol, triglyceride, and waist circumferences, height, and weight, waist circumference (WC), HbA1C were evaluated after overnight fasting for 8 hours at initial visit. We investigated the association between creatinine and obesity indicators such as waist and BMI. The statistical Pearson's correlation and student's t-test were performed by SPSS package for windows version 18. The probability less than 0.05 was considered as significant at both sided.

Creatinine was significantly correlated with BMI (p = .004), WC (p = .014) after adjusted for age, sex, and alcohol, smoking, exercise, and combined disease (DM, hypertension, hyperlipidemia), and blood pressure, fasting blood sugar, lipid profiles.
Well-controlled clinical trial would be needed in the future. In conclusion, creatinine is major determinant related with central obesity (WC) and general obesity (BMI).

Tab. 1. Demographic, metabolic risk variables according to creatinine.

Creatinine (mg/dL)	Q1 0.6 (0.001)	Q2 0.73 (0.001)	Q3 0.86 (0.001)	Q4 1.10 (0.003)	P
Age (years)	41.9 (0.5)	46.7 (0.5)	48.7 (0.5)	51.6 (0.5)	.000
BMI(Kg/m^2)	22.9 (0.9)	23.1 (0.1)	24.1 (0.1)	24.7 (0.1)	0.002
WC(cm)	77.8 (0.3)	79.1 (0.3)	83.8 (0.3)	86.3 (0.3)	.000
Systolic Pressures(mmHg)	114.2 (0.4)	116.4 (0.4)	119.6 (0.4)	121.3 (0.4)	.000
Diastolic Pressure (mmHg)	71.6 (0.2)	73.5 (0.2)	75.6 (0.2)	77.1 (0.3)	.000
Fasting Plasma Glucose (mg/dL)	97.8 (0.5)	98.9 (0.6)	102.4 (0.6)	103.7 (0.7)	.000
HbA1 C (%)	5.59 (0.02)	5.63 (0.02)	5.69 (0.02)	5.76 (0.01)	.000
Total Cholesterol (mg/dL)	188.6 (0.9)	191 (0.9)	189.5 (0.9)	190 (0.9)	.805
HDL-Cholesterol (mg/dL)	53.9 (0.3)	54.1 (0.3)	50.2 (0.3)	46.4 (0.3)	.000
TG (mg/dL)	118.3 (2.8)	123. (2.7)	145.1 (3.2)	156.2 (3.1)	.000
LDL-Cholesterol (mg/dL)	115.4 (2.6)	116.8 (3.0)	116.8 (1.9)	117 (1.9)	.046

Age, BMI, WC, Cardio-metabolic Variables to Quarter of Creatinine values Expressd as Mean (S.D).

PO1.100

Improvement of chronic inflammation in obese children consecutive to probiotic intake

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Introduction: Low grade inflammation is one of the main characteristic associated to obesity, and participates to the development of numerous comorbidities. The gut microbiota has been evidenced to interact with the host metabolic and inflammatory condition. We investigated the effect of an alimentary supplementation of Bifidobacterium pseudocatenulatum CECT 7765 on different elements of obese children health: gut microbiota global composition, inflammatory cytokines and cardiometabolic risk factors.
Methods: The study included 48 obese children with insulin resistance. They received dietary recommendations and a capsule of probiotic (10 CFU) or placebo daily for 13 weeks. Clinical, biochemical and gut microbiome measurement were made at baseline and at the end of the intervention.
Results: All children displayed body mass index (BMI) improvement consecutive to the intervention. Probiotic intake impacted gut microbiota, increasing the proportion of Rikenellaceae family, particularly the Alistipes genus. Regarding metabolic and inflammatory parameters, the children who received the probiotic displayed significant decrease in circulating high-sensitive C-reactive protein (P = 0,026), and monocyte chemoattractant protein-1 (P = 0.032) and an increase in high-density lipoprotein cholesterol (P = 0.035) and omentin-1 (P = 0.023) in comparison with the children who received the placebo.
Conclusion: The positive impact of the intervention on the BMI of all children reveals the benefits provided by the dietary changes. By complementing this intervention with the intake of B. pseudocatenulatum CECT 7765, a modification of the gut microbiota has been obtained, with an increase of bacterial groups associated to lean phenotypes. In parallel, those children displayed a greater improvement on inflammatory status and metabolic health. Our results suggest that modulation of gut microbiota with probiotic to be an effective tool to ameliorate obesity-related alterations in children.

PO1.101

Screening pediatric obese patients for diabetes using immediate tests: a financial analysis

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Background and Aims: Hemoglobin A1c (HbA1c) and glucose finger blood stick (FBS) are commonly used measurements to screen for diabetes in obese population at risk. These tests can be done during clinic visits and the results can be verified immediately by the health care providers to make the diagnosis of diabetes or impaired fasting glucose. A special testing machine is often provided at no cost by the manufacturer provided that testing kits are purchased on regular basis. These tests offer immediate laboratory diagnosis to help starting diabetes management when the diagnosis is confirmed.
Method: A cost analysis was performed to compare the price of HbA1c and FBS kits purchased in our pediatric clinic over a period of 2 years and compared to the total collections from payers within the same time. Testing was performed on obese pediatric patients to rule out diabetes.
Results: The total cost of kits in 2 fiscal years was $11485. The total collections from testing HbA1c and FBS in the same period was $28595. This shows a positive balance of $17110 (Average of $8500 per year). When adjusted for personnel's time of handling the kits, preparing the machine daily, testing patients and reporting results (20 % of total time multiplied by total salary of $29000), the profit is estimated to be around $ 2700 per year.
Conclusion: Testing HbA1c and FBS in outpatient clinic setting offers immediate feedback to provide an instant diagnosis for diabetes when combined with analysis of clinical symptoms and other laboratory tests. Hemoglobin A1c testing has been known as a standard of care in pediatric diabetes since it provides an assessment of the average glycemic control over past 3 months and may help in predicting the occurrence of diabetes related complications. Testing HbA1c can be very useful as well to screen for diabetes in the population at risk.
Testing HbA1c and FBS during clinic visit seems to be profitable even after adjusting for personnel's expenses. Using this immediate method to diagnose diabetes not only improves the quality of care for obese patients but also increases the financial profit of the practice.

PO1.102

Effects of magnitude of visceral adipose tissue reduction: impact on insulin resistance, hyperleptinemia and cardiometabolic risk in adolescents with obesity after long-term weight loss therapy

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Background: To investigate the interdependence of the visceral adipose tissue decrements on insulin resistance and hyperleptinemia in adolescents with obesity submitted to interdisciplinary weight loss therapy.
Methods: 172 post-puberty adolescents (body mass index greater than >95th percentile of the CDC reference growth charts), were recruited for the study. The adolescents were assigned to long-term weight loss therapy. Measurements of body composition, visceral and subcutaneous fat, glucose metabolism, lipid profile, hepatic enzymes and leptin concentration were analyzed. The adolescents were allocated into three different groups according the tertile of visceral fat reduction after weight loss therapy.
Results: Positive effects on body composition were observed in all analyzed groups independent of visceral fat reduction. It was found that visceral fat was an independent predictor of insulin resistance in the investigated population. Obese adolescents who lost a higher proportion of visceral adipose tissue (< −1.8cm), demonstrated metabolic and inflammatory parameters two times greater than those who presented smaller losses. Positive correlations between visceral fat and glucose metabolism, lipid profile, hepatic enzymes and HOMA-IR were demonstrated.
Conclusion: The magnitude of the reduction in visceral fat was an independent predictor of the insulin resistance control, hyperleptinemia state and a range of altered metabolic conditions observed in adolescents with obesity.

Acknowledgements: Support Foundation of São Paulo Research - FAPESP (2017/07372-1; 2015/14309-9; 2013/08522-6; 2011/50414-0; 2011/50356-0; 2008/53069-0, Fundação de Amparo à Pesquisa do Estado de São Paulo - FAPESP), National Council for Scientific and Technological Development – CNPq (409943/2016-9; 301322/2017-1) and Coordination of Higher Education Personnel Training – CAPES.

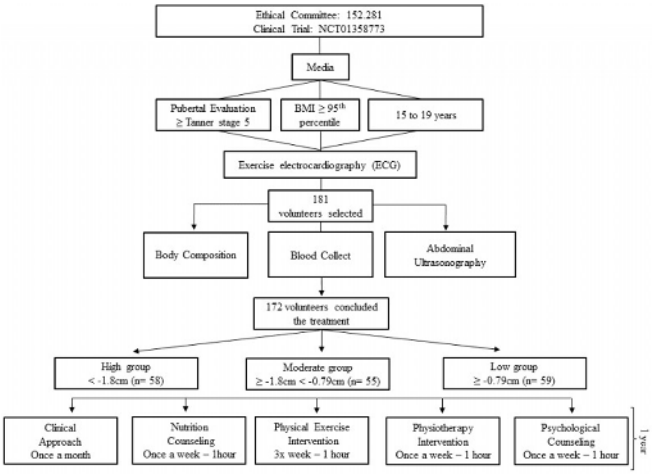

Fig. 1. Clinical trial of ınterdisciplinary long-term weight loss therapy to treat adolescents with obesity.

PO1.103

The magnitude effect of weight loss on energy balance pathways in obese adolescents engaged in a long-term interdisciplinary therapy

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Introduction: The control of energy balance (EB) involves many key factors such as energy intake, energy expenditure and body composition. In obesity, deregulations in anorexigenic and orexigenic neuropeptides generates a positive EB and the treatment perspective is very important to prognostic of normalization of these pathways. Studies exploring the effect of weight loss (WL) magnitude on the main neuroendocrine factors regulating EB remain scarce, especially in pediatric population.
Objectives: The aim was questioning the role played by magnitude of WL on main orexigenic and anorexigenic factors, in response to one-year interdisciplinary intervention in obese adolescents and investigate which EB factors impact the most the body fat loss responses.
Materials and Methods: 108 post-pubertal obese adolescents (BMI >95th percentile), were submitted to 1 year of interdisciplinary therapy (clinical, nutritional, psychological, physical exercise and physiotherapy support). Body composition and plasma levels of α-MSH, NPY, MCH, AgRP were measured before and after therapy. The volunteers were grouped by degree of WL (%): WL < 10% (Low WL; n = 68) and EL ≥ 10% (High WL; n = 40). Significance was set as $p<0.05$.
Results: Both groups present significant reduction in weight, BMI and body fat and improvement in free fat mass. The Low WL group reduce α-MSH, increase AgRP levels and remained with hyperleptinemia, while High WL group did not obtain significant difference at baseline and post treatment to anorexigenic and orexigenic factor and on average, the hyperleptinemia was normalized. The delta of α-MSH, NPY and AgRP were higher in Low WL but only in in High WL the value remains positive. The delta of weight, α-MSH and leptin it was associated with body fat loss.
Conclusion: The magnitude of weight loss induced by an interdisciplinary intervention is associated with the responses of the main anorexigenic and orexigenic factors involved in the control of energy balance in adolescents with obesity, particularly leptin. A weight loss above 10% of the adolescent initial body weight seems to favor a stabilization of the neuropeptides α-MSH, NPY and AgRP, which could prevent weight cycling effect.

Funding: FAPESP [2017/07372-1; 2015/14309-9], CNPq (301322/2017-1) and CAPES.

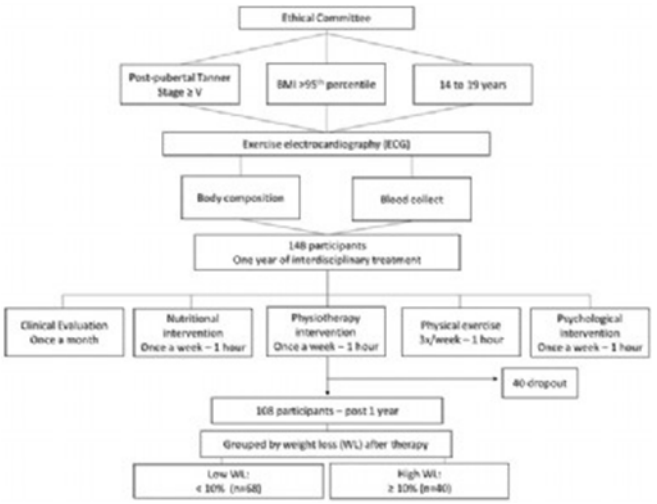

Fig. 1. Design of long-term weight loss therapy to treat adolescents with obesity.

PO1.104

High variation degree of FGF21 post long-term interdisciplinary weight loss therapy preserves the free fat mass and rest metabolic rate in adolescents with obesity

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Introduction: Fibroblast growth factor 21 (FGF21) is among the activators that can stimulate thermogenesis in the white adipose tissue and brown adipose tissue. People with obesity have elevated blood levels of FGF21, but also develop resistance to its action, impairing its beneficial role. Inversely, clinical treatments to weight loss has been pointed out as an important therapy for increasing and recovering sensitivity to FGF21. The aim was to analyse the effects of long-term weight loss interdisciplinary intervention on FGF21 variations and the relationship with body composition.
Methods: 86 post-pubertal obese adolescents (14-19 years-old), were submitted to 20 weeks of weight loss therapy (clinical, nutritional, psychological and physical exercise support). Anthropometric measures (Body Weight and Body Mass Index), Body composition (Body Fat and Free Fat Mass - FFM) and Rest Metabolic Rate (RMR) by bioelectrical impedance, and serum FGF21 sample by ELISA were evaluated. The adolescents were grouped according to FGF21 individual delta variations after therapy: Higher Increase (HI); Lower Increase (LI); Lower Decrease (LD); Higher Decrease (HD) (Figure 1-2).
Results: All groups present reduction regarding weight loss. The BMI was significantly reduced only in the HI group of FGF21 and Body Fat reduced just in the HD group of FGF21 variations. Considering FFM (Kg) at baseline (B) and after intervention (A) (LI: B- 72.6±13.4 and A- 70.7±12.9, p = 0.01; HI: B- 70.8±9.3 and A- 69.8±9.3, p = 0.85; LD: B- 66.9±10.8 and A- 65.1±10.1, p = 0.00; HD: B- 67.7±10.1 and A- 65.6±10.2, p = 0.00) and RMR (Kcal) (LI: B- 2207.7±407.1 and A- 2148.5±391.1, p = 0.00; HI: B- 2152.8±284.5 and A- 2124.9±281.7, p = 0.88; LD: B- 2034.8±331.9 and A- 1979.6±307.5, p = 0.01; HD: B- 2059.3±308.5 and A- 1989.7±300.5, p = 0.00), exclusive in the group with high increased of FGF21 these variables were preserved and to others group FFM and RMR were significantly reduced.
Conclusion: High increase in FGF21 can contribute to preservation of FFM and RMR after weight loss therapy, possibly preventing yo-yo effects because these variables could have important implications for energy balance regulation. Future studies are necessary to continue determining the role of magnitude effects of FGF21 levels in obesity to improve clinical practice, especially in paediatrics population.

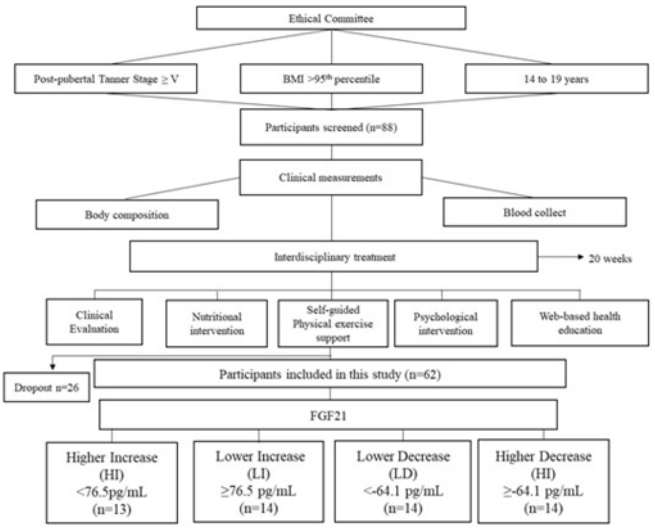
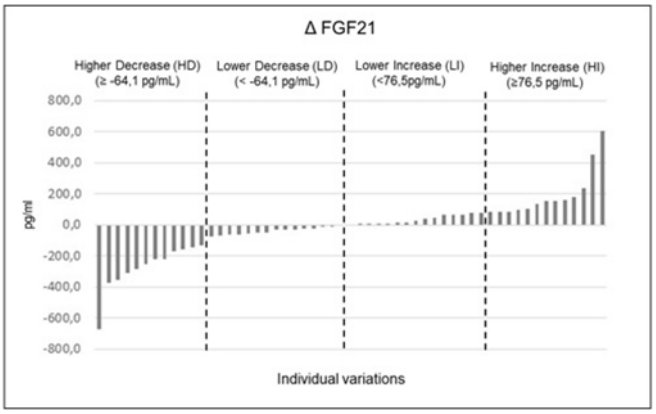


Fig. 1. Experimental design.



FGF21 were expressed in pg/mL. Lower Increase (LI) <76,5pg/mL FGF21 (n = 13); Higher Increase (HI) ≥76,5 pg/mL FGF21 (n = 14); Higher Decrease (HD) <-64,1 pg/mL FGF21 (n = 14); and lower Decrease (LD) ≥-4,1 pg/mL FGF21 (n = 14).

Fig. 2. Individual variations of FGF21 serum levels after interdisciplinary therapy to weight loss.

PO1.105

Utilization rate of the Glycosylated Hemoglobin A1C in teenagers and young children with obesity

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Introduction: To investigate the utilization rate of Glycosylated Hemoglobin A1c (HgA1c) in obese children and teenagers as a screening tool.
Method: We performed a retrospective chart review of well child visits (Age 2-18) during a one year period in 2014 to evaluate anthropometric measures (BMI) and the ICD10-code diagnoses.
We also looked at whether the patients that had been identified as obese via BMI criteria and had a Hg A1C done during that year or prior years. We also searched for associated diagnosis codes related to Diabetes. We also looked if the patients had any HgA1c tested over the 3 subsequent years after that visit.

Results: A total of 7350 clinic visit were analyzed, with 1263 cases having a BMI ≥ 95th percentile (17 %) and of those 141 (11 %) were tested for HgA1c on or before the 2014 clinic visit. Of those 141 patients screened, 79 cases (56%) had a BMI of ≥ 99 percentile, 1 patient was known to have a prior diagnosis of Type 1 Diabetes, 4 cases (3%) were then diagnosed with pre-diabetes after the test, and 3 cases (2%) were found to have HgA1c equal or greater than 6.5% and were then diagnosed with Diabetes Mellitus.
Over the subsequent 3 years to 2017 an additional 379 patients had a HbA1c completed bringing the total to 520 cases (41%) screened. Of the new total, 14 cases (3%) were diagnosed with pre-diabetes and 11 cases (2%) were diagnosed with Type 2 Diabetes. The average age for diagnosis was 12 years of age, with the youngest being 7 years old with pre-diabetes, and the oldest with diabetes at 18 years of age.
Conclusion: The utilization of the HbA1c as a screening method for diabetes proves to be an important tool. It is well known that early diagnosis and management of Type 2 diabetes can lead to better outcomes.
Evaluating clinical symptoms, blood glucose and HbA1c levels in obese children should become a standard approach. We have used this data to provide feedback to our colleagues.

PO1.106

Novel waitlist intervention to identify early responders to treatment in adolescent obesity as a triage approach

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Background: Obesity affects 12% of the adolescent population with risk of remaining so in adulthood with increased cardiovascular risk. A staged based approach to the management of adolescents with overweight and obesity is recommended, starting from Stage 1 program, which recommends healthy lifestyle behavior change in primary care. Currently, there are no structured services to manage obese adolescents in the community and primary care setting nor a triaged referral pathway for management of high risk adolescent obesity who requires tertiary intervention.
Methods: We propose a waitlist intervention consisting of a brief intervention by KKH paediatric and adolescent weight management clinic (WMC) nurse coordinator and referral to the Kurbo program at the point of referral to WMC as a triage approach. The Kurbo program aid adolescents to learn healthy eating habits and weight management through the use of a mobile application and 12 sessions of weekly coaching sessions via video, phone or text. Adolescents will be contacted at one month to identify the actions they have taken to manage their weight and to remind them of their WMC appointment which is usually between 6-12 weeks at the point of referral. Based on the actions they have taken to manage their weight at one month post referral, the adolescents will be triaged into low risk or high risk WMC clinic based on a standard pathway as attached in Figure 1. The primary outcome will be proportion of adolescents triaged into low risk WMC clinics.
Results: 15 adolescents (50% male) are currently recruited with mean Body Mass Index (BMI) of 30.8 ± 3.98 kg/m^2 Ethnic distribution are as follows: 7 Chinese, 5 Malays and 2 Indian. Median number of Kurbo sessions is 9. 7 adolescents were triaged to the high risk WMC due to lack of weight reduction (n = 5) or failure to engage with the Kurbo program (n = 2).
Conclusion: Kurbo Program may be a useful triage approach to risk stratify adolescents with obesity.

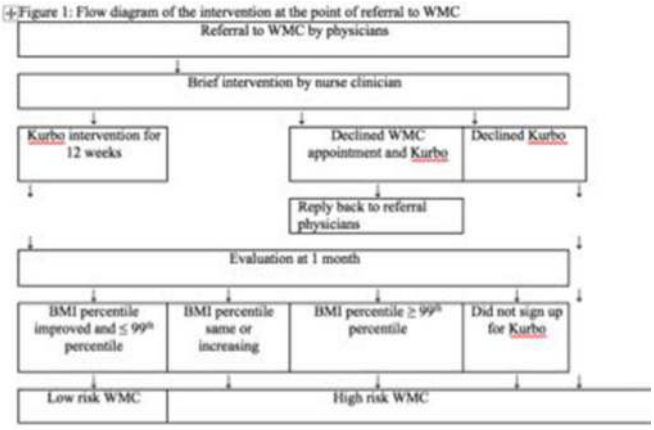

Fig. 1. Flow diagram of the intervention at the point of referral to weight management clinic.

PO1.107

Pediatric obesity and eating disorders symptoms: the role of the multidisciplinary treatment. A systematic review

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Introduction: The obesity prevalence in children/adolescents has increased worldwide in recent decades; the prevention and management of pediatric obesity onset are one of the most critical public health challenges. Pediatric obesity has been identified as a risk factor for various psychopathologies, including eating disorder (ED) symptoms.
Although it has been demonstrated that a comprehensive multidisciplinary treatment (MT) for children and adolescents with obesity reduced Body Mass Index (BMI) and risk of future co-morbidities, to the best of our knowledge, this is the first systematic review aimed at investigating the effect of MT on the development and/or progress of ED symptoms in children/adolescents with overweight/obesity.
Methods: A comprehensive and systematic literature search was undertaken of the following electronic databases: PubMed and Web Of Science (last search on 04 July 2018) according to a predetermined search strategy. Original studies published in English examining the effect of MT looking at the development of ED symptoms on children/adolescents affected by overweight/obesity were eligible for inclusion.
Results: Of 1040 identified records, nine articles were included, with study quality ranging from weak to moderate. MTs were heterogeneous in nature (including length, number, frequency and type of sessions, parent-involvement and technology involvement). Since the lack of a standardized questionnaire to evaluate the presence of ED symptoms in children/adolescents, various questionnaires were used. In three studies there was a significant decrease in external and emotional eating and in four studies a significant increase in restraint eating after an MT. Two studies found a significantly decreased of binge eating symptoms and other two studies showed an improvement of self-perceptions, weight and shape concern. A statistically significant decrease in BMI, BMI Standard Deviation Score (BMISDS) and BMI z score (BMIz) was observed after all treatment, except for one.
Conclusion: Results from this systematic review seemed to highlights the positive effect of MT on the development of ED symptoms. Moreover, since the BMI reduction after the MT was not necessarily related to ED symptoms reduction or improvement, the MT in pediatric obesity should be also targeted to treat not only the weight status but also the presence of ED symptoms.

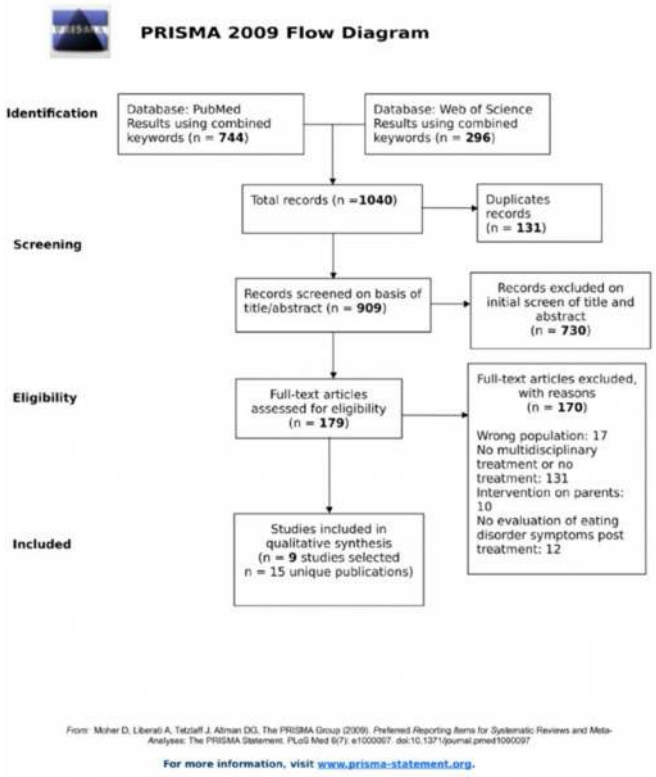

Fig. 1. Flow chart of study selection.

Tab. 1. Characteristics of selected studies.

Authors	Study design	Quality score	Simple size	Age	Questionnaire
Cohen et al. 2018	Randomized Controlled Trial	moderate	78	6 - 8 year old	CEBQ
Balantekin et al. 2017	Interrupted time series without comparison group	moderate	241	7 - 11 years old	ChEDE YEDE-Q
Halberstadt et al. 2016	Interrupted time series without comparison group	weak	120	8 - 19 years old	DEBQ
Adam et al. 2013	Interrupted time series without comparison group	weak	604	10 – 15 years old	TFEQ
Raimunda Damaso et al. 2013	Interrupted time series without comparison group	moderate	97	15 -19 years old	BES BITE
De Niet et al. 2012	Randomized Controlled Trial	moderate	144	8 -12 years old	DEBQ
Bishop-Gilyard et al. 2011	Randomized double blinded placebo - controlled trial	moderate	82	13 - 17 years old	QWEP EI
Goossens et al. 2011	Interrupted time series without comparison group	weak	108	10 - 17 years old	ChEDE
Sarvestani et al. 2009	Non Randomized Controlled Trial	moderate	60	11-15 years old	DEBQ

Tab. 2. Description of studies' multidisciplinary treatments.

Authors	Multidisciplinary treatment	Sessions	Length	Follow up	Focus	Diet or physical activity prescribed by a specialist	Inpatient period	Parents involved
Cohen et al. 2018	Based on Canadian diet and physical activity guidelines. Children were randomized into 3 groups: - Control (Ctrl; no intervention) - Standard treatment (StnTx: 2 servings milk and alternatives/ day (d), 3x/wk weight bearing physical activity) - Modified treatment (ModTx: 4 servings milk and alternatives/ day; daily weight bearing physical activity). Ctrl received counselling after 12 months	StnTx and ModTx participated in 6 interventions, which were held at the end of each month for the first 5-months of the study, then a final "relapse prevention" session at the end of the 8th month. Ctrl group received the interventions after 1-year.	12 months	NO	- Physical activity - Nutrition - Eating behavior - Parenting skills	YES (diet, structured physical activity)	NO	YES
Balantekin et al. 2017	Family-based behavioral weight loss treatment	16 session of family-based behavioral treatment.	Not specified	NO	- Nutrition, - Physical activity, - Eating behavior - Parenting skills	NO	NO	YES
Halberstadt et al. 2016	Combined multidisciplinary lifestyle intervention. Two months or 6 months period of inpatient treatment during weekdays requiring active and frequent participation of the parents/caregivers.	The MT had a period of inpatient treatment during weekdays of either 2 months and bi-weekly return visits of 2 days during the next 4 months or 6 months, followed by 6 monthly return visits of 2 days	12 months	12 months	- Nutrition, - Physical activity - Eating behavior - Parenting skills	NO	YES	YES
Adam et al. 2013	The DAK program, designed for one year with an initial multidisciplinary inpatient treatment followed by an outpatient family based treatment	The details of MT was previously published elsewhere. The protocol was written in Germany (see supplementary table)	12 months	48 months	- Nutrition, - Physical activity - Eating behavior - Parenting skills	YES (diet and structured physical activity)	YES	YES

Raimunda Damaso et al. 2013	Multidisciplinary treatment with the supervision of an exercise physiologist	Once a week, the adolescents had classes on topics related to improved food consumption. Adolescents underwent therapy support group weekly Adolescents were involved in structured session of physical activity three times a week.	12 months	NO	- Physical activity - Nutrition - Eating behavior	YES (structured physical activity)	NO	NO
De Niet et al. 2012	SMS maintenance treatment (SMSMT) program After the first 3 months of treatment where children and parents were involved into educational session group, participants were randomly assigned to: - intervention group, receiving SMSMT for 9 months, or to - control group (no SMSMT)	1 intake session; 8 children sessions; 3 parent sessions; for 3 months.	12 months	NO	- Physical activity - Nutrition - Eating behavior - Technology involvement - Parenting skills	NO	NO	YES
Authors	Multidisciplinary treatment	Sessions	Length	Follow up	Focus	Diet or physical activity prescribed by a specialist	Inpatient period	Parents involved
Bishop-Gilyard et al. 2011	Participants attending at a family based behavioral weight loss program were randomly assigned to: -intervention group (sibutramine 15 mg/d) or to - control group received placebo	The treatment was structured into 2 phases. Phase 1: Both intervention and control group attended a behavioral counseling for 4 months followed by bi-weekly visits for an additional 2 months. Parents were instructed in methods of supporting their children. Phase 2: After the initial 6 months all participant received sibutramine for 6 months.	12 months	NO	- Physical activity - Nutrition - Eating behavior - Parenting skills	YES (diet)	NO	YES
Goossens et al. 2011	Inpatient non-diet healthy lifestyle program.	Each child received 4 hours of individual guided exercises. All children had facilities to take part in exercise programs for at least 14 hours per week. All children received a 12-week cognitive behavioral treatment.	10 months	60 months	- Physical activity - Nutrition - Eating behavior - Parenting skills	YES (structured physical activity)	YES	YES
Sarvestani et al. 2009	Participants were randomized into: - intervention group receiving lifestyle counselling and structured sessions of physical activity - control group attended only three sessions of the same treatment.	Four-hour structured sessions of physical activity were held weekly for 16 weeks; each session involved 2 hours of behavior modification or dietary instruction and 2 hours of yoga therapy.	4 months	NO	- Physical activity - Nutrition - Eating behavior - Parenting skills	YES (structured physical activity)	NO	YES

Description of studies' multidisciplinary treatments

Tab. 3. Outcome of selected studies.

Authors	Outcome
Cohen et al. 2018	StnTx: - Food Approach □** - Food Avoidance not significantly change - BMIz □* ModTx: - Food Approach □ - Food Avoidance not significantly change - BMIz □ Ctrl: - Food Approach □ - Food Avoidance not significantly change - BMIz □ *
Balantekin et al. 2017	Entire sample: - Weight concern □** - Shape concern no significant change - LOC no significant change - BMIz □*** HIGH and SWC (compared with LOW): - Weight concern □*** - Shape concern □***
Halberstadt et al. 2016	Girls: - Restraint eating □** - External eating □ Boys: - Emotional eating □* - External eating □** Entire sample: BMISDS □***
Adam et al. 2013	Cognitive control/Restrained eating □*** Flexible control □*** Disinhibition □*** Rigid control □(at 24 months and at 48 months)*** BMISDS □***
Authors	Outcome
Raimunda Damaso et al. 2013	Percentage of adolescents with binge eating symptoms □*** BMI □***
De Niet et al. 2012	Emotional eating □* External eating □* BMISDS □***
Bishop-Gilyard et al. 2011	Percentage of adolescents with binge eating symptoms □** Hunger □*** Disinhibition □*** Cognitive restraint □*** BMI □
Goossens et al. 2011	OBE □ Restraint □ Weight concern □ Shape concern □ SBE □ Eating Concern □** Drive for Thinness □** Bulimia □** Body Dissatisfaction □** adjusted BMI □***
Sarvestani et al. 2009	Emotional eating □* Restraint eating □* External eating □* BMI □*

Legend: SBE: subjective binge eating episodes; OBE: objective binge eating episodes; LOC: loss of control; HIGH: High probability to develop ED pathology group; SWC: Shape and Weight concern group; LOW: Low probability to develop ED pathology group; BMIz: BMI z score; BMISDS: BMI Standard Deviation Score; □ decrease; □ remain stable; □ increased. *p≤0.05; **p≤0.01; *** p≤0.001.

PO1.108

Do the dimensions of the resected gastric specimen correlate with outcome after a sleeve gastrectomy in adolescents?

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Introduction: The relation between the volume of the resected gastric specimen and weight loss after laparoscopic sleeve gastrectomy (LSG) remains undetermined. Latest reports advocate the use of resected volume divided by preoperative weight or Body Mass Index (BMI) to predict the effectiveness of the gastrectomy.
The aim of this study was to investigate the correlation of the dimensions of the resected gastric specimen and demographics and early weight loss after LSG in our cohort of adolescent patients.
Methods: Retrospective review of all adolescent patients operated between April 2012 and December 2018. A standardized surgical technique was used in all patients with calibration of the sleeve with a 36 Fr bougie. The specimen dimensions were based on histology measurements (specimen length and width in centimeters). Demographic data, comorbidities and postoperative results were identified. Correlation was assessed using a Spearman Rank correlation. A P value of 0.05 was regarded as significant.
Results: Twenty-five (17 female) patients were included, with a mean age of 16.4 years (range 13-19). Mean preoperative weight was 141 kg (range 85-172) and mean BMI 50 kg/m^2 (range 35–72). Weight loss results after 6 months and 1 year were available for 17 patients with a mean % Excess Weight Loss (%EWL) of 40% and 49% respectively.
There was no correlation between specimen size and preoperative BMI (rS = 0.14; P = 0.24); BMI loss at 3 months (n = 19, rS = 0.19; P = 0.21) and 6 months (n = 17, rS = -0.13; P = 0.30). Neither was there significant correlation with %EWL (rS = 0.12; P = 0.30 after 3 months and rS = -0.02; P = 0.46 after 6 months).
Conclusion: We could find no relationship between excised stomach size and postoperative indices of outcome in our cohort of obese adolescents.

PO1.109

Baseline plasma ghrelin and obestatin levels do not predict the effectiveness of lifestyle modification and liraglutide therapy in obesity

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Introduction: Liraglutide therapy leads to clinically significant weight loss in some obese patients, however predictors of the effectiveness of this therapy are still unknown.
Methods: 22 obese patients without diabetes were separated into 2 groups. Patients of both groups did not differ significantly in gender, age, body weight, BMI and waist circumference (WC) at a baseline. Group 1 was recommended lifestyle modification: to reduce the daily calorie intake by 20% and fat intake by 25%, as well as to extend everyday physical activity up to 10 thousand steps per day for three months. In addition to these recommendations, group 2 was treated with liraglutide at a daily dose of 3.0 mg for three months. Fasting ghrelin and obestatin levels were assessed before enrollment and after 3 months of treatment in both groups.
Results: The median of the body weight loss was -3.3 kg and -4.5, the median of BMI change was -1.19 and -1.62, the median WC decrease was -3.0 and -6.5 cm respectively. In the first group the level of ghrelin and obestatin were 6.7 femtomoles per milliliter (fmol/ml) and 1.91 pg/ml before and 5.29 fmol/ml and 2.19 pg/ml after the treatment. The median of ghrelin change was -1.69 fmol/ml and 0.2 pg/ml – for obestatin. In the

liraglutide group, the level of ghrelin and obestatin were 8.67 fmol/ml and 1.84 pg/ml before and 6.07 fmol/ml and 1.95 pg/ml after the treatment. The median of ghrelin and obestatin change was -0.37 fmol/ml and 0.12 pg/ml. The decrease in body mass, BMI and WC was statistically significant in both groups (p□0.05). However, the difference in ghrelin (p = 0.11 and p = 0.29) and obestatin (p = 0.42 and p = 0.25) levels after the treatment was not statistically significant. The level of obestatin at the baseline did not correlate with body weight loss, BMI and WC. In lifestyle modification group we found a statistically significant correlation of ghrelin level with WC decrease (p = 0.02).
Conclusion: In our study, fasting ghrelin and obestatin levels at the baseline could not predict obesity therapy results. Only ghrelin level at the baseline was associated with WC reduction. These findings suggest that plasma ghrelin and obestatin concentrations have no predictive value for liraglutide therapy.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.110

Dramatic weight loss after sleeve gastrectomy in a patient with obesity due to heterozygous leptin receptor mutation

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Monogenic forms of obesity are uncommon, accounting for an estimated 1 – 5% of cases of severe obesity. Of these leptin receptor mutations are among the rarest and are associated with hyperphagia and rapid weight gain starting early in life. The outcome of bariatric surgery in these individuals is unknown. Here, we present the case of a morbidly obese young man with a leptin receptor (LEPR) mutation and his response to sleeve gastrectomy.
KAZ, an Emirati adolescent presented to our centre at aged 15 years for evaluation of progressive weight gain from the age of eight. There was a clear history of hyperphagia, but no clinical indication of hypothalamic dysfunction such as mood disorders or temperature dysregulation. There was a strong family history of obesity; mother, sister and two brothers were all obese. There was no parental consanguinity. Physical examination was unremarkable apart from obesity (weight 141 kg, BMI 45.13 kg/m^2). He was noted to have subclinical hypothyroidism (TSH 7.2 uIU/ml; free T4 18.51 pmol/L) and was commenced on daily thyroxine treatment. In spite of regular dietetic input, the patient continued to gain weight.
Genetic testing for a mutation in MC4R gene was negative. Further genetic tests were requested, but before results were available, the patient sought surgical treatment elsewhere and underwent a sleeve gastrectomy. He was lost to medical follow-up at our centre and re-presented 16 months post-op. During this time, he had lost 63 kg and reached a weight of 78.4 kg (BMI 25.02 kg/m^2). His previously requested genetic tests confirmed a heterozygous mutation in leptin receptor gene (c.3019A>T (p.Ser1007Cys)).
To our knowledge this is the second report of bariatric surgery in an individual with LEPR mutation. This case demonstrates the potential for a good response to sleeve gastrectomy in such cases. This may have important implications in treatment of this rare form of obesity, and also provide insights into hormonal pathways in obesity.

Health, Behaviour and Environment

PO1.111

The management of the high-risk patient with obesity and comorbidities: impact of online education on physician knowledge and confidence

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Purpose: To determine if case-based online medical education for primary care physicians (PCPs) and diabetologists/endocrinologists (diabs/endos) can improve knowledge and confidence regarding the management of patients with obesity and comorbid conditions.
Methods: This educational activity featured two interactive case studies that challenged learners to develop and apply the skills needed for providing appropriate care for patients with obesity and comorbidities who are considered at high risk for cardiometabolic and other overweight-related complications.
Educational effect was assessed with a repeated pairs pre- and post-assessment study with a 3-item multiple-choice knowledge, and a one-item confidence questionnaire in which participants act as their own controls. A χi-squared test assessed statistical significance at the P <.05 level. The activity launched November 29, 2017; data were collected until January 11, 2018.
Results: Participation in the activity significantly enhanced knowledge levels of PCPs (average correct responses increased from 42% to 88%; n = 513) and diabs/endos (from 58% to 94%; n = 202) regarding the weight-loss medications currently approved in Europe, the correct risk categorization of the given case example and the results of a major interventional clinical study (SOS) (p<.0001). After education, 58% of PCPs and 38% of diabs/endos were more confident in treating patients with obesity.
Conclusion: Participation in online interactive case-based education resulted in improvement of knowledge and confidence with respect to the management of complex patients with obesity and comorbidities. Further education is warranted on the distinction between the different approved weight-loss medications and their utility for certain patient types who are overweight or obese.

PO1.112

NUPP - A novel psychological weight loss program leads to sustained body weight reduction and improves satiety perception, emotional eating, stress hormone levels, and psychological pitfalls

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Introduction: Conventional approaches for body weight loss are not successful in the long term because they do not affect the fundamental loss of satiety perception and accustomed emotional eating in obesity. In a prospective intervention study, we examined the long-term effectiveness of a novel three months behavioral therapeutic program for weight reduction applied by a smartphone app (NUPP), which explicitly abstains from diet and exercise instructions. Ameliorated eating habits applied by the program should train hunger/satiety perception and reduce emotional eating to lose weight in the long term.
Methods: Over a study period of six months, 75 obese subjects (BMI 34.4 ± 0.5 kg/m^2; 55 % female) were examined at program start, after one month, at program ending, and three months thereafter. Body weight and composition, circulating stress hormones, satiety perception, emotional eating, self-efficacy, body image, and satisfaction with oneself were determined over the entire study period.

Results: We found a significant reduction in body weight ($p = 0.002$) and BMI ($p = 0.005$) associated with an increase in muscle-fat mass ratio ($p = 0.003$). Satiety perception increased and both ravenous hunger and emotional eating were diminished ($p < 0.001$ for all) by the program. Circulating ACTH and cortisol levels continuously declined ($p < 0.001$ for both) during the study period. Moreover, participants developed a higher self-efficacy in terms of body weight regulation, perceived their body image as less negative and were more satisfied with themselves ($p < 0.007$ for all).
Conclusion: The novel smartphone-based psychological weight loss program NUPP trains satiety perception and reduces ravenous hunger as well as emotional eating leading to sustained weight loss and improved body composition. In addition, the program ameliorates psychological and endocrine factors, which hamper successful weight loss, thereby breaking the vicious circle of unsuccessful weight loss, dissatisfaction, and stress.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.113

Motivational therapy in the co-existence of obesity and depression

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Introduction: Obesity is associated with increased risk of depression. Motivational therapy is a patient-centered treatment method focusing on enhancement of intrinsic motivation and behavioral changes. Here; it was aimed to evaluate the success of motivational therapy in obesity treatment, in the co-existence of obesity and depression.
Method: All patients who were seen in the obesity out-patient clinic for the first time in a month were included in the study. Age, gender and body mass index (BMI) were recorded. Depression diagnosis/ treatment, symptoms of depression, presence of eating disorders were questioned. Patients presenting signs/symptoms of depression were suggested a consultation by a psychiatrist, expert in the field of motivational therapy. All patients who gave consent for motivational therapy (MT) and those who did not were followed for 3 months and the amount of weight loss was recorded. Results were evaluated using SPSS.
Results: 28 female, 4 male, totally 32 patients were included in the study. Mean age was 52 year-old and mean BMI was 42 kg/m^2. 8 (patients (25%) had diagnosis of depression and were on antidepressants. 2 patients (6%) had binge eating disorder. None of the patients had nighttime eating syndrome. 31 patients (96%) showed signs of depression. There was only one patient showing no sign of depression but he was excluded from the study due to failure to attend follow-ups. 2 patients with previous depression diagnosis and 6 patients with new depression diagnosis, totally 8 patients (25%) gave consent for MT. 23 patients (72%) were followed with standard treatment (ST = diet and exercise). At the end of 3rd month, MT group lost statistically significantly more weight than ST group (mean weight loss in MTG was 4.8 kg and in STG was 2.3 kg).
Conclusion: As seen in our study, depression is common among patients with obesity and the signs should be searched in every obesity patient. Treating depression concomitantly with obesity and motivational therapy given by a psychiatrist that is expert on the field, is an important part of obesity treatment regimen especially for the patients who experience difficulty with treatment adherence.

Conflict of Interest: None Disclosed.

Funding: No funding.

PO1.114

Impact of behavioural dietary intervention coupled with oral rehabilitation on the health and nutritional status of older adults: a systematic review and meta-analysis

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Introduction: The ageing population represents significant nutritional challenges; where vulnerabilities to obesity, malnutrition and age-related diseases are exacerbated by impaired dental and oral health status. As natural teeth are lost, many older adults choose softer, more manageable foods lacking in essential micronutrients and fibre, yet replacing missing natural teeth alone does not positively influence diet. This systematic review synthesised literature relating to oral rehabilitation coupled with dietary intervention in adults. The primary outcome was diet/nutritional status; secondary outcomes pertained to health status (e.g. body mass index (BMI)), oral health and dietary intervention characteristics including: theoretical basis, intervention delivery and behaviour change techniques (BCTs).
Methods: MEDLINE, Web of Science, PubMed and CENTRAL were searched systemically, alongside hand-searching reference lists and contacting authors. Studies were eligible if they replaced missing teeth in edentate/partially dentate adults and included a dietary intervention, reporting diet/nutritional outcomes.
Results: Nine studies were included. Study designs were heterogeneous (three RCTs; five single-arm; one parallel-groups) involving 526 participants. Narrative synthesis identified improvements in all studies for least one aspect of patients' oral health (i.e. chewing) alongside at least one positive diet/nutrition outcome post-intervention (including some plasma biomarkers). Dietary outcomes included increased fruit/vegetable (F/V), protein and fibre intake. F/V results were pooled for three studies using meta-analysis techniques resulting in a standardised mean difference (SMD) of 0.29 [CI -0.54, 1.12], $p = 0.49$, but with marked heterogeneity ($p = 0.0007$). Five of nine studies reported BMI at baseline (three reported average BMI values of 22.5–22.9 kg/m^2; two reported average BMI values of 26.8–27.4 kg/m^2). Despite positive dietary changes in four of these studies, BMI did not change significantly post-intervention (reported in two studies with overweight participants only). Few interventions were theory-based with intervention components and delivery poorly described. Identifiable BCTs ranged from one to nine; five interventions tailored dietary information, and the most common BCT was giving information on the health consequences of diet.
Conclusion: Narrative synthesis indicated support for dietary intervention coupled with oral rehabilitation on improving intake. Impact on BMI from dietary intervention was unclear from the limited results reported. Meta-analysis of F/V intake was only possible with three studies, highlighting limitations. Further research with large-scale, appropriately designed and described trial methodologies is needed.

PO1.115

Influence of brisk walking on coronary heart disease risk markers in South Asian and White European women

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Introduction: South Asians are the largest ethnic minority in the United Kingdom and have elevated risk of coronary heart disease (CHD)[1].

South Asian men exhibit impaired postprandial metabolism, but acute walking and running appear equally, if not more, efficacious for improving postprandial CHD risk markers in South Asian than white European men[2]. However, it is not known whether similar responses are observed in women.

Methods: Twelve healthy South Asian and 12 healthy white European premenopausal women matched for age and body composition (Table 1) completed two, 2-day trials in a counterbalanced, crossover design during the follicular phase of the menstrual cycle. On day 1, participants rested (control) or completed a 60 min treadmill walk at 60% maximum oxygen uptake (exercise). On day 2, participants rested and consumed two high-fat meals (57% energy from fat) over an 8-h period during which 13 venous blood samples were taken.

Results: Based on ratios of the geometric means (95% CI), fasting high-density lipoprotein cholesterol (HDL-C) concentrations were 22% lower in South Asians than white Europeans (-36 to -6%, ES = 1.28, P = 0.013). Postprandial non-esterified fatty acid (NEFA) concentrations were 22% higher in South Asians than white Europeans (10 to 35%, ES = 0.51, P = 0.001). Postprandial triacylglycerol (TAG) (Figure 1), insulin, glucose and C-reactive protein (CRP) concentrations were not significantly different between ethnicities (P ≥ 0.172). Exercise reduced concentrations of postprandial TAG by 13% (-16 to -10%, ES = 0.29, P = < 0.001) and CRP by 22% (-32 to -10%, ES = 0.20, P = 0.001), but did not affect postprandial NEFA, insulin or glucose (P ≥ 0.134). The exercise-induced reduction in TAG was greater in South Asians than white Europeans (-19% vs -7%, respectively; ethnicity-by-group interaction P < 0.001). The magnitude of exercise-induced change was different between South Asians and white Europeans for NEFA (6% vs -16%, respectively; ethnicity-by-trial interaction P = 0.003) and glucose (-3% vs 4%, respectively; ethnicity-by-trial interaction P = 0.001).

Conclusion: South Asian women exhibited lower fasting HDL-C and higher postprandial NEFA concentrations than white European women. Brisk walking reduced postprandial CRP concentrations to a similar extent in both ethnicities but provoked a greater reduction in postprandial TAG concentrations in South Asians than white Europeans. This supports a beneficial role of brisk walking for reducing postprandial lipaemia in South Asian women.

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Funded by Loughborough University and the Leicester NIHR BRC.

Tab. 1. Physical characteristics.

	South Asian (n = 12)	European (n = 12)	95% CI WE vs. SA	P value
Variable				
Age (years)	24.2 (6.2)	24.3 (5.4)	-5.1 to 4.8	0.945
BMI (kg·m-2)	23.3 (3.8)	23.9 (4.0)	-3.9 to 2.7	0.700
Body fat (%)	31.1 (7.3)	29.9 (6.1)	-4.6 to 7.1	0.658
Visceral adipose tissue (L)2	1.1 (0.9)	0.9 (0.3)	-0.4 to 0.8	0.469
Maximal Oxygen Uptake (mL·kg-1·min-1)	34.8 (5.1)	40.5 (8.5)	-11.6 to 0.3	0.060

All values are mean (SD). 95% CI, 95% confidence interval of the difference between groups. Body fat determined by bioelectrical impedance; visceral adipose tissue determined by Magnetic Resonance Imaging.

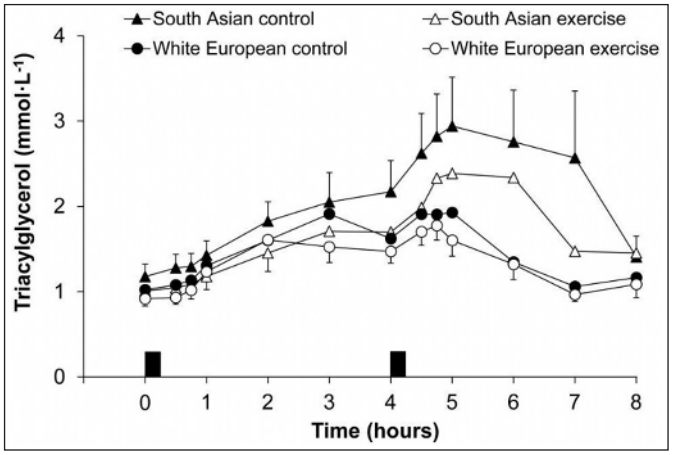

Fig. 1. Postprandial triacylglycerol responses.

Mean (SEM) postprandial plasma triacylglycerol concentrations in the exercise and control trials for South Asian (n = 10) and white European (n = 10) women. Black rectangles indicate consumption of breakfast and lunch meals.

PO1.116

Assessment on food addiction in obese individuals

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Introduction: Obesity is an epidemic which has significantly increased in spite of attempts to fight against it mainly through healthy diet and physical activity. In last years, the existence of an addiction to certain highly palatable and ultra-processed food has been proved.

Objectives: Assessing food addiction and related symptoms in obese people undergoing weight loss treatment.

Method: 132 patients (82 female), aged 28 to 70 (mean 51+/-11), BMI 30 to 46.9 (mean 32.85). Food addiction was assessed through the Yale Food Addiction Scale (YFAS). All patients were undergoing a VLCD alternating with LCD, with multivitamin, magnessium and potassium and were attending cognitive behavioral therapy groups aimed at losing weight with physical activity and monthly medical nutrition monitoring.

Results: 62.5% of patients showed diagnosis consistent with food addiction. 87.5 % resembled a symptom count (such as, tolerance, abstinence, and use in spite of negative consequences) without diagnosis.

Conclusion: In obese patients, the addictive food behaviours are significant and must be taken into account in order to provide an effective treatment. According to our experience, behavioural alternative therapies in the context of a comprehensive approach, optimize results not only in weight loss but also in maintenance to avoid weight regain.

PO1.117

The trends in weight and lifestyle of the first-year students from Kaunas universities between 2000 and 2017

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Introduction: University students are faced with two transition steps (from parental home to university and from university into adult life). Both transition steps may be related with changes in health behaviours such as diet, physical activity and harmful habits. Those changes can affect body weight. The aim of our study was to evaluate the trends in weight and lifestyle of the first-year students from Kaunas universities between 2000 and 2017.

Methods: The study was carried out in four Kaunas universities in 2000, 2010 and 2017. Anonymous questionnaire included information on

nutrition, physical activity and harmful habits, height and weight. Self-reported body weight and height were used to calculate BMI. In total, 689, 739 and 1062 randomly selected the first-year students were interviewed. The trends in weight and lifestyle of the students have been evaluated over 17 years of study period.

Results: During the study period the prevalence of an overweight in men increased from 11.7% in 2000 to 15.3% in 2010 and reached 23.7% in 2017; the proportion of obese men increased from 0.3% to 0.4% and to 4.3% respectively. In women, the prevalence of overweight was lower compared with men, but increasing trends were seen starting from 3.4% in 2000, reaching 5.7% in 2010 and 6.9% in 2017. The prevalence of obesity among females was 0.8% in 2000 and 0.2% in 2010, reaching 2.1% in 2017. P<0.001 for all trends.

Despite some positive changes in diet, nutrition habits of majority first year students were not in the line with nutritional recommendations. Data showed that daily consumption of fresh fruits, vegetables and porridges increased. However only 39.7% of men and 56.4% of women consumed fresh vegetables daily during the last study. The consumption of red meat decreased, but a half of men and 25.4% of women still used meat daily. Decreasing trends were seen in consumption of sweets, sweet pastries, sweet beverages, thought more than 60% of students at least twice per week reported eating sweets or sweet pastries. Fast food and unhealthy snacks were quite popular among students, being more common among men than women.

Only 26.5% of students were physically active at least 4 times per week. Male students were more physical active than female during all study period.

Conclusion: Over 17 years, the prevalence of overweight and obesity has increased among first-year students. The diet and physical activity of majority of the students did not comply with the recommendations.

PO1.118

Weight gain through life. Reasons why and divers to change it. The patient's beliefs

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Introduction: Some studies have examined the beliefs about obesity amongst patients. These groups are more likely to place more importance on causes that are within the individual's control and provide relatively weaker endorsement for social and biological causes. We wanted to examine the beliefs of the people affected and also asked for motivation drivers to change their habits.

Methods: From June to December 2018, we ask people who were in the waiting room of our office to fill in a questionnaire. Questionnaire was divided in 4 parts. First part, we assessed anthropometric data and asked for presence of cardiovascular risk factors. Second, we asked the weight they had when they were 18 years old. Third part was rating 11 reasons that could explain the weight gain and finally rating reasons that could drive a weight loss in case they wanted to.

Results: 32 people aged 36 to 76 years complete the questionnaire (17 women and 15 men). Average IMC was 34 Kg/m^2 and the weight gain from the aged 18 years old was 38'5% in men and 49'6% in women. Women had an average of 1'88 child and weight gain among women who had children compared with women with no pregnancies was 49,6% VS 21'3%.

Participants rated as very important reason "to eat unhealthy foods", but when we asked specifically for fast food then people rated as non-significant (44 VS 17 points).

Participants pointed lack of exercise as the main reason for weight gain (124 points), followed by lack of self-control (100 points), big food portions (52 points) and finally fast food (17 points).

There was totally agreement that most valued driver to change habits is for health reasons (92 points), self-esteem was next (89 points) and the less rated was "to buy nicer clothes" (46 points).

Conclusion: Overweight and obesity apart from being a risk factor itself, are linked with major risk factors responsible for cardiovascular disease. Quantity, rather than quality (at least in the Mediterranean area) may make some difference. Health would be the most valued reason to change. This study along with others examine the beliefs of the people affected which is good to assess knowledge and beliefs, but also asked for motivation drivers in order to design policies aligned to take the most advantage of it.

PO1.119

What are the ethical risks of using simulation body suits in obesity research, education and practice? A reflexive critique

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Introduction: Simulation body suits have received much attention by health service providers and researchers as an aid for training health professionals in safe manual handling and addressing weight bias (1–3). However, less is known about the ethical risks of their use in clinical practice, education, and research and their utility has been questioned by weight stigma scholars (4). To date there is a paucity of published evidence regarding the ethical principles and considerations that should guide this type of simulation work. This paper presents a discourse about the use and ethical risks of using simulation suits as a training tool and to address weight bias in health care by drawing on the recent experiences of conducting 2 research studies and multidisciplinary education sessions with health professionals.

Methods: Using a reflexive critique methodology this research aimed to establish the ethical risks and provide guidance on the considerations of researchers and clinical trainers when using simulation suits in research, education and practice.

Results: The paper will present a reflexive discourse on the ethical risks of simulation that takes into consideration the purpose of the suits use, the vulnerabilities of the people involved in their use, and the training requirements of the person leading the research or training sessions. Key recommendations will be offered for further contemplation.

Conclusion: More robust ethical guidance needs to be developed in conjunction with further research about the risks and benefits of using simulation suits for health professional education and clinical practice. This requires a commitment by industry suppliers and purchasers to uphold the ethical principle of benevolence.

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Conflicts of Interest: None disclosed.

Funding: Research relating to this abstract was funded by Victoria University of Wellington, New Zealand and the Department of Primary Health Care and General Practice, University of Otago, Wellington, New Zealand.

PO1.120

Use of mobile app for health promotion in normal weight and overweight or obese pregnant women

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Introduction: Selection of mobile apps for recording health-related variables is thriving. These apps may provide motivation for improving life style habits including food consumption and exercise, although scientific research in this area is scarce. Health advancing lifestyle is important during pregnancy as it has been related to the well-being of both mother and child. A particular challenge is how to motivate overweight and obese pregnant women to follow the recommended dietary and exercise patterns. Mobile apps, in addition to the usual maternal health clinic follow-up visits could provide a benefit. The aim of the present study was to evaluate the usability of a mobile app for recording lifestyle variables and to explore the differences between normal weight and overweight or obese pregnant women.
Methods: Pregnant women were enrolled to the study through announcements in social media. The women (n = 1047) interested in the study received a link to download a health-related app for recording a range of lifestyle related variables. A separate electronic questionnaire was sent to the women to inquire background data, height and weight prior to pregnancy and dietary quality by a validated index. Summary statistics regarding the use of app were collected from the app recordings data and combined with the questionnaire data. SAS 9.4 software was used for handling and analyzing data.
Results: In total 746 (71.5%) pregnant women downloaded the app and 591 (79.2%) of these women recorded at least one type of lifestyle variable in the app. The number of recordings in the app ranged from 1 to 4651, the median being 18 recordings. The most common recording was eating frequency (23.1% of all recordings), followed by water consumption, fruit consumption, vegetable consumption and mood. Duration of recordings ranged from 1 day to 44 weeks, the mean being 4 weeks. The proportion of women who recorded their lifestyle for 4 weeks or longer was higher for women (24.8%) with good diet quality, compared to those with poor diet quality (18.2%; p = 0.042). The proportion of overweight and obese women (15.3%) who used the app for 4 weeks or longer was lower than the respective proportion of normal weight women (21.6%; p = 0.013).
Conclusion: Overweight and obese pregnant women appeared to act somewhat differently to that of normal weight women in recording lifestyle habits to an app. Overall, at least 4-weeks recording of lifestyle variables to the app was related to a better dietary quality with reference to that recommended for healthy eating.

PO1.121

Impact of tableware visual cues on portion size, meal microstructure and the satiety response in lean and overweight women

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Introduction: Studies indicate that portion-control plates have the potential to reduce food intake. However, the process by which they moderate meal size remains unclear.
Objective: To understand the effects of a calibrated plate (with separate sectors and depictions for starch, protein and vegetables) on portion control, satiety, memory formation, and meal micro-structure, in women.
Methods: Forty-seven women (53% overweight/obese, 43±13 y old), self-served and ate a meal in the laboratory, once with a calibrated plate and once with a conventional (control) plate, in random order. On both days the meal comprised rice, meatballs, and vegetables, plus (optional) water, bread and fruit. Eating behaviour was monitored with a Universal Eating Monitor. Memory for portions consumed was assessed at 3-h using bespoke computer software. Pre- and post-meal appetite ratings were taken using an electronic VAS. Cephalic (blood pancreatic polypeptide (PP), insulin) and intestinal (ghrelin) satiety responses were measured in a subgroup of 13 women. Effects of plate type (calibrated or control) were tested with paired samples t-tests or Wilcoxon Sing-Rank tests.
Results: Mean±SEM amounts served (291.4±2.7 vs. 319.6±6.2 g) and consumed (282.2±2.9 vs. 308.3±6.5 g) were smaller with the calibrated compared with the control plate, especially consumed rice (69.7±3.4 vs. 85.0±4.4 g) ($p<0.01$ for all comparisons). Bite size (4.7±0.0 vs. 5.1±0.0 g; $p<0.05$) and eating rate (30.1±0.1 vs. 30.7±0.4 g/min; $p<0.01$) were also reduced but only in lean women. Fullness ratings were higher for the control plate only immediately post-meal (84.1±0.2 vs. 86.3±0.8 mm; $p<0.05$). Using the calibrated plate did not improve memory for portion size (high inter-individual variability detected). Blood PP levels (but not glucose, insulin or ghrelin) 5 min after starting the meal were higher with the calibrated plate (Median±IQR 296±392.9 vs. 233±209.6 pg/ml; $p<0.05$) in unadjusted models.
Conclusion: The calibrated plate reduces portion serving sizes and it promotes an eating style with reduced bite size and eating rate. Potentially, it also enhances the cephalic satiety response.

Conflict of Interest: Plate and rice donations were received from Precise Portions NLS, USA and Herba Ricemills, Spain.

Funding: Research funded by the Government of Navarra (grant PT028) and CIBERobn, Spain.

PO1.122

Chronotype may positively correlate with body mass index among Chinese young adults: a pilot study

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Background: Limited studies have explored the association between chronotype, social jetlag and body composition among Chinese, the aim of this study is to investigate the association between chronotype, social jetlag and body mass index among Chinese young adults.
Method: 447 healthy nonsmoking Chinese young adults aged 18-25 years old were included in this study. Information about chronotype and social jetlag was obtained from self-reported Munich Chronotype Questionnaire (MCTQ). Body mass index (BMI) was calculated from self-reported height and weight. Data were analyzed by adjusted multivariate linear regression models. Models were adjusted for gender, physical activity, eating timing and eating duration, study burden, sleep duration and light exposure.
Result: Among all participants, 268 (59.96%) were female, 228 (51%) were from Sichuan province. The average chronotype was 4:14 (1:12), and around half of participants experienced with social jetlag. About three fifth subjects suffered from chronic sleep deficiency and average body mass index was 19.9 (2.8) kg/m^2. Chronotype was found correlated with BMI in spearman correlation (rs = 0.10, P = 0.03). In multivariate linear regression models, we found that lower eating duration and later breakfast timing may enhance the relationship between chronotype and log-transformed BMI (β = 0.009, SE = 0.003, P = 0.007). In final model, chronotype was positively correlated with log-transformed BMI (β = 0.009, SE = 0.003, P = 0.02) after controlling for all covariates in previous models and social jetlag. However, social jetlag was not statistically correlated with BMI in all 5 models.

Conclusion: Our analysis indicated that later chronotype may positively correlate with body mass index among Chinese young adults.

Conflict of Interest: None Disclosed.

Funding: No Funding.

Tab. 1. Adjusted multivariate linear models between BMI and major predictors (Beta coefficients (Standard error)).

	Chronotype	P	Social jetlag	P
Model1	0.007 (0.003)	0.030	0.004 (0.003)	0.223
Model2	0.006 (0.003)	0.066	0.003 (0.003)	0.379
Model3	0.005 (0.003)	0.088	0.003 (0.003)	0.426
Model4	0.009 (0.003)	0.007	0.005 (0.003)	0.164
Model5	0.009 (0.004)	0.020	0.001 (0.004)	0.780

Model1 was unadjusted model. Model2 adjusted for general covariates, including demographic covariates (gender, region), lifestyle covariates (exercise, electronics, early-class, daytime nap, shift work, weekly light exposure, sleep duration). Model3 added study burden (credit and early class time) to model2. Model4 added eating timing covariates (breakfast timing, dine speed for 3 meals) to model3. Model5 adjusted for covariates in model3 and another MCTQ computed variables(MSFsc, SJL).

PO1.123

Current alcohol consumption status and its association with obesity in Korea: data from the 2013–2017 Korea Community Health Survey

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Introduction: The prevalence of alcohol dependence and alcohol abuse is much higher in Korea compared to other countries. There is still controversy about the effect of alcohol consumption on obesity. This study aimed to examined current alcohol consumption status and its association with obesity in Korea.
Methods: This study was conducted on subjects who participated in the 2013-2017 Korea Community Health Survey (KCHS). The KCHS was a nationwide survey to investigate health and disease statistics. Body mass index (BMI) (weight-kg/height-m^2) was categorized into: non-obese (<25 kg/m^2) and obese (≥25 kg/m^2). Alcohol consumption was measured using following measures: history of drinking, binge drinking, quantity of drinks/day and frequency of drinking. High risk drinking was defined as more than two times per week and 7 drinks or more per one drink (5 drinks for women).
Results: 1,142,884 participants 19 years or older were analyzed. The prevelence of obesity (BMI ≥25 kg/m^2) was 25.4%. The percent of the participants who reported drinking more than once a month was 52.1% (men 69.7%, women 37.6%). Among total participants, 23.5% (men 36.8%, women 12.5%) are binge drinkers (7 drinks or more per one drink, 5 drinks for women). and 12.5% (men 22.4%, women 4.0%) are high risk drinkers. In particular, the proportion of high-risk drinkers was highest in men in their 40s (32.1%). The odds of obesity were significantly greater among binge drinkers (1.24, 95% CI: 1.14-1.60, p = 0.030) and high risk-drinkers (1.77, 95% CI: 1.24-1.92, p = 0.022). However, those who reported drinking one or two drinks per day had 0.59 (95% CI: 0.34-0.62, p = 0.032).
Conclusion: The prevalence of binge drinkers and high-risk drinkers is high in Korea. Binge drinking and high-risk drinking is associated with obesity. Healthy alcohol drinking habits need to be controlled for prevention of obesity.

PO1.124

Drivers and barriers of water intake in preschool children with unhealthy drinking habits in a one-year longitudinal field study

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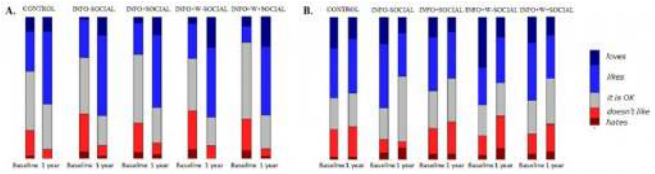
Background: Many children consume too little water and too many sugar-sweetened beverages (SSBs), with potential negative consequences for health. Sustainably increasing water intake is therefore relevant, however challenging.
Objective: Explore drivers of and barriers to water intake during a one-year field study in Poland aiming to increase plain water consumption using Installation Theory in preschool children.
Method: Caregivers of children (3-6 yrs) completed questionnaires on the child's preference for water and SSBs, their water drinking habit strength (Self-Report Habit Index, range 1 (low)-5 (high habit)), and barriers to drinking water, at baseline and after one year. Children were first allocated to one of three interventions: CONTROL: no intervention; INFO: online coaching sessions on water health benefits (3 weeks); INFO+W: similar coaching sessions and home water delivery (3 weeks). After 3 months, half of INFO and INFO+W subjects were also exposed to an online discussion forum (3 weeks) (+SOCIAL); the other half received no further intervention (-SOCIAL).
Results: 334 children (age: 4.4±1.2 yrs; 50% female) completed the study. At baseline,72% attended kindergarten, among which only 48% had access to water during the day. Drinking water during class was not allowed for 41%. The proportion of children who liked or loved water increased from 28% at baseline to 67% after one year. Conversely, that of children who liked or loved SSBs decreased from 58% at baseline to 45% after one year. The increase in preference for water was greater in the groups who initially received INFO+W compared to CONTROL (p = 0.004). The mean drinking water habit score increased from 2.3 at baseline to 3.0 across all groups with a larger increase in INFO+W+SOCIAL (+28%) compared to CONTROL (+16%) (p = 0.001). At baseline, the strongest barriers to drinking water were (1) Drinking large amounts of other beverages (72%), (2) A preference for other beverages such as SSBs (71%), (3) Not being aware that they should drink more water (61%), and (4) Not being used to drinking water or water having no taste (both 55%).Most barriers strongly decreased over the course of the study with no specific effect of the interventions.
Conclusion: An intervention aiming to increase water in pre-school children was able to modulate the preference for water, habit to drink water, and barriers to drinking water in preschool children with unhealthy drinking habits. Providing information and facilitating access to water were the most important contributors to improving healthy hydration habits.

Conflict of Interest: JHB, QD, IG, AV are full-time employees of Danone Research and SBM of Nutricia Research.

Funding: This study was supported by Danone Research and the London School of Economics.



Preference for water (A) and SSB (B) were assessed at baseline and after one year in each group with a rating from.Hates to Loves. Larger increase in preference between baseline and one year were observed in the INFO+W-SOCIAL and INFO+W+SOCIAL groups compared with CONTROL. CONTROL: no intervention INFO-SOCIAL: online coaching sessions on water health benefits INFO+SOCIAL: online coaching sessions on water health benefits and online forum INFO+W-SOCIAL: online coaching sessions on water health benefits and home water delivery INFO+W+SOCIAL: online coaching sessions on water health benefits and home water delivery and online forum.

Fig. 1. Changes in preference for water (A) and SSB (B) between baseline and 1 year in each intervention group.

PO1.125

Cognitive and behavioural strategies for weight control following weight loss programmes: exploratory analysis from the DROPLET trial

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Background: The aim of this study was to investigate the self-reported cognitive and behavioural strategies to aid weight control used by participants following two weight loss programmes.

Methods: Participants were drawn from a trial in which they were randomised to either a total diet replacement programme for 8 weeks plus 4 weeks food re-introduction, or a nurse-led behavioural programme for 12 weeks (n = 164, 61.6% female, mean ± SD; age 50.2 ± 11.2 years, BMI 36.6 ± 4.5 kg/m^2). At the end of the weight loss period after 12 weeks, participants completed a questionnaire to identify which of 115 cognitive and behavioural strategies, grouped into 21 domains, they had been using during the prior 4 weeks.

First we examined the association between an a priori model consisting of 9 'essential' strategies and prior weight change from baseline to 12 weeks, and secondly, the association with subsequent weight change from 12 weeks to 12 months. We used factor analysis to assess patterns of strategy use during each period using multivariable linear regression.

Results: Mean weight loss from baseline was -9.69 kg (SD 7.2) at 12 weeks and -8.28kg (SD 9.2) at 12 months. Reported use of the 'essential' strategies was associated with significantly greater weight loss at 12 weeks (-3.6 kg, 95% CI -0.95 to -0.37, p<0.001). Strategies linked with physical activity (-0.62 kg, 95% CI -1.2 to -0.94) and food purchasing behaviours (-1.5 kg, 95% CI -2.4 to -0.66) were significantly associated with weight loss at 12 weeks. There were no significant prospective associations between any of the behavioural domains with weight-loss maintenance.

Conclusion: Weight control strategies focused on physical activity and food purchasing behaviours were significantly associated with successful weight loss, but none of the reported strategies were associated with weight-loss maintenance outcomes.

PO1.126

How do adults define the treats they give to children? A thematic analysis

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One in four children on the Island of Ireland are overweight or obese. The consumption of energy-dense, nutrient-poor foods such as snacks, contribute to one fifth of children's calorie intake. However the snack food literature has failed to draw firm conclusions between snack food intake and obesity. Within this literature, the word snack and treat are used interchangeably, inconsistently and in differing contexts, which may explain the poor link between snacks or extra foods, and overweight or obesity. There is currently no academic definition of the word 'treat' relevant to an Irish population. Defining how adults perceive the treats they give children is of particular importance in the context of children's diets, and may provide insight into the relative contribution of treats to energy intakes. Using ten focus groups with adult caregivers of children, across the Island of Ireland, this study aimed to investigate treat giving behaviour. This research highlights a paradoxical definition of treats: a treat was identified as an energy-dense food that gave pleasure, was deserved and believed to be infrequent; participants perceived this to be the true definition of treats which was coined "real treats". However, in reality, treats were given and consumed frequently, downgrading treats status to "regular treats" which reflected their real-life use. Developing the definition of treats for an adult population, may enhance our understanding of why adults give food treats to children, the role this has on the development of eating habits, the design of interventions and communication strategies to reduce the consumption of non-nutritive foods, labelled by adults as treats.

PO1.127

Rice supply and prevalence of obesity - an international comparative study

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Purpose: Obesity is a very serious health problem in the world. Low carbohydrate diets are a popular weight-loss strategy in the developed countries. There are many studies on the relationship between grains and obesity. However, effect of rice on obesity is not clear. The purpose of this study is to clarify the relationship between rice supply and obesity using international database.

Methods: Rice supply (g/day/person) and energy supply (kcal/day/person) by countries excluding lost between production and household were identified by the Food and Agriculture Organization of the United Nations Statistics Division database. Prevalence of obesity (BMI30<) was identified by the World Health Organization database. Education years were identified by the United Nations Educational, Scientific and Cultural Organization Institute for Statistics. Current smoking rate was identified by the Global Burden of Diseases, Injuries, and Risk Factors Study 2015 database. Total population, percentage of population with over 65 years old (aging rate), gross domestic product (GDP) per capita and health expenditure was identified by the World Bank database. Each country was

divided into groups of high and low rice supply countries according to median of rice supply. We examined 136 countries with population 1 million or over using the latest data available since 2010. Differences of the groups compared by Student's t-test. The association between rice supply and obesity was examined using multiple regression analysis. Statistical analyses were performed using R 3.5.0.
Results: Energy supply, smoking, obesity, GDP, aging rate, education and health expenditure were significantly lower in high rice supply countries than in low rice supply countries. Rice supply was inversely related to obesity (Beta; -0.04, SE; 0.01, p<0.01). It was significantly related to obesity controlled for GDP (Beta; -0.03, SE; 0.01, p<0.01), and after controlled for aging rate, education, energy supply, smoking, and health expenditure (Beta; -0.02, SE; 0.01, p<0.01). From these results, the prevalence of obesity in the world was expected to decrease by about 1 point with increasing 50 g/day/capita rice supply.
Conclusion: The prevalence of obesity was significantly lower in the countries with higher rice supply even after controlling for life-style and socioeconomic indicators.

PO1.128

Adherence to the Mediterranean diet in a fasting population according to Christian Orthodox Church (COC) dietary recommendations in Greece

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Introduction: Studies regarding health effects of religious fasting increased during the last decade. Our aim is to investigate the adherence to the Mediterranean Diet principles in a sample that follows long-term structured fasting periods according to Christian Orthodox Church (COC) in Greece.
Methods: 411 individuals (187 men and 224 women) aged 18 to 76 years (48.18±13.65 years) from Northern Greece participated in the study. 199 individuals fasted regularly according to the fasting periods of COC since their childhood or for at least the last 10 consecutive years, and 212 were control subjects that did not fast. Anthropometric measurements (weight, height, and body circumferences), blood pressure and lipid analysis were performed during a non-fasting period. Adherence to the Mediterranean Diet was assessed using the Mediterranean Diet Score questionnaire (MedDietScore, MDS).
Results: Total Mediterranean Diet score was 30.11±3.6 for those following the fasting rituals and 29.39±4.36 for non-fasters. Although the total diet score is not statistically different (p = 0.074) significant differences exist in their weekly habits. Independent sample T-tests showed that the weekly consumption of fruits (p = 0.022), legumes (p = 0.000), red meat (p = 0.022) and poultry (p = 0.003) was statistically different in the two groups. Consumption of 9 or more servings of fruits per week are consumed by 60.3% fasters and 53.3% non-fasters, while none to 4 servings of fruits per week are consumed by 16.1% fasters and 25.4% non-fasters. Regarding the legumes consumption, 18.1% of fasters consume 3 or more servings per week comparing to 6.6% of non-fasters. Also, red meat and its products are consumed weekly from 4 or more servings by 10.0% and 16.5% of fasters and non-fasters respectively. Last, poultry consumption of 7 or more servings per week are consumed by 2.0% of fasters and 83.5% of non-fasters. Notably, olive oil is consumed daily by the majority of fasters (87.9%) and non-fasters (95.8%).
Conclusion: People who follow the COC fasting through their lifetime tend to follow the Mediterranean Diet guidelines more closely in their daily life, even during non-fasting periods when compared to non fasters.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.129

Trends in adult overweight and obesity prevalence in Mongolia, 2005-2013

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Introduction: To analyze trends in the prevalence of overweight and obesity among Mongolian adults during the past decade as measured by body mass index (BMI) and waist circumference (WC).
Methods: Data from the repeated cross-sectional surveys on the prevalence of noncommunicable disease risk factors conducted in 2005, 2009, and 2013 in Mongolia were used. Linear regression was used to quantify trends in mean BMI and WC, adjusted for age group, sex, and survey year.
Results: The age-standardized prevalence of obesity, denoted by the international BMI cutoff values, in men and women between 2005 and 2013 increased from 10.8% to 17.6% and from 18.9% to 26.4%, respectively. Using Asian-specific BMI cutoff values for men and women, the age-standardized prevalence of obesity between 2005 and 2013 increased from 20.0% to 32.8% and 33.4% to 43.7%, respectively.
Conclusion: The prevalence of overweight and obesity has increased markedly between 2005 and 2013 similarly across all age groups and sexes. It is important to consider the use of Asian-specific cutoffs as the burden of obesity is twice as high as when using international BMI cutoffs. These data demonstrate the urgent need for obesity treatment, prevention, and monitoring in Mongolia.

Conflict of Interest: No conflict of interest.

Funding: No Funding.

PO1.130

Diet quality of overweight and obese women during pregnancy in a population-based study

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Introduction: More than every third woman in reproductive age is overweight or obese in Finland. This predisposes to increased risks for gestational diabetes and other health-related conditions, including obstetric complications, during pregnancy. Conventional strategies to advance health of pregnant women include counselling to modify dietary and exercise habits. Regular health care visits during pregnancy provide an opportunity for counselling, one primary aim being to raise motivation towards healthy lifestyle changes. The aim of the study was to evaluate dietary quality and physical activity of overweight and obese women over pregnancy in an unselected population-based study.
Methods: Pregnant women were enrolled to the study by announcements in social media. The interested women (n = 1047) filled in an electronic questionnaire on their background data, validated Index of Diet Quality (IDQ) and index on leisure-time physical activity (MET-index). A second set of questionnaires was filled in at gestational week 33 to 40. IDQs and MET-indices were compared between normal weight (63.4 %) and overweight/obese women (36.6 %).
Results: The study population was representative of the Finnish pregnant women as compared with national perinatal statistics. Overall 46.7 % of the women had a good dietary quality (IDQ score 10 or more) with reference to that recommended. The IDQ score was significantly lower in

overweight/obese women than in normal weight women (8.9±2.3 and 9.6±2.1, p<0.001). Overweight/obese women were less likely to consume vegetables (p = 0.017), fruit or berries (p<0.001) and whole-grain products (p<0.001) daily than normal weight women. Diet quality did not change over the pregnancy in either group (p = 0.234). Leisure-time physical activity was 7.5 (IQR 15.8) in normal weight women and 4.8 (IQR 10.8) in overweight/obese women in early pregnancy, being more likely persistently low in overweight/obese women than in normal weight women (p<0.001). Having a high IDQ score was in association with higher leisure-time physical activity.

Conclusion: The majority of overweight and obese women, at risk for health complications during pregnancy and beyond, had lower diet quality and physical activity in early pregnancy than normal weight women. Furthermore, no change in diet quality was seen over the duration of the pregnancy in both groups. Overweight women could benefit from more intensive health counselling during pregnancy in order to improve their diet and exercise habits.

Conflict of Interest: The authors declare no conflict of interest.

Funding: Support from Business Finland (#3486/31/2015) to the University of Turku. The funding source had no role in the design, execution, analyses, interpretation of the data, or decision to submit results.

PO1.131

Intake of minerals by body mass index and gender in nutritional survey

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Introduction: The aim of our study was to determine the uptake of minerals in obesity vs. normal and overweight by body mass index groups and gender, evaluating actual, actual/recommended uptake (%), and uptake/kg body weight.

Materials and Methods: The nutrient intake (n = 462, BMI≥25 kg/m² n = 401, BMI <25 kg/m² n = 61) were analyzed using 3-day interview NutriComp3.0 program. After exclusion of under and over-riporting, n = 257 cases were tested [male:93, female:164, mean age (SD): 50.7 (11.8) years, mean BMI (SD): 37.1 (8.9) kg/m²]. Nutrient uptake of obese (30-39.9 kg/m²) and morbidly obese (> 40 kg/m²) compared with overweight (25-29.9 kg/m²) and normal weight (18.5-24.9 kg/m²) control groups. Analysis of variance was used, BMI groups pairwise comparison was made with the Tukey method in addition to the descriptive statistical methods.

Results: Sodium: both gender in all BMI groups extreme uptake was established. Potassium not reached the required value in obese and morbidly obese men groups of actual/recommended value 74.6%, 75.5%, in overweight group 100%, in all female groups showed decreased extreme characteristics. Calcium: actual/recommended value in obese and morbidly obese men 78.5%, 79%, in overweight 82.6%, while in women overweight 81.65%, obese 77.5%. Magnesium: did not reach a desirable intake in overweight men group 65.2%, in women all groups appropriate. Iron: suitable in all men groups, in women the recommended value was less in each group (from 100 to 86.5%). Zinc: in men 54.5% of the cases did not reach the required value, overweight 73.9%, obese 99.1%, increasing linear uptake by BMI in women, but the desirable value of overweight and obese 47-47 % not reached. Copper values are appropriate for men, in women overweight and obese groups not reached 39.5% and 40.8%. Manganese: in men overweight 82.6%, obese 60.6%, in women obese 66.2% not achieved the desired uptake. Chromium, phosphorus: target values. All minerals per kg body weight decreased with increasing BMI groups (ANOVA p <0.001), except copper in males NS.

Conclusion: The extreme level of sodium intake estimated in obesity and overweight, while the uptake of other minerals generally do not reached the recommended intake values. Although the increase by BMI expressed as the amount of consumption increases, but mineral uptake per kg of body weight is significantly reduced. Comparison according to gender substantial difference was observed only in the case of sodium, iron, manganese in men, in women the uptake of potassium and calcium somewhat higher.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.132

A high-protein Mediterranean diet and resistance training on the amelioration of cardiometabolic risk markers in cardiac rehabilitation patients with sarcopenic obesity: study protocol for a randomized control trial

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Introduction: Cardiovascular disease (CVD) in the UK is behind 1 in 4 deaths/year. While obesity is a leading risk factor in the development of CVD and weight loss has been shown effectiveness in reducing cardiometabolic (CM) risk markers, an obesity paradox exists in the cardiac population, where increased mortality has been linked to low body mass index (BMI) (1). Low BMI in cardiac patients may be primarily due to low lean body mass (LBM) rather than fat mass. A combination of low LBM and abdominal distribution of body fat, known as sarcopenic obesity (SO), results in greater risk of CVD (2). Increasing relative LBM, rather than simply promoting weight loss, may be appropriate for cardiac rehabilitation (CR) patients. Mediterranean diet (MD)-based approaches are established tools for treating CVD (3) and studies have shown a MD high in lean meat to be advantageous in improving CM markers (4). Protein intakes above current recommended levels, >0.8 g/kg bodyweight, combined with resistance training positively influence muscle mass (5), and promote greater improvement in body composition, due to a reduction in the proportion of fat mass (6).

Aims and hypothesis: 1) estimate the prevalence of SO in CR patients and 2) develop an intervention based on a combination of resistance training and a high-protein Mediterranean diet for the amelioration of SO and CM risk markers in this population. Hypothesis: LBM and body composition will be improved in CR patients, leading to reduced CM risk markers.

Methods: Screen a sample of CR patients for body composition, anthropometry and CM risk markers followed by a pilot, 12-week randomised controlled trial with CR-SO patients; a control group will receive standard CR guidelines; the exercise group will be prescribed resistance training; the Mediterranean diet group will be prescribed a modified high-protein Mediterranean diet (1.2-1.5 g protein/kg of body weight); and the exercise and diet group will be prescribed both resistance training and the high-protein Mediterranean diet. Baseline and endpoint measurements will be taken for body composition (DXA), anthropometry, cardiorespiratory fitness, muscle strength and CM risk markers (cholesterol, triglycerides, fasting glucose etc.).

Expected outcomes: We anticipate this research will highlight the importance of dietary protein and the fundamental need to increase exercise and improve diet in the CR patient group.

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PO1.133

Fluid intake patterns of children and adolescents in the Liq. In7 cross-sectional surveys are driven by water or sugar sweetened beverages

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Purpose: This study aimed to identify and characterize patterns of fluid intake in children and adolescents from six countries; Argentina, Brazil, China, Indonesia, Mexico and Uruguay.
Methods: Data on fluid intake volume and type amongst children (4-9 years; N = 1400) and adolescents (10-17 years; N = 1781) were collected using the validated 7-day fluid specific record (Liq.In7 record). To identify relatively distinct clusters of subjects based on eight fluid types (water, milk and its derivatives, hot beverages, sugar sweetened beverages (SSB), 100% fruit juices, artificial/non-nutritive sweetened beverages (A/NSB), alcoholic beverages, other beverages), a cluster analysis (partitioning around k-medoids algorithm) was used. Clusters were then characterized according to their socio-demographics and lifestyle indicators.
Results: The six interpretable clusters identified were: low drinkers – *SSB (n* 523*), low drinkers – water & milk (n* 615*), medium mixed drinkers (n* 914*), high drinkers - SSB (n* 513*), high drinkers – water (n* 352*) and very high drinkers – water (n* 264*)*. Country of residence was the dominant characteristic, followed by socioeconomic level, in all six patterns.
Conclusion: Fluid Intake patterns among children and adolescents are primary driven by water and SSB. In addition to country, socio-demographic and lifestyle factors determined the characteristics of each cluster. Therefore, interventions aimed to induce healthier fluid intake behavior need to target and be adapted to a particular subpopulations.

Conflict of Interest: CM, JB and IG are full time employees of Danone Research. JS-S, LAM, SAK, JG, HM are members of the advisory board on fluid intake of Danone Research, and have received consultancies from Danone Research. SAK has active research grants from Danone Research. JS-S and LAM has received consultancies from Danone S.A.

Funding: Research relating to this abstract was funded by Danone Research, Palaiseau, France.

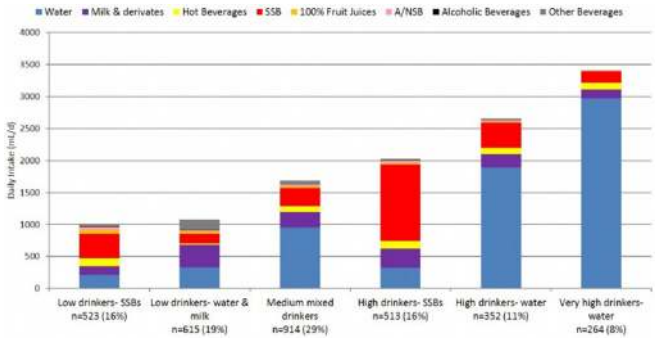

Fig. 1. Mean daily intake of different fluid types (mL/day) of each cluster among children and adolescents.

PO1.135

The use of dietary patterns analyses methods to develop a Brief Diet Quality Assessment Tool - BDQAT

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In the UK, there are few validated, brief dietary assessment tools available for population surveillance. The purpose of this study was to identify groups of food variables and wider sample characteristics that were indicative of dietary quality to develop a brief tool based on these indicator foods.
Dietary quality was explored using a priori and a posteriori dietary patterns analyses in adults from the UK National Diet and Nutrition Survey (n = 2083). Principal Component Analysis of 60 food variables was used to derive empirical dietary patterns that were analysed for their associations with biomarkers of nutritional status, as a proxy for diet quality. Backwards elimination regression and confirmatory analysis were conducted to identify the combination of food variables and sample characteristics that were independently most predictive of a theory driven, validated, Nutrient-based Diet Quality Score (NDQS). Further exploratory analysis investigated the most parsimonious model of diet quality with 8 items or less.
Four a posteriori dietary patterns, subjectively labelled as 'fruit, vegetables, oily fish, 'snacks, fast food, fizzy drinks', 'meat, potatoes, beer' and 'sugary food, dairy' explained 13.6% of the dietary variance in the data and were broadly representative of patterns of varying diet quality, as indicated by their associations with nutrient biomarkers. Confirmatory analysis showed that both the 12-item model derived from the a priori method and the 14-item model derived from the a posteriori method were moderately associated with diet quality (R2 = 0.33 and 0.29 respectively). Further analyses revealed a 5-item tool of 'fruit' (B = 0.04, p<0.001), 'vegetables' (B = 0.03, p<0.001), 'sugar sweetened soft drinks' (B = -0.004, p = 0.01), 'coated chicken/turkey' (B = -0.05, p = 0.03) and 'wholemeal bread' (B = 0.04, p<0.001) was moderately associated with diet quality (R2 = 0.26). In the analysis that included sample characteristics, smoking status was found to be predictive of diet quality (p<0.001). When included with 'fruit' and 'vegetables' in a 3-item tool, the construct was as predictive of diet quality as the 5-item food-only tool (R2 = 0.26).
A brief tool comprising 5 food items (fruit, vegetables, sugar sweetened soft drinks, coated chicken/turkey and wholemeal bread) can be used in the UK population to assess and monitor broad patterns of diet quality.

PO1.136

The relationship between dietary acid load with osteoporotic fracture risk and bone mineral density in two elderly Mediterranean populations

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Introduction: Osteoporosis is a multifactorial bone disease. Bone contributes to the maintenance of the acid-base system as a buffering system. The composition of the diet affects the acid-balance too. Animal origin food and cereals provide acid precursors while fruits and vegetables alkaline precursors. There is although some controversy, the high acid diet would contribute to easier bone mass demineralization and greater the fracture risk.
Objective: Our objective was to examine the association of potential renal acid load and net endogenous acid production with bone density and the risk of osteoporosis-related fractures in two elderly Mediterranean populations.
Methods: These analyses carried out with 1134 participants from the PREDIMED-Plus study and 870 participants from the PREDIMED study. Participants were women and men, aged 55-80 years with metabolic syndrome (PREDIMED-Plus) and high cardiovascular risk (PREDIMED). PRAL and NEAP were calculated from food frequency questionnaires. Bone density was measured using Dual-energy X-ray absorptiometry scans. Fracture information was obtained from medical records. Differences between basal PRAL/NEAP and bone density were evaluated by analysis of covariance. The association between accumulated average PRAL/NEAP and fracture risk was evaluated by multivariate Cox models.
Results: The highest tertiles of PRAL/NEAP were significantly associated with lower bone density. Participants in the extreme tertiles of cumulative PRAL/NEAP had a higher risk of osteoporotic fracture (PRAL T1 HR: 1.65; 95% CI: 1.02 - 2.63; T3 HR: 1.83; 95% CI: 1.11 - 3.03; NEAP T1 HR: 1.78; 95% CI: 1.10 - 2.86; T3 HR: 1.80; 95% CI: 1.07 - 3.03) compared to participants in the second tertile.
Conclusion: A high PRAL/NEAP are related with a lower bone density and extremes of PRAL/NEAP are associated with a higher risk of osteoporotic fractures in two elderly Mediterranean populations at high cardiovascular risk or metabolic syndrome.
Agreements: We acknowledge PREDIMED/PREDIMED-Plus staff, Rovira i Virgili University, Pere Virgili Institute, Sant Joan Hospital, the Fundación Patrimonio Comunal Olivarero, Hojiblanca SA, California Walnut Commission, Borges SA and Morella Nuts SA. In addition, we thank the support of the Spanish government and ISCIII that co-funded part of these studies in conjunction with the European Regional Development Fund. CIBERobn is an initiative of ISCIII, Spain.

PO1.137

Use of anthropometric characteristics as an additional tool for the assessment of changes in body composition during pregnancy

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Introduction: As during pregnancy a change in body composition and an accretion of water occurs differently in women, body weight gain might not be the best and only measure reflecting changes in fat storage. One useful additional tool for estimating body composition and the amount of body fat, besides weight and BMI, are anthropometric measurements, e.g. body circumferences and skinfold thickness measures.
Methods and sample: Anthropometric measurements from 332 pregnant women included in the Croatian Islands' Birth Cohort Study (CRIBS) were taken in each trimester, during three visits to the gynaecology practices and they included measurements of pregnant woman's height and weight (self-reported and additionally validated by a measurement at the first visit), middle upper arm and abdomen circumference, and skinfold thicknesses of upper-arm triceps and biceps. All anthropometric measurements were carried out following the standard International Biological Program protocol (1981). The sample was then further divided into three pre-pregnancy BMI and weight gain categories and differences between two groups were tested using One-way ANOVA.
Results: All findings of upper arm and abdominal circumferences were significantly ($p<0.05$) associated with pre-pregnancy BMI, in all three measurements. However, only upper arm circumference in the second and third trimester of pregnancy correlated with gestational weight gain. Biceps and triceps skinfold measurements in the first and second trimester were significantly correlated with pre-pregnancy BMI, while no correlation has been detected with gestational weight gain. Both pre-pregnancy BMI and gestational weight gain were significantly associated with changes in weight during pregnancy, as was expected.
Conclusion: Anthropometric characteristics can be used as an additional tool for the assessment of changes in body composition during pregnancy. However, they are more informative when associated with maternal pre-pregnancy BMI than with gestational weight gain.

Conflict of Interest: None Disclosed.

Funding: Research related to this abstract was funded by the Croatian Science Foundation under the grant number HRZZ UIP-2014-09-6598.

PO1.138

A novel meal nutritional score applied to meals from NHANES and exemplary menu plans

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Introduction: The aim of this study was to compare the healthfulness of meals from NHANES 2007-14 and exemplary menu plans using a novel meal score based on Nestlé's Nutrition Algorithm.
Methods: Nestlé's Meal Nutritional Score (MNS) is a number between 0 and 100 that provides a measure of the extent to which a meal meets US dietary recommendations. The MNS is derived from Nestlé's Nutrition Algorithm, which is based on pre-defined healthy ranges for carbohydrate, protein, total fat, fiber, calcium, potassium, magnesium, iron, food folate, vitamin A, vitamin C, vitamin D, vitamin E, sodium, saturated fat, and added sugars (Mainardi et al 2018). The MNS was applied to over 12,000 meals reported in NHANES 2007-14 for females with 24h energy intakes of 1700-2300 kcal/day. In order to compare against dietary recommendations, the MNS was also applied to 3 exemplary 14 day menu plans designed to meet the USDA's dietary recommendations for different dietary patterns (healthy US, Mediterranean and Vegetarian). A 24h diet score, based on the same methodology, was also generated for each of the menu plans and NHANES 24h recalls.

Results: The MNS scores for NHANES meals and 24h diets vs exemplary menu plans are shown in the table.

Conclusion: The main meals of the exemplary meal plans had higher scores than the meals of NHANES participants. The 24h diet scores were higher than the main meal scores, especially for the exemplary menu plans. This is consistent with the fact that single meals are unlikely to meet all the requirements of the US dietary guidelines, which apply to the whole diet. However, meal scores can be improved by adding more variety in terms of fruit, vegetables, whole grains, proteins and low fat dairy and by reducing sodium, saturated fat and added sugars, while respecting energy requirements.

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Conflict of Interest: The authors were all employed by Nestlé when this work was done.

Funding: No funding.

Tab. 1. Scores for NHANES meals and 24h diets vs exemplary menu plans.

Meal Nutritional Scores	NHANES	US healthy menu plan	Mediterranean menu plan	Vegetarian menu plan
Breakfast	43 ±14	74 ±11	68 ±11	75 ±7
Lunch	41 ±14	68 ±11	63 ±12	64 ±12
Dinner	41 ±14	69 ±11	63 ±5	68 ±7
Snack	34 ±14	56 ±11	59 ±10	63 ±7
24h diet score	45 ±20	80 ±4	80 ±4	80 ±5

Data are mean ± SD.

PO1.139

Examining the relationship between implicit and explicit preferences for high fat and high sugar foods and 24 hour dietary intake

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Introduction: Individual preference for palatable (high fat/sugar) foods is typically reward driven and may lead to obesity[1]. Food preferences may be conscious or unconscious, and can be separated into 'liking' (pleasure) and 'wanting' (desire to consume)[2]. These have been identified as drivers of eating behaviour[3]. The aim of this study is to examine the relationship between liking and wanting of high fat or high sugar food and 24hr dietary intake.

Methods: Participants (n = 65, 44.3±12.7yrs, 62% female, BMI: 36.6±11.1kg/m^2) were recruited as part of a wider residential study. Food preferences were measured using the Leeds Food Preference Questionnaire (LFPQ)[4]. The LFPQ is a validated, computer-based measure of explicit liking (hedonic feelings), explicit wanting (motivation) and implicit wanting (unconscious desire). Explicit measures were taken using Visual Analogue Scales, whilst implicit measures were determined through food selection and reaction time in a forced-choice task.

Dietary intake was covertly measured using 24hr weighed records. Participants had ad-libitum access to a range of food/drinks pre-determined by food preference questionnaires. Foods were proportionally represented in 6 groups, varied by fat content (high (>30%) vs. low (<20%)) and macronutrients including sugar (high >40%).

Results: There was no significant relationship between implicit or explicit preference for sweet food and daily percentage energy intake (%EI) from sugar (R^2 = 0.67, F(3,59) = 1.40, p = 0.25), or between implicit or explicit preferences and %EI from high sugar foods (R^2 = 0.05, F(3,59) = 0.96, p = 0.42). Implicit or explicit preferences for high fat foods were not significantly related to %EI from fat (R^2 = 0.11, F(3,59) = 0.25, p = 0.07), or %EI from high fat foods (R^2 = 0.12, F(3,59) = 0.26, p = 0.06). However within BMI groups, implicit and explicit preferences for high fat foods did significantly relate to %EI from both fat (R^2 = 0.11, F(3,36) = 4.26, p = 0.01) and high fat foods (R^2 = 0.21, F(3,36) = 3.15, p = 0.04) in those categorised as obese.

Conclusion: The significant relationship between preferences for high fat foods and 24hr fat intake may indicate greater reward driven behaviour for high fat foods in obese individuals. The relationship between sweet preferences and 24hr sugar intake was not significant for any BMI group. Eating behaviour is complex, and these findings indicate influences aside from food preference may drive energy intake.

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Conflict of Interest: None.

Funding: Funded by the US-Ireland Research Development Programme.

PO1.140

Consumer shopping behaviour and their food choices. A supermarket study

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Introduction: One important area regarding the influence of the environment on food intake and eating behaviour is the food store environment. Over half of all food purchases occur in grocery stores and account for approximately 85% of the energy content of the diet in the UK. Moreover, studies estimate that between 20% and 60% of a typical shopping basket is made up of unplanned purchases. While some studies reported higher spending and higher purchased energy content in overweight shoppers, other studies could not confirm these results. However, still little is known about the food purchasing in grocery stores and its possible relation to overweight and obesity.

Methods: In fall 2016 to spring 2017, over the course of 4 weeks, 61 grocery store shoppers (38 normal weight; 23 overweight/obese) were asked to write a shopping list and to collect their grocery receipts for each grocery store visit. Food categories including unplanned vs. planned purchases, money spent, and hunger ratings while shopping were compared across weight status.

Results: Overall, most bought food items were fruits and vegetables representing 32% of the entire purchase followed milk and cheese products (21%), On average, 57€ were spent for the weekly shopping trip with most money spent on food (52€). About 23% of the entire purchases were unplanned.

No differences between the number of purchased food products and weight status were found for any food category except for meat products with more meat products being purchased by the overweight/obese shoppers compared to the normal weight shoppers (p <.05). BMI correlated positively with unplanned sweets (r = .304) and savory snack (r = .286) purchases. Overweight/obese shoppers also tended to shop hungrier (hunger rating for normal weight = 3.52; overweight/obese = 4.01 on a 10 cm VAS).

Conclusion: The current study did not find significant differences in money spent or number of purchased food product, except meat. However, differences between overweight/obese and normal weight shoppers regarding unplanned purchase behaviour were found. More research regarding grocery shopping behaviour across populations is urgently needed in order to improve public health research and policy.

Conflict of Interest: None Disclosed.

Funding: No funding.

PO1.141

The relationship between emotional eating valence and food reward in participants of a weight loss maintenance intervention

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Introduction: Overweight, obesity and associated diseases are key societal challenges to the health of European citizens [1]. Despite initial success of weight loss attempts, weight relapse is the most common outcome [2]. Food hedonics (the pleasure [liking] and the motivation to eat [wanting]) can influence self-regulation of energy intake (EI) [3, 4]. Eating in response to negative emotions may affect EI [5] and undermine successful long-term weight control. However, little is known about the role of emotional valence and its associations with hedonic responses to food. This study aimed at examining the relationships between negative and positive emotional eating and food reward in a subsample of participants of a weight loss maintenance intervention.
Methods: This cross-sectional study investigated correlations between positive and negative emotional eating and food reward – liking and wanting for high fat vs low fat and sweet vs savoury foods. The sample included 66 participants (14 men, 52 women) with a mean (SD) age of 49.37(11.91) and BMI of 32.24 (6.75). Explicit liking and implicit wanting were assessed using the Leeds Food Preference Questionnaire, and negative and positive emotional eating was assessed through the Positive and Negative Emotional Eating Scale.
Results: Explicit liking bias for high fat foods was positively associated with negative emotional eating (.30, p = .016). Implicit wanting for fat was positively associated with negative (.28, p = .025) and positive emotional eating (.25, p = .043).
Conclusion: Results offer preliminary evidence that eating in response to negative and positive emotions is associated with components of food reward, namely wanting for high fat foods. Prospective studies should explore these associations and how the interaction between emotional valence and hedonic responses to energy dense foods may influence eating behavior and EI during weight management attempts.

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PO1.142

Protein intake and socioeconomic status in a Korean elderly population

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Background: Deficiency of protein intake is prevalent in the Korean elderly population whose main staple is rice. This study is to examine the relationships between socioeconomic status and protein intake in the Korean elderly population.
Methods: Data were obtained from 1,484 male and 2,028 female Koreans aged of 60 years or older from the 2013~4 Korea National Health and Nutrition Examination Survey. One day 24-hour recall data were used to estimate the daily total, animal, and plant protein intake. Educational attainment and household income were assessed by trained interviewers.
Results: About 70% of Korean elderly were in the lower middle or the lowest income quartile groups and 73% had less than 9 years of education. Household income quartiles and years of education completed were positively associated with total protein intake (g/kg) (p = 0.003, p = 0.004, respectively) and animal protein intake (p = 0.003, p<0.001). For plant protein intake, household income quartiles had nonsignificant associations (p = 0.579) and the years of education completed showed negative associations (P = 0.010).
Conclusion: In Korean adults aged 60 years or older, the protein intake was associated with socioeconomic status assessed with household income and years of education completed. Strategies to increase protein intake in the lower socioeconomic groups are needed.

PO1.143

The role of Mediterranean diet in the prevention and the treatment of increased body weight: review

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Introduction: The continously renewed data of WHO about obesity point out that it is a global epidemic with a rapid evolution and disastrous parameters. As a metabolic disease, obesity is responsible for increased morbidity, disability and mortality, negatively affects quality of life, while being related to increased risk of death due to cardiovascular disease and a lot of forms of cancer. Through thorough attempts towards finding dietary patterns against obesity, the pattern of Mediterranean Diet might be an effective means at the hands of the scientific community. The purpose of this thesis was to review the newest existing data about the role and the relationship of the Mediterranean Diet and increased body weight and obesity.
Methods: Fourteen studies have been retrieved, including five prospective, two cross-sectional, five clinical trials and two simple uncontrolled clinical follow-up studies about the relationship of the Mediterranean Diet with obesity.
Results: The results of these studies show the positive, protective role of the Mediterannean Diet against gaining body weight, through increased adherence to the pattern of Mediterranean diet, as well as against increased body weight and obesity through dietary interventions with Mediterranean Diet.
Conclusion: These findings make the Mediterranean Diet a trustworthy dietary pattern and, at the same time, a valuable tool that can be used in the general population, in the context of primary and secondary prevention, and for dealing with obesity.
Keywords: Mediterranean Diet, dietary pattern, overweight, obesity, BMI

Conflict of Interest: None.

Funding: No funding.

Tab. 1. Results of the studies for overweight/obesity.

Πίνακας 6. Αποτελέσματα των ερευνών για την ΜΔ στον υπέρβαρο/παχυσαρκία

Μελέτη (όνομα)	Σωματικό βάρος(kg) (BW body weight)	Δείκτης μάζας σώματος(kg/m2) (BMI body mass index)	Περίμετρος μέσης(cm) (WC waist circumference)
Επιδημιολογικές μελέτες			
Προοπτικές μελέτες			
Rumawas et al[91]			↓ (97,1)
Beunza et al[94]	NS (10,244/έτος)		
Romaguera et al[95].	(-0,16)	↑ 10%>25 NS	
Kesse – Guyot et al[96]			↓ (93,23),(87,8)
Yingrui Li et al[97]	NS (10,03)		NS(10,05)
Συγχρονικές μελέτες			
Romaguera et al[98]		NS	↓ 1P ♂(-0,09), ♀(-0,06)
Martinez – Gonzales et al[99]		↓>10P ♀(30,05), ♂(29,08)	↓ >10P ♀(96,5), ♂(102,0)
Κλινικές μελέτες			
Απλής παρακολούθησης			
Leblanc et al[100]	↓ ♂(1,4), ♀(0,7)	↓ ♂(0,6), ♀(0,2)	↓ ♂(1,9), ♀(1,3)
Pontes -Torrado et al[101].	↓ ♂(-12,9), ♀(-9,2)		
Τυχαιοποιημένες ελεγχόμενες			
Tuttle et al[102].		↓ (1)	
Shai et al[103]	↓ (-4,4)	↓ (-1,5)	↓ (-3,5)
Esposito et al[104].	↓ (-3,3)	↓ (-1,2)	↓ (-3,0)
Elhayany et al[105].	↓ (-7,4),(-10,1)	↓ (-2,6),(-3,3)	↓ (-9,3),(-10,1)
Estruch et al[106]	↓ (-0,88),(-0,40)		↑ (+0,85),(+0,37)

PO1.144

Eating behavior and metabolic syndrome over time

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Purpose: We evaluated longitudinal associations between eating behaviors (EB) and risk of metabolic syndrome (MetS).
Methods: We obtained complete data on EB (restrained EB, emotional EB, and external EB assessed using Dietary Eating Behavior Questionnaire) and MetS components at baseline and follow-up for 1237 individuals (594 men, 643 women; mean age, 42.7 ± 11.8 years) among the participants of the Korean Healthy Twin study. A generalized estimating equation model was applied.
Results: MetS at baseline was found in 17.5% of individuals, while MetS had developed in 9.7%, resolved in 5.7%, and persisted in 11.7% at the 3.2-year follow-up period. After adjusting for twin and household effects, age, education, smoking status, alcohol use, physical activity, and other EB scores at baseline, restrained EB in men was associated with concurrent MetS (odds ratio [95% CI] per 1-point increase, 1.49 [1.20–1.86]) and persistent MetS (1.67 [1.27–2.16]), and emotional EB at baseline in women was associated with incident MetS (2.07 [1.30–3.32]) and persistent MetS (1.89 [1.22–2.93]). In the adjusted models, compared to the non-MetS group at both visits, incident MetS was associated with persistently high emotional eating and increased emotional eating; resolved MetS was associated with decreased restraint eating and increased external eating; and persistent MetS was associated with persistently high restrained eating, decreased restrained eating, and increased external eating.
Conclusion: In these Korean twins and their family members, restrained eating and emotional eating may be associated with risk of MetS.

Tab. 1. Cross-sectional and longitudinal associations of eating behavior (EB) scales at baseline with metabolic syndrome (MetS).

	MetS at baseline*	Incident MetS†	Resolved MetS†	Persistent MetS†
Baseline EB in all subjects				
Restrained	1.19 (1.02-1.40)	1.11 (0.89-1.40)	1.14 (0.89-1.46)	1.23 (1.02-1.49)
External	0.95 (0.77-1.18)	0.90 (0.68-1.20)	0.93 (0.65-1.32)	0.95 (0.74-1.23)
Emotional	1.27 (0.97-1.66)	1.31 (0.95-1.82)	1.35 (0.90-2.01)	1.35 (1.00-1.82)
Baseline EB in men				
Restrained	1.49 (1.20-1.86)	1.20 (0.89-1.64)	1.33 (0.93-1.90)	1.67 (1.27-2.16)
External	1.03 (0.80-1.34)	1.07 (0.78-1.46)	0.78 (0.48-1.26)	1.18 (0.88-1.60)
Emotional	1.28 (0.87-1.87)	0.66 (0.39-1.12)	1.97 (1.19-3.26)	0.89 (0.55-1.45)
Baseline EB in women				
Restrained	0.91 (0.72-1.17)	0.95 (0.69-1.30)	0.94 (0.62-1.45)	0.93 (0.71-1.23)
External	0.90 (0.64-1.26)	0.65 (0.38-1.11)	1.19 (0.72-1.95)	0.70 (0.45-1.07)
Emotional	1.28 (0.85-1.92)	2.07 (1.30-3.32)	0.75 (0.39-1.42)	1.89 (1.22-2.93)

Values represent odds ratio (95% CI) per 1-point increase of each EB score. Adjusted for age, sex (except for the analysis in each sex), education, smoking status, alcohol drink, exercise, zygosity, household, and other EB scores using generalized estimating equation. * Reference was a group of non-MetS at baseline; †Reference was a group of non-MetS at both visits.

Tab. 2. Longitudinal associations of eating behavior (EB) with metabolic syndrome (MetS).

	Incident MetS*	Resolved MetS*	Persistent MetS*
Restrained EB at baseline & follow-up			
Low & low	1.0	1.0	1.0
Low & high	1.42 (0.70-2.89)	1.15 (0.46-2.88)	1.92 (0.99-3.69)
High & low	1.59(0.79-3.17)	2.41(1.09-5.32)	2.79(1.44-5.39)
High & high	1.32 (0.78-2.23)	1.32 (0.70-2.49)	1.88 (1.11-3.17)
External EB at baseline & follow-up			
Low & low	1.0	1.0	1.0
Low & high	0.66 (0.32-1.35)	3.58(1.64-7.78)	2.09 (1.10-3.97)
High & low	0.98(0.53-1.80)	1.29(0.52-2.92)	1.11(0.61-2.03)
High & high	0.56 (0.30-1.03)	1.80(0.82-3.93)	1.13 (0.63-2.04)
Emotional EB at baseline & follow-up			
Low & low	1.0	1.0	1.0
Low & high	2.64 (1.26-5.51)	0.50(0.17-1.52)	1.05(0.49-2.26)
High & low	1.20(0.63-2.26)	1.22(0.61-2.45)	1.49(0.84-2.67)
High & high	2.97 (1.64-5.40)	0.73(0.37-1.44)	1.35 (0.81-2.26)

Values represent odds ratio (95% CI). Eating behavior in each domain was categorized by combinations of dichotomized two groups (low vs. high) by sex-specific median at baseline and follow-up. Adjusted for age, sex, education, smoking status, alcohol drink, exercise, zygosity, household, and other EB at baseline and follow-up using generalized estimating equation. *Reference was a group of non-MetS at both visits.

PO1.145

Dietary changes and its psychosocial moderators during the university examination period

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Purpose: Stress is thought to stimulate unhealthy dietary choices towards fat and sweet foods. Nevertheless, individual vulnerabilities might exist depending on psychological factors. We will check the impact of examination stress on nutrition via a longitudinal study, while identifying risk groups via moderation by eating behavior (emotional/external/restrained), food choice motive, taste preference, reward/punishment sensitivity, impulsivity, coping strategies, sedentary behavior, social support, living in a student home and being a first-year student.
Methods: Before and after the examination period January 2017, 232 Flemish students completed online questionnaires on diet (food frequency questionnaire with diet quality index), the above mentioned psychological factors, perceived exam stress and some demographics.
Results: During the examination period, diet quality decreased: lower general diet quality index, lower fruit and vegetables intake, higher fast food intake and more difficulties to eat healthy. Based on significant time moderation, emotional eaters, external eaters, sweet/fat lovers, those with health as food choice motive, sensitive to reward or punishment, highly sedentary, non-first-year students and those with high stress reports were at higher risk for exam-induced diet deteriorations (partial èta^2:017-0.071; highest effects for health as food choice motive and external eating). Most tested variables were also related to baseline dietary intake which was of rather low quality.
Conclusion: Students are vulnerable to diet deterioration during examination periods and high-risk groups were identified. Prevention strategies should integrate both psychological and lifestyle aspects: stress management, nutritional education with techniques for self-effectiveness, awareness of eating-without-hunger and a healthy diet and activity stimulating environment.

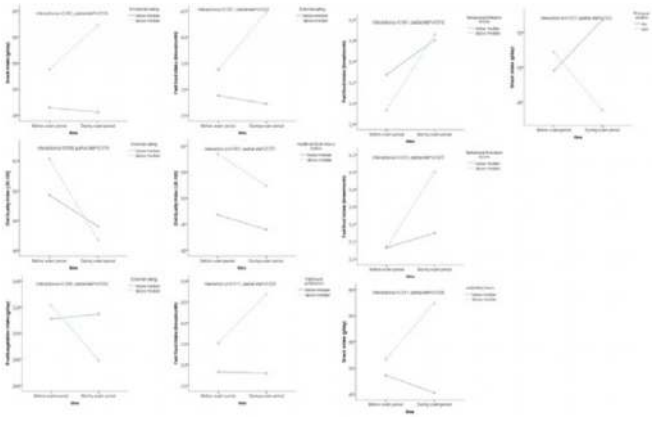

Fig. 1. Significant interactions by psychosocial variables in the relation between time (before versus during exam period) and diet.

Tab. 1. The effect of reported stress on dietary change over exam period.

	p-value interaction "time*stress"	Partial èta^2	Mean Before exam period	Mean During exam period	Mean estimated difference
Diet Quality Index score [-25;100]	0.005	0.034	High stress: 51.0 Low stress: 50.7	High stress:46.2 Low stress: 52.5	-4.8 (-9%) +1.8 (3.5%)
Fruit & vegetables (g/day)	0.400	0.003	High stress: 310.5 Low stress: 351.8	High stress: 287.8 Low stress: 350.3	22.7 (7%) -1.5 (-0.4%)
Snacks (g/day)	0.005	0.034	High stress: 50.6 Low stress: 47.3	High stress: 57.4 Low stress: 31.6	+6.8 (13%) -15.7 (-33%)
Fast food (times/month)	0.623	0.001	High stress: 3.2 Low stress: 2.6	High stress: 3.7 Low stress: 2.8	+0.5 (15%) +0.2 (8%)

Results obtained by repeated measures ANOVA adjusted for sex, including time, stress and time*stress as predictors.

PO1.146

Weight status in relation with eating disturbances in a county representative group

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Introduction: Eating disorders are frequently associated with obesity and overweight leading to complications and co-morbidity which are difficult to treat and raise the cost of health care. The aim of the study was to analyze the frequency of eating disturbances (binge-eating (BE), eating inhibition (EI), eating disinhibition (ED), excessive hunger sensation (EHS), night eating (NE), carbohydrates craving (CC), stress related eating (SRE)) and their relation with weight status in adult population of Galati county, Romania.

Methods: The group (311 adult persons) - representative for Galati district population for age, gender (50.56% women, 49.44% men) and residence (urban 61.51%, rural 38.49%).We assessed: Three-Factor Eating Questionnaire–Eating Inventory (TFEQ,Stunkard) – food restriction, eating disinhibition, hunger sensation; Binge Eating Quiz (H. Pope, J. Hudson) to identify binge-eating; night eating, carbohydrates-craving, stress related eating questionnaires (Center of Diabetes, Nutrition and Metabolic Diseases, Cluj-Napoca, Romania), Body Mass Index (BMI, 26.92±5.91 kg/m^2), obesity/BMI categories (normal weight, overweight, obesity), abdominal obesity (abdominal circumference, AC, 91.82±16.32 cm) and categories (low risk, moderate risk, high risk).

Results: Prevalence in studied parameters were: BE categories - binge eating-12.94%, bulimic behavior-0.33%, without BE-86.73%; EI-27.65%, ED-27.01%, EHS-21.86%, NE-2.04%, CC-56.46%,SRE-9.52%.

BE score was directly correlated with BMI and AC.BE score was higher in obesity BMI and high risk AC. EI was inversely related with AC and risk AC. ED was direct related with BMI, BMI categories and risk AC. NE was direct related with BMI categories, while CC was inversely related with AC risk. The other tests were not statistically significant.

Conclusion: In the adult group of persons, both from urban and rural areas, prevalence and scores of binge-eating were higher in subjects with increased BMI and AC, and also in obesity and high risk abdominal obesity. Higher scores were noticed for eating disinhibition in obesity and high risk abdominal obesity and for night eating in obesity, confirming increased prevalence of eating disturbances in persons with abnormally augmented weight status.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.147

Associations of binge-eating disorder and food addiction with executive functions in adults with obesity

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Introduction: Recent research has proposed that impairments in general executive functions might be a causal and maintaining factor for obesity. For example, reduced inhibition and planning were related to unsuccessful weight loss-related behavior in individuals with obesity. The eating disorder diagnosis of binge-eating disorder (BED) as well as the trait of food addiction (FA) are highly comorbid with obesity and were also found to be associated with impaired executive functioning compared to individuals without BED or FA. However, nothing is known about cumulative effects of BED and FA on executive functions in adults with obesity.

Methods: In a convenience sample of N = 88 adults with obesity seeking treatment within two brain-directed intervention studies, n = 19 individuals presented with BED, n = 23 with FA and n = 23 with BED and FA. BED diagnosis was based on clinical interview, while FA was assessed via a well-established self-report questionnaire. In addition, n = 23 otherwise healthy individuals with obesity were stratified to the other groups regarding body mass index, age, and sex. Well established computerized neuropsychological tasks were used to assess response inhibition, attention, decision-making, and impulsivity.

Results: The BED group presented with lower executive functions compared to individuals with obesity only. Specifically, adults with BED showed a significantly higher variability of their response times in an attention task and inadequate feedback integration compared to individuals with obesity only. Adults with comorbid BED and FA presented with higher levels of depression, but did not show any impairment in executive functions compared to the other groups, including the group of adults with FA only.

Conclusion: Overall, this study found only few group differences in executive functions in treatment-seeking adults with obesity with and without BED and/or FA. Most evidence was provided for a BED-specific, but not FA-specific neuropsychological profile in individuals with obesity. Studies with larger samples and food-specific tasks are necessary to further discriminate between BED and FA. Longitudinal studies are also recommended to determine the causal direction of pathological eating behavior and possible changes in executive function.

PO1.148

Binge eating disorder is associated with lower glucose levels three hours after an oral glucose tolerance test

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Introduction: Binge-eating disorder (BED) is characterized by regularly and compulsively eating large amounts of food, often rapidly, and to the point of discomfort or pain. The exact cause of BED is still unknown, but it is currently attributed to a combination of psychological, behavioral, and environmental influences. The aim of this study has been to assess any association of BED with metabolic disorders, specifically glucose metabolism.
Methods: 1166 non-diabetic obese subjects were retrospectively selected among those who had undergone a 3-hour-OGTT and a psychological assessment including psychometric tests as part of the routine patients accessing our obesity center undergo for initial evaluation. The patients were divided in two groups depending on the presence or absence of BED. Subjects with other eating disorders with no binge eating pattern were excluded from this study.
Results: Patients with a diagnosis of BED were 150, and 868 obese subjects with no eating disorder were selected as control. BMI and HOMA IR were not significantly different between the two groups. The area under the curve (AUC) of glucose and insulin after an oral glucose load were not significantly different, but glucose at 3 hours was significantly lower ($p<.0001$) and insulin significantly higher ($p = .005$) in BED patients compared to control subjects.
Conclusion: Although OGTT is no longer recognized as a tool to assess for reactive hypoglycemia, these preliminary results may suggest that low postprandial glucose levels possibly caused by an abnormal insulin secretion could lie at the root of BED by acting as a possible trigger of binge eating. These data need to be further confirmed by specifically designed studies.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.149

Body image and eating disorders in adults seeking help for weight loss

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Introduction: Many studies show that body image dissatisfaction and disordered eating behavior obstruct overweight people's efforts to obtain a healthy weight. The purpose of the present study was to investigate the frequency of body image distortions and eating behavior disorders of adults seeking help from nutritionists for weight loss.
Methods: The sample of the study was 184 adults (36 men) who visited voluntarily 16 nutritionists at their offices. The mean age was 36 years (S.D. = 11.3) with a range of 18-82 years and body mass index (BMI) ≥18.5. The data were collected through the tools: 'Body Image Assessment Scale', 'Body Shape Questionnaire' (BSQ-34), 'Eating Attitude Test (EAT-26) and 'Eating Disorders Inventory' (EDI-64).
Results: Statistical analysis revealed that all subjects tend to underestimate their BMI, assuming that it is lower than the real one, with men having a greater deviation between the two values. The findings showed that women have concerns of mild to moderate intensity about body shape, with men to be less worried despite being more overweight or obese. The frequency of eating disorders was significantly higher in women than in men, with the 1/3 of the subjects to be at risk or to have already an eating disorder. A positive correlation between BMI and distorted body image and disordered eating behavior was found. Disordered eating behavior seemed to be related to difficulties in managing adult life responsibilities and to interpersonal relationships.
Conclusion: This population group has a quite high frequency of eating disorders and distorted body image. The findings highlight the importance of training nutrition experts on how to identify these psychological parameters involved in weight loss in order for them to be able to provide a more integrated treatment to their patients.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.150

Impact of cardiovascular risk in single-person household among Korean middle-aged adults: a nationwide cohort study (2009-2015)

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Objective: To examine impact of cardiovascular incidence in living alone and using a representative population data in South Korea.
Methods: The study population aged 40–69 years who enrolled in the national health checkup program between 2009 and 2015 and who didn't had MI or Stroke at baseline using the Korean National Health Insurance Service database and resident registration data. Hazard ratios (HRs) were estimated from Cox proportional hazard models.
Results: Among 1,679,942 individuals of single-person household, total of 12,855 cases of incident MI and 16,919 case of newly diagnosed stroke during the mean follow-up period of 5.21 years. After adjustment for age, gender, smoking, alcohol intake, physical activity, income level and chronic metabolic disease such as hypertension, diabetes mellitus, dyslipidemia, the risk of developing CVD for those who lived alone at baseline compared with multiple person household 1.14 (95% confidence interval (CI) 1.119,1.163) in MI, 1.12 (95% CI 1.099,1.136) in stroke.
Conclusion: Single-person household was positively associated with incident CVD risk among middle aged adults in South Korea.

PO1.151

Subclasses and individual compounds of phenolic acid intake and breast cancer risk in the Seguimiento Universidad de Navarra (SUN) Cohort

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Introduction: Biological and epidemiological evidence supports an inverse association of phenolic acids with obesity-associated chronic disease. However, no previous study has prospectively evaluated the relationship between subclasses and individual compounds of phenolic acids and the risk of postmenopausal breast cancer (BC), one of the most important and frequent obesity-related locations of cancer. We aimed to evaluate the association of phenolic acids, including hydroxycinnamic and hydroxybenzoic acids, with the risk of BC in a Mediterranean cohort.
Methods: The present work is a prospective assessment conducted within the SUN (Seguimiento Universidad de Navarra) cohort. Over an average of 11.8 years of follow-up, we confirmed 101 incident cases of BC among 11,028 women who completed a validated 136-item food frequency questionnaire (FFQ) at baseline. Phenolic acid intake was calculated by matching food consumption data from the FFQ with the Phenol-Explorer database on phenolic acid content of each reported food items.
Results: After multivariable adjustment, an inverse association with BC risk was observed when comparing extreme tertiles of hydroxycinnamic acid intake [HR T3 vs T1 0.38 (95% CI 0.16-0.88; p for trend = 0.033)] among postmenopausal women. Specifically, the hydroxycinnamic acids with the strongest inverse associations were chlorogenic acids (5-, 4-, and 3- caffeoylquinic acids) [HR T3 vs T1 0.35 (95% CI 0.15-0.82; p for trend = 0.017)].

Conclusion: A higher intake of hydroxycinnamic acids, especially from chlorogenic acids –present in coffee, fruits and vegetables– was associated with decreased postmenopausal BC risk, possibly through reductions in adipose tissue inflammation, oxidative stress or insulin resistance. These findings support current World Cancer Research Fund/American Institute for Cancer Research guidelines to adhere to a diet high in fruits and vegetables for cancer prevention.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Spanish Government-Instituto de Salud Carlos III, the European Regional Development Fund (FEDER) (RD 06/0045, CIBER-OBN, Grants PI13/00615, PI10/02658, PI10/02293, PI13/00615, PI14/01668, PI14/01798, PI14/01764, PI17/01795 and G03/140), the Navarra Regional Government (27/2011, 45/2011, 122/2014), and the University of Navarra.

PO1.152

Preventive examinations in family medicine in Zagreb, Croatia

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Introduction: Primary preventive care requires an active approach from the health professionals and from all individuals of the target population. Raising awareness of the inappropriate habits and behaviour patterns as risk factors that influence the occurrence of chronic non-communicable diseases is one of the continuous tasks of public health professionals.
Methods: Persons older than 50 who did not visit their family doctor at least two years were invited for free physical examination and certain laboratory tests. 648 persons were examined and interviewed from 2013 to 2018. The paper shows analytic results expressed in percentages of the prevalence and 95% confidence interval (CI).
Results: A total of 648 patients were included. The age (mean) was 60.2 years [standard deviation (SD) = 8.9], sex ratio male:female was 0.46. Overweight (BMI 25-30) were 46.8% male and 39.6% female. Obese (BMI>30) were 29.1 % male and 31.9% female. There were 25.2% smokers and 16.1% former smokers. Up to three alcoholic drinks per week consumed 21.8% respondents (37.5% male and 10.7% female). Hypertension (systolic pressure above 140 mm Hg and diastolic above 90 mm Hg) was found in 15.2% male and 17.9% female. Isolated systolic hypertension was found in 19.1% male and 16.2% female, and isolated diastolic hypertension in 4.8% male and 3.4% female. Suspicion on one or more newly diagnosed disease was placed in 57.1% (95% CI 53.2-60.4) respondents. In total, there was a suspicion of 712 newly diagnosed diseases. Newly diagnosed diseases were disorders of lipoprotein metabolism (n = 170, 23.9%), followed by hypertension (n = 81, 11.4%), obesity (n = 73, 10.6%) and independent of insulin diabetes (n = 53, 7.4%). 55 persons [7.7% (95% CI 5.8-9.7)] had suspected neoplasm and they were immediately referred for further diagnostic evaluation.
Conclusion: The most commonly diagnosed disorder is causally associated with obesity. Program covers all persons who were not in contact with the physician for two years or they themselves have not noticed symptoms or timely respond to the observed symptoms. Detecting chronic non-communicable diseases and malignant state as early as possible is important and thereby confirms the public health significance of such programs.

PO1.153

Prevalence of obesity in the Roma population from a rural area in the South part of Romania - Călăraşi County

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Background: The aim of this study was to evaluate the prevalence of obesity in Roma population living in rural settlements from Călăraşi County in the south part of Romania compared to ethnic Romanian Caucasians.
Methods: This study included 978 people: 660 Roma (457 females/203 males), and 318 Romanian Caucasians (213 females/105 males) aged between 18 and 88 yr. BMI was classified using the definitions of World Health Organization; overweight was defined as a BMI of 25-29.9 kg/m^2, and obesity as a BMI over 30 kg/m^2.
Results: The prevalence of overweight and obesity in Roma population living in rural settlements was 25% (n = 165) and 43.9% (n = 290) respectively. In Romanian Caucasians, the prevalence of overweight and obesity was 33.3% (n = 106) and 45.3% (n = 144) respectively.
In multivariate analysis, significant predictors of obesity in Roma population were physical activity less than 30 min/day, current smoking, lower socio-educational level (under eight classes), and family history of obesity.
Conclusion: Even though the data are limited to a single county, the results trigger an alarm signal on the high prevalence of overweight and obesity. Prevention strategies targeting a healty lifestyle, improved access to education and medical care are needed in this community.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.154

Application of nutrient profile models to compare products offered in "healthy" vs "conventional" vending machines in a hospital environment

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Vending machines promote easy access to food with low nutritional value. "Healthy" Vending Machines(HVM) have been introduced as a means to improve the availability and accessibility of healthy food options, but its actual healthiness has been not evaluated. Our aim was to assess the healthiness of the products offered in HVM and "Conventional" Vending Machines(CVM), located in a hospital setting. All products available in these devices were evaluated using three nutrient profile models. Regardless of the NPM used, significant differences were observed in the proportion of healthy products among HVM and CVM. Although not all products in HVM are rated as healthy by the different NPM, the percentage of these is significantly higher than in CVM. Our results suggest that while introducing HVM is a positive initial step to improve the food supply in hospital environments, the setting up of official regulations regarding the kind of products included in these machines would be necessary to protect consumers from misunderstanding that all products included in HVM constitute healthy options. Further research is warranted to investigate other possible determinants of food purchase in HVM, such as price or proximity to unhealthy options, among others.

PO1.155

Insufficient vitamin intake in overweight and obesity people and the combined effects of central obesity on several chronic diseases in Tianjin adults

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Introduction: With the rapid development of social and economy, the prevalence of overweight and obesity in Tianjin is very high. But overweight and obesity is also a kind of malnutrition, such as accompanied by lacking of vitamin intake. And concomitant central obesity is more harmful to health. It is necessary to improve the correct perception of their weight, and various public health measures should be taken to control overweight and obesity.

Methods: According to the 2015 Chinese Adult Chronic Disease and Nutrition Surveillance Program, 7 districts in Tianjin were selected by multistage cluster random sampling method. This cross-sectional analytical study was conducted on adults by questionnaire and three days dietary recall suvery. BMI was measured by the medical teams in the clinics, and chronic diseases were judging by medical diagnosis combined with blood biochemical test.
Results: The overweight and obesity rate was 63.3% in Tianjin adults, it is found that it was higher in male (66.1%) than in female (60.9%) (P<0.05), whereas only 21.9% overweight and obesity adults realize their real weight situation. The cognitive accuracy rate of females was higher than that of males, and the cognitive accuracy rate decreased with age (P<0.05). The insufficiency rate of vitamin A, vitamin B2, vitamin B6, vitamin B12 and vitamin C in overweight and obesity people was higher than that in normal weight adults(P<0.05). Whether the BMI is normal or overweight/obesity, the prevalence of hypertension, diabetes, and dyslipidemia in participants with central obesity is higher than that in non-central obesity subjects (P<0.05).
Conclusion: The prevalence of overweight and obesity was very high in Tianjin adults. On the contrary, overweight and obesity subjects have a very low cognitive accuracy rate for their weight facts, and lack of vitamins intake is very common in overweight and obesity people. If overweight/obesity combined with central obesity, the prevalence of hypertension, diabetes and dyslipidemia will be higher.

Conflict of Interest: There have no conflict of interest.

Funding: No Funding.

Tab. 1. Overweight/obesity subjects consider they are overweight/obesity in Tianjin adults (%).

	n	Cognitive correct rate	χ2	P
Total	2762	21.9		
Sex			23.746	<0.001
Male	1321	17.9		
Female	1441	25.5		
Region			1.481	0.224
Town	1748	22.6		
Rural	1014	20.6		
Age (years)			62.792	<0.001
18-44	791	29.8		
45-59	982	23.0		
60+	989	14.4		

Tab. 2. Overweight/obesity situation of adults in Tianjin (%).

	n	Proportion	χ2	P
Total	4365	63.3		
Sex			12.223	<0.001
Male	2000	66.1		
Female	2365	60.9		
Region			1.202	0.273
Town	2789	62.7		
Rural	1576	64.3		
Age (years)			104.345	<0.001
18-44	1494	52.9		
45-59	1433	68.5		
60+	1438	68.8		

Tab. 3. Insufficient vitamin intake in different BMI populations (%).

	Normal weight	Overweight/obesity	χ2	P
Vitamin A	35.6	39.7	7.085	0.008
Vitamin B2	36.7	40.6	6.375	0.012
Vitamin B6	38.2	42.1	6.489	0.011
Vitamin B12	38.4	42.5	7.187	0.007
Vitamin C	29.8	32.9	4.657	0.031

Tab. 4. Combined effects of overweight/obesity and central obesity on several chronic diseases (%).

	Central obesity	Non-central obesity	χ2	P
Normal BMI				
Hypertension rate	38.1	31.7	6.687	0.010
Diabetes rate	13.1	6.1	20.736	<0.001
Dyslipidemia rate	23.6	18.7	5.446	0.020
Overweight/obesity				
Hypertension rate	49.8	33.3	23.046	<0.001
Diabetes rate	20.2	10.2	12.092	0.001
Dyslipidemia rate	40.3	31.1	6.855	0.009

PO1.156

Renal outcome in obese kidney with glomerular hypertension

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Introduction: Obesity is a predictive factor of progression of chronic kidney disease. Individuals with obesity noted increased renal blood flow and renin-angiotensin system, and leads to glomerular hyperfiltration (GH) by tubuloglomerular feedback. GH was known to be associated podocyte injury, and damaged kidney could induce the activation of inflammatory cells. However, renal outcome of GH remained uncertain in individuals with obesity.
Methods: A longitudinal observational cohort study was performed using data from regular health checkup examinations in tertiary hospital during 2004-2017. We analyzed 55,098 adults at initial examination who had initial estimated glomerular filtration rate (eGFR) ≥ 60 ml/min/1.73 m^2. Obesity was defined as body mass index (BMI) ≥30 kg/m^2. GH was defined as an eGFR over the age- and sex-specific 97.5th percentile.
Results: Among 55,098 adults, 29.3% were overweight, and 3.9% obese. GH was significantly higher in obese individuals (2.7% vs.2.3% vs. 3.0%; BMI <25, 25-29, ≥ 30 kg/m^2; P = 0.012, respectively). In obese individuals, GH was associated with younger age, lower albumin, and higher BMI (P<0.05). GH was not associated with presence of diabetes mellitus, hypertension, dyslipidemia and decreased muscle percent in obese individuals. In addition, GH was significantly related to higher monocyte count and C-reactive protein level (P≤0.24). GH was a significant risk factor for the development of 30% eGFR decline in obese individuals (RR, 19.939; 95% CI 1.189-334.352). However, GH was not associated with development of 30% eGFR decline in non-obese individuals.
Conclusion: GH was significant factor for the prediction of renal function decline in obese individuals, and these might be mediated by inflammation. Further studies will be needed.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.157

The obese parturient: more than baby weight

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Introduction: The prevalence of obesity within the UK has increased markedly over the past 30 years[1]. In 2010, 48.4% of pregnant women in Scotland were overweight or obese with 20.7% classed as obese[4]. The obese parturient and her fetus are at greater risk of peripartum morbidity and mortality[2]. In the 2015 MBRRACE-UK review, 52% of women who died were overweight or obese[3].
Ayrshire Maternity Unit (AMU) serves a population of 400,000 people and approximately 3000 births per year. We aimed to quantify the prevalence of obesity and it's growing trend in our patient population to better understand the healthcare challenges we must meet locally.

Methods: We searched our electronic database for all women who delivered in AMU from 2009 to 2018. Average body mass index (BMI, Kg/ m^2) per year was calculated. Each category of BMI was considered against birth weight and method of delivery. Records with incomplete information within those parameters were excluded from analysis.
Results: Average BMI increased as shown in figure 1. As BMI category increased so did average birth weight. Over a 10 year period, the average birth weight within BMI category > 25 showed no significant change. The average birth weight of normal and underweight BMI women has reduced. The proportion of caesarean section births rises with increasing BMI from 20.7% BMI 15-20 to 55.8% BMI > 40.
Conclusion: Maternal obesity is a worsening problem in our region. Both increasing BMI and incidence of operative delivery in this patient group mandate a greater need for obstetric theatre services and accompanying medical and nursing staff. We need to shape our service with this changing demographic in mind. Caring for the obese parturient is often complex and associated with multiple comorbidities. Measures to try and halt or reverse this trend are paramount.

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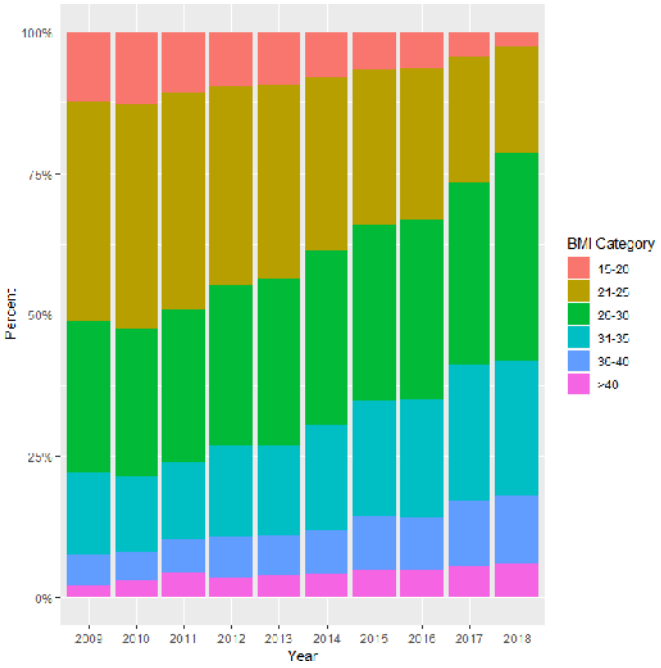
Conflict of Interest: None.

Funding: No funding.



Average BMI increased from 2009-2018.

Fig. 1. Percentage BMI category per year.

PO1.158

The risk of obesity-related variables according to vitamin D concentration in Korean women

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Introduction: Vitamin D deficiency is increasing worldwide and is recognized as a global public health problem. In addition, Vitamin D deficiency is known increase the risk of many chronic diseases such as obesity, hypertension, cardiovascular disease, and cancer. The management of cardiovascular disease prevention in postmenopausal women is important because their cardiovascular risks increase rapidly when women experience menopause.
Methods: We used data from the Korean National Health and Nutrition Examination Survey to investigate the combined interaction of serum 25-hydroxyvitamin D [25(OH)D] concentration and menopausal status on obesity-related variables. We included 8,726 (4,309 premenopausal and 4,417 postmenopausal status) Korean women and evaluated obesity-related variables according to the menopausal status and 25(OH)D concentration.
Results: The average age and 25(OH)D concentration of participants were 48.29 years (19-97 years) and 19.42 ng/mL (3.0-53.5 ng/mL), respectively. In the 25(OH)D insufficient group, the obesity-related variables such as body mass index (BMI) (P = 0.019), fasting glucose (FG) (P = 0.019) and triglycerides (TGs) (P<0.001) were significantly higher and high-density lipoprotein cholesterol (HDL-C) (P = 0.006) was significantly higher according to vitamin D concentration. Significant differences were observed in the interaction effect of vitamin D concentration and menopausal status on obesity-related variables. Among only postmenopausal women, vitamin D insufficient participants had higher BMI (P<0.001), waist circumference (P = 0.011), FG (P = 0.035) and TGs (P = 0.001) compared to those who with sufficient vitamin D. HDL-C (P = 0.029) was also lower in postmenopausal participants lacking vitamin D compared to those who with sufficient vitamin D. The adjusted odds ratios [95 % confidence intervals (95% CI)] of obesity and metabolic syndrome were 1.1297 (95% CI = 1.078-1.560) and 1.223 (95% CI = 1.020-1.468) among only postmenopausal women, respectively, than those with 25(OH)D sufficient group.
Conclusion: These findings indicate that serum vitamin D concentration was negatively associated with obesity-related variables in Korean postmenopausal women. Additionally, further investigations regarding why these combined interactions are prominent in postmenopausal women and what mechanisms influence these interactions should be done.

Tab. 1. Metabolic syndrome-related variables and dietary macronutrient consumption according to the 25(OH)D concentration.

	Sufficient ≥50 nmol/L (n = 1515)	Insufficient <50 nmol/L (n = 2242)	p-Value *
BMI (kg/m2)	23.49 ± 0.10	23.76 ± 0.06	0.019
WC (cm)	79.05 ± 0.32	79.49 ± 0.18	0.196
SBP (mmHg)	117.30 ± 0.45	118.02 ± 0.26	0.155
DBP (mmHg)	74.51 ± 0.29	74.61 ± 0.17	0.755
FG (mg/dL)	95.24 ± 0.52	96.82 ± 0.38	0.019
TG (mg/dL)	109.29 ± 1.82	121.23 ± 1.76	<0.001
TC (mg/dL)	192.10 ± 0.96	192.32 ± 0.63	0.856
HDL-C (mg/dL)	52.53 ± 0.35	51.49 ± 0.19	0.006
Energy (kcal)	1705.28 ± 20.29	1696.26 ± 11.11	0.682
%_CHO	70.06 ± 0.31	69.79 ± 0.20	0.452
%_PRO	14.35 ± 0.14	14.11 ± 0.07	0.114
%_FAT	15.59 ± 0.26	16.10 ± 0.17	0.095

The data are expressed as the means ± SEM; BMI, body mass index; WC, waist circumference; SBP, systolic blood pressure; DBP, diastolic blood pressure; FG, fasting glucose; TG, triglycerides; TC, total cholesterol; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; * p-values between serum 25-hydroxyvitamin D concentration using a general linear model after adjusting for age, education level, household income, marital status, living region, subjective stress level, dietary supplement consumption, smoking status, drinking status, and physical activity.

Tab. 3. Adjusted odds ratio for obesity and metabolic syndrome according to the menopausal status and 25(OH)D concentration.

	Premenopasal status (n = 4309)	Postmenopasal status (n = 4417)	p-Value
Obesity	0.914 (0.720-1.161)	1.1297 (1.078-1.560)*	<0.001
Metabolic syndrome	1.143 (0.826-1.583)	1.223 (1.020-1.468)*	<0.001

The odds ratios (95 % confidence intervals) were calculated in reference to a serum vitamin D concentration ≥50 nmol/L using multivariate logistic regression adjusting for age, education level, household income, marital status, living region, subjective stress level, dietary supplement consumption, smoking status, drinking status, and physical activity. (* p<0.05).

Tab. 2. Metabolic syndrome-related variables and dietary macronutrient consumption according to the menopausal status and 25(OH)D concentration.

	Premenopasal status ≥50 nmol/L (n = 670)	Premenopasal status <50 nmol/L (n = 3639)	p-Value *	Postmenopausal status ≥50 nmol/L (n = 1427)	Postmenopausal status <50 nmol/L (n = 2990)	p-Value *	p-Value for interaction**
BMI ((kg/m^2)	23.16 ± 0.18	23.09 ± 0.08	0.724	24.01 ± 0.11	24.53 ± 0.10	<0.001	<0.001
WC (cm)	77.09 ± 0.50	76.69 ± 0.22	0.439	81.59 ± 0.40	82.71 ± 0.26	0.011	<0.001
SBP (mmHg)	109.68 ± 0.67	110.19 ± 0.33	0.474	126.03 ± 0.63	126.88 ± 0.42	0.235	0.018
DBP (mmHg)	72.86 ± 0.44	72.86 ± 0.23	0.998	76.53 ± 0.35	76.54 ± 0.24	0.994	<0.001
FG (mg/dL)	91.60 ± 0.72	92.45 ± 0.41	0.313	99.69 ± 0.70	101.79 ± 0.67	0.035	0.046
TG (mg/dL)	90.89 ± 2.81	104.07 ± 2.42	0.001	129.88 ± 2.39	140.49 ± 2.03	0.001	<0.001
TC (mg/dL)	185.52 ± 1.48	183.66 ± 0.83	0.290	200.36 ± 1.24	202.23 ± 0.88	0.220	<0.001
HDL-C (mg/dL)	54.40 ± 0.64	53.28 ± 0.27	0.102	50.45 ± 0.38	49.47 ± 0.27	0.029	0.044
Energy (kcal)	1737.73 ± 30.75	1777.82 ± 15.26	0.248	1647.41 ± 23.43	1602.48 ± 14.04	0.079	0.017
%_CHO	66.14 ± 0.52	65.90 ± 0.26	0.648	74.48 ± 0.35	74.19 ± 0.26	0.492	0.033
%_PRO	15.11 ± 0.27	14.86 ± 0.10	0.387	13.50 ± 0.12	13.25 ± 0.09	0.091	0.352
%_FAT	18.76 ± 0.46	19.24 ± 0.22	0.344	12.02 ± 0.29	12.55 ± 0.21	0.130	0.004

The data are expressed as the means ± SEM; BMI, body mass index; WC, waist circumference; SBP, systolic blood pressure; DBP, diastolic blood pressure; FG, fasting glucose; TG, triglycerides; TC, total cholesterol; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; * p-values between the menopausal status and serum 25-hydroxyvitamin D concentration using a general linear model after adjusting for age, education level, household income, marital status, living region, subjective stress level, dietary supplement consumption, smoking status, drinking status, and physical activity.; ** p-values for interaction between the menopausal status and serum 25-hydroxyvitamin D concentration using a multivariate logistic regression after adjusting for age, education level, household income, marital status, living region, subjective stress level, dietary supplement consumption, smoking status, drinking status, and physical activity.

PO1.159

Low-grade inflammatory status, derived from the inflammatory potential of the diet, physical activity level and abdominal obesity, and risk of colorectal cancer in the EPIC study

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Background: Inflammation plays a central role in the carcinogenesis of colorectal cancer (CRC). There is mounting epidemiological evidence that more pro-inflammatory diets increase risk of developing CRC. However, how a low-grade inflammatory status, encompassing the combined inflammatory effect of diet, physical activity and abdominal obesity, modifies risk of CRC has not yet been explored.

Methods: We examined the association between the diet's inflammatory potential and low grade inflammation status and risk of incident CRC in the European Prospective Investigation into Cancer and Nutrition (EPIC) study. A total of 476,160 participants were recruited from 10 European countries and followed up for 14 years, during which time 5,991 incident CRC cases were identified (3,897 colon and 2,094 rectal tumours). The diet's inflammatory potential was estimated using an Inflammatory Score of the Diet (ISD), which incorporated 28 dietary components and their corresponding inflammatory weights. A 5 level inflammatory profile score (IPS) was also created, incorporating the ISD, physical activity level and abdominal obesity. The association between the ISD and CRC and IPS and CRC was assessed using multivariate Cox regression models.

Results: More pro-inflammatory diets were related to an increased risk of CRC. Sub-site analyses showed this association was restricted to colon cancer with no evidence of an association with rectal cancer; Hazard

Ratios (HR) for subjects in the 4th compared to the 1st quartile of the ISD was 1.15 (95% CI 1.04-1.27) for CRC, 1.24 (95% CI 1.09-1.41) for colon cancer and 0.99 (95% CI 0.83-1.17) for rectal cancer. The associations were more pronounced in men and not significant in women. The combined effect of a more pro-inflammatory diet, lower levels of physical activity and abdominal obesity resulted in a large increased risk of CRC, particularly colon cancer and in men; subjects classified in the highest compared to the lowest IPS had a 37% (95% CI 16%-62%) increased risk of CRC, a 62% (95% CI 31%-201%) increased risk of colon cancer overall and a 211% (95% CI 50%-297%) increased risk of colon cancer in men.
Conclusion: This study adds to the existing evidence showing that pro-inflammatory diets increase risk of CRC, in particular colon cancer. Our results also show that the combined effect of three major factors contributing to low-grade inflammation has a large impact on risk of CRC. Consequentially, the risk of developing CRC could be reduced dramatically by adopting a healthy lifestyle, including an anti-inflammatory diet, adequate physical activity, and avoiding obesity. Jointly targeting these three modifiable risk factors in public health interventions may be particularly effective for CRC prevention.

PO1.160

Association of deep abdominal adipose tissue (DAAT) with arterial hypertension (AH)

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Introduction: Systemic hypertension is a risk factor for cardiovascular disease, and is associated with body fat. In Mexico, the prevalence of hypertension according to the 2016 National Health Survey (ENSANUT) was found in 25.5%, of which 40% were unaware that they had this disease and only 58.7% of adults with previous diagnosis were in control suitable. The present study aims to show the relationship between DAAT and arterial hypertension.
Methods: Analytical cross-sectional study. The data was obtained from a national probabilistic, multistage, stratified and conglomerate survey with representativeness of urban and rural regions (ENSANUT 2016). A sample of 29,795 individuals was obtained. For this research, a subsample of 8348 individuals older than 20 years was employed. The survey protocol was approved by the ethics and research committee of the National Institute of Public Health (INSP). The DAAT was calculated with the following formula:

$$DAAT = (2{,}125 \times age) + (2{,}843 \times waist\ circumference) - 225.39$$

The results of the Conicity Index and the DAAT were placed in percentiles, and the values that were after the 75th percentile were used to define an alteration of these two indices.
Results: The distribution of DAAT between men (n = 2867) and women (n = 5481) was relatively similar, since the highest DAAT value frequency was found at 150 cm^2. Regarding the comparisons between individuals with and without AH, statistically significant differences were found in all variables except for height. In individuals with AH were found greater weight, BMI, conicity Index, waist size index (WSI) and DAAT. It is important to emphasize that in both groups, there was overweight, and a WSI of 0.6, which is a value well above the accepted cut-off point (0.5)
Conclusion: It was found that DAAT is strongly associated with AH ($p < 0.0001$), and is a risk factor for the development of hypertension (OR = 1.8 CI 95%: 1.5-2.1, B = 0.6, SE = 0.08). The DAAT predicts up to 70% the development of hypertension (AUC: 0.67). It was concluded that the DAAT is related to the development of AH, and can be a useful test for its detection and to discriminate healthy subjects having DAAT below 182 cm^2.

PO1.161

Metabolic disease and risk factors in patients with type 1 diabetes mellitus

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Objective: The occurrence of cardiovascular disease (CVD), obesity and metabolic disease in patients suffering from type 2 diabetes is a widely discussed issue, less so in those with type 1 (T1DM). The purpose of this study was to evaluate the frequency of these complications as well as certain risk factors that they are associated with.
Methods: We conducted a retrospective observational study by analyzing data from the observation charts of patients evaluated in our clinic between January 2014 – November 2018. Out of 677 patients with T1DM admitted, 83 were overweight (BMI of over 25 kg/m^2) and above 18 years old at the time. They were subsequently divided into two groups: patients who had metabolic syndrome according to IDF definition criteria and patients who were overweight, but did not meet the necessary criteria.
Results: Of the 83 patients included in the study, 37% were women, 71% lived in urban areas, with a mean age of 44.22±14.66 years, a mean disease duration of 19±14.11 years and the mean age at diagnosis of 24.95±10.88 years.
Hypertension was found in 44 patients (53%), the mean triglycerides levels was 168.27±150.84 mg/dl and HDL-cholesterol was 50.60±18 mg/dl for men and 55.78±15.41 mg/dl for women. Regarding weight, the mean BMI was 30.21±3.38 kg/m^2, the waist circumference for men was 106.94±9.63 cm and for women 99.63±12.55 cm. The average HbA1C was 9.21±1.69 %.
The frequency of chronic diabetes complications was: 61% retinopathy, 56% neuropathy, 17% nephropathy and 8% foot complications, and for CVD: 2% ACS, PAD 8% and 8% stroke. Diabetes heredity was found in 13 % and 16 % suffered from other auto-immune disease, mainly thyroiditis (13%).
As expected, there was a statistically significant difference between the two groups regarding the occurrence of HT (p-value 0.00688), their BMI (p-value 0,000000002) and their triglycerides levels (p-value 0.031272), but also for the presence of foot complications (p-value 0.0422).
Conclusion: The association of T1DM with an authentic metabolic disease is quite rare, but it can lead to a mixed clinical picture. This can mislead the diagnosis and determine a delay in the appropriate

PO1.162

41-year changes in the prevalence of obesity and social inequalities in Austria: men in the fast lane

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Background: The examination of long-term trends is important to plan public health interventions specific to target-groups. We investigated trends for the prevalence of obesity for adult Austrian women and men between 1973 and 2014 according to their sex, age and education. Furthermore the magnitude of educational-inequalities was calculated for the 41-year Investigation period.
Methods: Data were derived from six national, representative, cross-sectional interview surveys (N = 194,030) conducted by Statistics Austria. Data correction factors for self-reported BMI were applied according to a preliminary study in Austria. Obesity was defined as BMI ≥ 30 kg/m^2. Absolute changes (AC) and aetiologic fractions (AF) were calculated to identify trends in the obesity prevalence. To measure the extent of social

inequality, the relative index of inequality was computed based on the educational levels.
Results: In 2014, the age-adjusted prevalence of obesity was 14.6% (95% CI: 14.0-15.3) for women and 16.8% (95% CI: 16.1-17.9) for men. Obesity was most prevalent among subjects aged 55-74 years and those with low educational level. The AC in the obesity prevalence during the study period was highest for men aged 75 years and older with high/middle educational levels (16.2%). It was also high for subjects aged 55 years and older with low educational levels. The greatest dynamics for obesity, presented by the AFs, were observed among the oldest men with high/middle educational levels. Educational inequalities for obesity were higher among women, but only increased among men during the Investigation period.
Conclusion: Since 1973, the prevalence for obesity was observed to be higher for men than women in Austria for the first time. Men showed the greatest increase in prevalence and risk for obesity during the 41-year study period. Prospective studies are needed to determine the drivers behind these trends.

PO1.163

Yeast bread consumption is associated with improved diet quality and nutrient intakes and not associated with CVD risk, diabetes-, and weight-related outcomes in US adults

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Previous data has shown that certain grain-based foods are key contributors of shortfall nutrients in American adult diets. Additionally, several grain dietary patterns in adults have been associated with improved diet quality, however, no study has compared nutrient intakes and cardiovascular risk (CVD) scores, diabetes- and weight-related health outcomes in adults consuming breads. US adult (≥19 y; N = 9,201) consumers and non-consumers of yeast breads were identified using data from the National Health and Nutrition Examination Survey (2011-2014) to compare diet quality (as measured by the Healthy Eating Index-2015), nutrient intakes, and CVD/diabetes-related outcomes. The USDA food coding system was used to define yeast bread consumption. Adults consuming breads had significantly higher diet quality relative to non-consumers (53.3±0.4 vs. 51.6±0.3, p<0.001). Bread consumers had greater energy (2233±21 vs 2177±11 kcal/day, p = 0.002 and sodium (3729±43 vs 3584±20 mg/day, p = 0.001) intake. Bread consumers also had increased dietary fibre (19±0.4 vs 17±0.2 g/day, p<0.001), iron (15.7±0.2 vs 15.2±0.1 mg/day, p = 0.01), folate, DFE (575±10 vs 551±6 mcg/day, p = 0.005) and magnesium intake (325±5 vs 310±3 mg/day, p = 0.001). Yeast bread consumers had greater polyunsaturated fat intake in comparison to non-consumers, with no differences observed for total, monounsaturated, and saturated fat intake. There were no significant differences observed comparing yeast bread consumers to non-consumers for CVD risk scores, body mass index, waist circumference, metabolic syndrome risk factor counts, plasma glucose, insulin, total cholesterol, LDL- and HDL-cholesterol and triglycerides. Thus, the current epidemiological data show that inclusion of yeast breads in the diet are associated with improved nutrient intakes and diet quality, in addition to higher sodium intake. The present epidemiological analysis did not observe any associations between yeast bread consumers and CVD risk scores, and diabetes-related health outcomes in US adults.

PO1.164

Prevalence of sarcopenia and sarcopenic obesity using different assessment criteria: findings from UK Biobank

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Background: Sarcopenia is defined as the age-associated decline in muscle strength and size. Furthermore, when excess adiposity accompanies this condition it is termed sarcopenic obesity. Despite many research groups proposing a range of assessment criteria to define sarcopenic obesity, there is still no consensus about which criterion should be use. Therefore, the aim of this study was to determine the prevalence of sarcopenic obesity using different assessment criteria in 497,962 participants from the UK Biobank study.
Methods: Sarcopenia was defined as low muscle strength and low physical function and/or low muscle mass whereas the combination of all three criteria was used to define severe sarcopenia. The cut-off points of the new European Consensus on definition and diagnosis in Sarcopenia 2018 were used for each criterion. Sarcopenic obesity was defined as the combination of sarcopenia with at least one of the following criteria: BMI ≥30 kg/m^2, waist circumference (WC) > 88 cm in women and > 102 cm in men, or the two highest quintiles of body fat (60%).
Results: The prevalence of sarcopenia and severe sarcopenia was 2.9% (95% CI: 2.86; 3.00) and 0.3% (95% CI: 0.24; 0.30), respectively. The prevalence of sarcopenic- and severe sarcopenic-obesity varied depending on the adiposity criteria used: for BMI the prevalence was 3.3% (95% CI: 3.32; 3.44) and 0.1% (0.08; 0.11), for WC 2.3% (95% CI: 2.20; 2.30) and 0.1% (95% CI: 0.12; 0.14) and for % body fat the prevalence was 2.9% (95% CI: 2.28; 2.92) and 0.2% (95% CI: 0.21; 0.24). Compared to men, women had a higher prevalence of sarcopenic and severe sarcopenic obesity than men, using all assessment criteria.
Conclusion: The prevalence of sarcopenic obesity and severe sarcopenic obesity ranged from 2.3% to 3.3% and from 0.1% to 0.2%, respectively, depending on the assessment criteria used. Further work is needed to establish which of these assessment criteria are most predictive of health outcomes and to identify which should be used for clinical practice.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.165

Association between adiposity and cognitive impairment in the Chilean older adult population

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Background: High and low adiposity levels have been linked to cognitive impairment in older adults; however, this association has not been studied in Chile. The aim of this study was to investigate the association between adiposity levels and cognitive impairment in older Chilean adults.
Methods: a Cross-sectional study of 1,384 participants, over 60 years of age, from the National Health Survey (2009-2010). Cognitive impairment was evaluated using the Mini-Mental State Examination (MMSE). Body mass index (BMI) and waist circumference (WC) were used as measures of adiposity.
Results: Compared to people with a normal BMI, the odds of cognitive impairment were higher in participants who were underweight (Odd ratio (OR): 4.82 [95% CI: 2.63; 7.84], p<0.0001), overweight (OR: 1.95 [95% CI: 1.10; 3.47], p<0.0001) and obese (OR: 2.37 [95% CI: 1.36; 3.12], p<0.0001). The associations were robust after adjustment for confounding variables. Similar results were observed for WC.
Conclusion: Low and high levels of adiposity are associated with an increased likelihood of cognitive impairment in older adults in Chile.

PO1.166

Correlates of obesity in Chilean adults: findings from the Chilean National Health Survey 2009-2010

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Background: Chile is currently leading the Latin America obesity ranking. However, it is unknown, which factors correlate with this emerging obesity prevalence in Chile. Therefore, the aim of this study was to investigate the main factors associated with obesity in the Chilean population.
Methods: 2.876 participants (1.478 normal weight and 1.398 obese) from the Chilean National Health Survey 2009-2010 were included in this study. Socio-demographic, physical activity, dietary and health-related factors were the exposures and obesity (BMI ≥30.0 kg.m-2) were the main outcome. Logistic regression was used to investigate the association between the exposures and the outcome.
Results: The main factors associated with higher odds of being obese in both women and men were age, salt and alcohol intake. In addition, education, income levels and place of residence (rural/urban) were associated with an increased risk of obesity in men but with a protective effect in women. Sleeping less than 7 hours per day or those who reported a poor health to have a higher risk for obesity in women. Whereas physical inactivity and higher sedentary time were associated with a higher risk for obesity in men.
Conclusion: Identifying the factor associated with an increased risk of obesity in Chile may help to improve our public health policies and design better interventions aimed at those who are at higher risk of becoming obese.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.167

Increased prevalence of physical and mental health problems among overweight and obese persons who want to lose weight and need support to do so

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Introduction: Evidence-based methods to lose weight are important in tackling increasing obesity trends in adult populations. However, attempts to lose weight are often associated with weight gain. More knowledge about persons who want to lose weight and need support to do so is needed to design effective preventive practices. The aim was to investigate the prevalence of health problems in overweight and obese persons who want to lose weight and do not/do need support to do so.
Methods: The study includes 9,142 overweight or obese persons (BMI ≥25 kg/m^2) aged 30-69 years who responded to a postal survey questionnaire sent to a random population sample in five counties in Mid-Sweden in 2017. BMI was based on self-reported weight and height. Subjects were divided into three groups: those who do not want to lose weight (n = 1236), those who want to lose weight but do not need support (n = 5484) and those who want to lose weight and need support (n = 1462). Multivariate odds ratios were calculated for several health problems adjusted for obesity, gender, age and educational level.
Results: In total, 79% of overweight and 94% of obese persons wanted to lose weight. 21% of those who wanted to lose weight reported that they need support to do so. In this latter group, the prevalence of hypertension, poor self-rated health and musculoskeletal pain, but not diabetes, was higher than in the other two groups even when adjusted for confounders. In addition, mental health symptoms such as anxiety and worry as well as diagnosed depression were more common in this group.
Discussion: Overweight and obese persons who want to lose weight and need support to do so are a special group with higher frequency of different types of health problems, including mental health problems. This should be taken into consideration when designing preventive and weight-control measures for overweight and obese persons.

Conflict of Interest: None Disclosed.

Funding: No funding.

PO1.168

Circulating metabolites associated with objectively-measured sleep duration and sleep variability in overweight/obese subjects: a metabolomics approach within the SATIN study

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Introduction: To investigate the associations of circulating metabolites with sleep duration and sleep variability. We also assessed the ability of metabolites to discriminate between sleep duration and sleep variability categories.
Methods: Cross-sectional analysis of 205 participants with overweight/obesity from the "Satiety Innovation" (SATIN) study. A targeted metabolite profiling (n = 159 metabolites) approach was applied using three different platforms (NMR, LC-MS, GC-MS). Associations between circulating metabolite concentrations and accelerometer-derived sleep duration and variability in sleep duration were assessed using elastic-net regression

analysis. Ten-fold cross-validation was used to estimate the discriminative accuracy of metabolites for sleep duration, and sleep variability categories.
Results: A metabolite profile, including acyl-carnitines (C11:0/C5:1-DC/iso-C11:0, 2-M-C4:1/3-M-C4:1, C4:0); sphingomyelins (42:1, 33:1); glycerol; stearic acid; 2- and 3- hydroxyl-butyric acid; docosahexaenoic acid; serotonin; and phosphatidylcholine (34:2), was significantly associated with high sleep duration (4th plus 5th quintile). Ten metabolites, including acyl-carnitines (C18:1, C7:0, C6-OH); phosphatidylcholine (40:6, 37:4, 42:5); lyso-phosphatidylcholine, (20:1); sucrose; glutamic acid, and triacylglycerol (52:4), were significantly associated with high sleep variability (4th plus 5th quintile). The area under the curve was 0.69 (95% CI 0.62–0.75), and 0.63 (95% CI 0.53–0.72), in the multi-metabolite score for high sleep duration, and sleep variability, respectively. The variance in sleep duration explained by metabolites was 7%. No metabolites were selected for prediction of sleep variability (continuous).
Conclusion: A small set of metabolites within distinct biochemical pathways were associated with high sleep duration and sleep variability. These metabolites appeared to moderately discriminate sleep duration and sleep variability categories.

PO1.169

Study of lycopene intake in overweight and obese young people

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Introduction: The aim of the study was to compare the level of lycopene consumption in young people with overweight and obesity and to research the frequency of inclusion in the diet main sources of lycopene.
Methods: The study involved 526 medical students aged 17–28 years (133 men and 393 women), of whom 68 students with overweight and obesity (39 men and 29 women) were selected as the two target groups. There are 51 students with overweight (28 men and 23 women, mean BMI 26.85±1.29, mean age 22±2.16) and 17 students with obesity (11 men and 6 women, mean BMI 33.15±2.66, mean age 22.24±1.35). All subjects completed the questionnaire specifically designed on the basis of the 24-hour diet recall. The questionnaire included the list of the rich food sources of lycopene and subject's data (age, sex, weight and height). A quantitative assessment of lycopene intake was carried out using the USDA database of lycopene content in food products.
Results: The optimal level of lycopene intake (5 mg/day) into the target group with overweight, was achieved in 28 respondents (15.38±7.94 mg). Insufficient level of lycopene intake was recorded in 9 students (1.96±1.09 mg). In the diets of 14 students there were no main sources of lycopene. The main sources of lycopene were red tomatoes (25.5%), catsup (19.6%) and fast food products with tomatoes or tomato sauce – pizza, pasta, burgers (13.7%). Additional sources of lycopene such as red and pink grapefruits, grapefruit juice, watermelon, persimmon, were present in the diet of 4 students (7.84%). Among the respondents with obesity an adequate level of lycopene intake was observed in 8 students (19.81±12.1 mg), insufficient - in 3 students (2.32±0.36). Six students with obesity didn't include sources of lycopene in their diet. The major lycopene sources in the group of obese students were red tomatoes (47.1%), fast food products – pizza, pasta (11.8%) and catsup (5.9%). None of the obese students included tomato juice, canned red tomatoes, red and pink grapefruits, grapefruit juice, watermelon, and persimmon in the diet.
Conclusion: The study showed, the main sources of lycopene in overweight and obese students diet were red tomatoes, catsup and tomato-containing fast food products (pizza, pasta and burgers). It is established, the majority of respondents with obesity did not include additional sources of lycopene (in addition to tomatoes) in the diet. It should be noted, there were no significant differences in the levels of lycopene consumption and the main sources of lycopene in the diet of overweight and optimal weight students.

Conflict of Interest: The authors declare no actual and potential conflict of interests.

Funding: Research was conducted without sponsorship.

PO1.170

Regional differences in prevalences of obesity and adverse obstetric events in primiparous women in Finland 2006-2013

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Introduction: In Finland, regional differences have been reported in overall population morbidity, eg from coronary heart disease. The aim of this study was to investigate whether regional differences can be seen in the prevalence of maternal obesity and in the incidence of obstetric and neonatal events in four regions in Finland.
Methods: We extracted information from the Finnish Medical Birth Register on all women who delivered their first singleton newborn in 2006-2013. Women with missing data on prepregnancy body mass index (BMI) or delivery unit (n = 4017) were excluded leaving 189 797 women in the study cohort. The data was compiled with International Classification of Diseases-10 codes from the Finnish Hospital Discharge Register. We categorized women to be living in four regions (Southern, Western, Eastern and Northern Finland) based on location of delivery units. We assessed the incidence of gestational diabetes, gestational hypertension, preeclampsia, caesarean delivery and delivery of a small-for-gestational-age (SGA) or large-for-gestational-age (LGA) infant by maternal obesity and region.
Results: Prevalence of obesity (BMI ≥30 kg/m^2) was 8.9%, 11.7%, 11.6% and 10.8% in Southern, Western, Eastern and Northern Finland, respectively (Table 1). Women in Southern Finland were older, leaner and more frequently non-smokers than in any other areas. Regional differences in the incidence of gestational diabetes, gestational hypertension, preeclampsia and caesarean delivery were observed both among non-obese and obese women (Table 2). Non-obese women in Southern Finland and obese women in Southern and Northern Finland had a lower incidence of gestational diabetes than in other regions ($p<0.001$). Both non-obese and obese women in Northern Finland had a higher incidence of gestational hypertension than in any other region ($p<0.001$). In Western Finland both non-obese and obese women developed preeclampsia or had a caesarean delivery less frequently than in any other region ($p<0.001$). Non-obese women in Western Finland were less likely to deliver a SGA infant ($p<0.001$) but among obese women incidence did not differ according to the region ($p = 0.187$).
Conclusion: Prevalence of prepregnancy obesity among primiparous women varies across different regions of Finland. There are also differences in the incidence of adverse obstetric and neonatal events. The findings may predict later differences in regional cardiovascular disease morbidity.

Conflict of Interest: None Disclosed.

Funding: No specific funding.

Tab. 1. Maternal characteristics by region in primiparae women, Finland 2006-2013.

	Southern Finland	Western Finland	Eastern Finland	Northern Finland	p value*
n = 189 797	98 289	36 135	29 549	25 824	
Maternal age, mean, years	28.4	27.3	27.0	26.4	<0.001
Maternal height, mean, cm	165.9	165.9	165.2	164.7	<0.001
Maternal prepregnancy BMI by WHO classification					<0.001
<18.5 kg/m2, %	4.5	4.0	3.9	4.8	
18.5-24.9 kg/m2, %	67.9	63.5	63.8	64.0	
25-29.9 kg/m2, %	18.7	20.8	20.8	20.4	
30-34.9 kg/m2, %	6.2	7.7	7.8	7.5	
35-39.9 kg/m2, %	1.9	2.8	2.8	2.4	
≥40 kg/m2, %	0.8	1.2	1.0	1.0	
Socioeconomic status					<0.001
Upper white collar workers, %	16.7	16.2	13.2	15.6	
Lower white collar workers, %	24.3	34.7	30.8	34.0	
Blue collar workers, %	9.0	15.1	13.6	13.9	
Other, %	12.6	18.3	20.8	20.0	
Missing data, %	37.5	15.7	21.6	16.6	
Smoking					<0.001
Non-smoker, %	82.2	78.7	75.6	79.4	
Quit in first trimester, %	6.7	9.1	11.7	5.8	
Continued smoking, %	10.0	10.6	11.0	12.7	
Missing data, %	1.1	1.6	1.8	2.2	

* p value obtained from one-way analysis of variances (maternal age and height) and χ2 test (BMI, SES, smoking).

Tab. 2. Incidence of obstetric and neonatal complications by region and obesity in primipare women, Finland 2006-2013.

	Southern Finland	Western Finland	Eastern Finland	Northern Finland	p value*
Gestational diabetes					
Non-obese (a), %	8.9	10.2	10.3	10.7	<0.001
Obese (b), %	36.3	39.4	40.5	36.0	<0.001
Gestational hypertension					
Non-obese (a), %	5.8	6.7	5.9	7.9	<0.001
Obese (b), %	14.9	16.4	15.2	19.0	<0.001
Preeclampsia					
Non-obese (a), %	4.0	2.8	4.0	3.7	<0.001
Obese (b), %	8.6	5.1	8.1	7.6	<0.001
Caesarean delivery					
Non-obese (a), %	19.8	17.1	19.4	18.3	<0.001
Obese (b), %	31.5	26.6	30.4	31.7	<0.001
Small for gestational age infant					
Non-obese (a), %	4.8	4.1	5.1	5.1	<0.001
Obese (b), %	4.6	3.9	4.6	4.9	0.187
Large for gestational age infant					
Non-obese (a), %	1.2	1.3	1.0	1.3	0.006
Obese (b), %	3.4	3.2	3.0	3.2	0.780

(a) Prepregnancy BMI<30 kg/m^2, (b) prepregnancy BMI ≥ 30 kg/m^2 * p value obtained from χ^2 test.

PO1.171

Adiposity and risk of vascular and non-vascular mortality among relatively lean Chinese adults with diabetes

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Introduction: Adiposity is a major cause of diabetes. Among people with diabetes, however, the role of excess weight in influencing mortality risk remains controversial. We aimed to assess the associations of adiposity with the risk of cardiovascular disease (CVD), non-CVD, and all-cause mortality among individuals with diabetes. These were compared with associations among individuals without diabetes.
Methods: We analysed data from 446,713 men and women aged 30-79 without prior cancer, respiratory diseases and CVD, who were recruited into the China Kadoorie Biobank during 2004-08. During ~9 years' follow-up, 26,905 participants died, including 3517 deaths among 23,842 participants with previously diagnosed or screen-detected diabetes at baseline. Cox regression was used to yield adjusted hazard ratios (HRs) for mortality associated with adiposity, which were contrasted with those among individuals without diabetes.
Results: Overall the mean baseline BMI was 25.0 kg/m^2 (SD 3.4) among individuals with diabetes and 23.6 kg/m^2 (SD 3.1) among those without. Diabetes was associated with a 1.5- to 2-fold higher incidence of CVD and overall mortality. Among individuals with diabetes, BMI showed a log-linear positive association with CVD incidence. However, there was a reverse J-shaped association between BMI and overall mortality risk, with an adjusted HR of 2.49 (95% CI 2.15-2.90) for those with BMI<18.5 kg/m^2 and 1.08 (0.95-1.22) for BMI>30 kg/m^2, compared with those with BMI 22.5-24.9 kg/m^2. Similarly, for CVD mortality and CVD events followed immediately by death, there was a U-shaped and reverse J-shaped association with BMI, respectively. These associations differed little between individuals with previously-diagnosed and screen-detected diabetes, and persisted after limiting analyses to never smokers and excluding the first 5 years of follow-up. There were similar, although less extreme, associations among individuals without diabetes.
Conclusion: Among relatively lean Chinese adults with diabetes, higher adiposity was associated with higher incidence of CVD. However, there was a possible adverse survival effect of low BMI.

Conflict of Interest: None Disclosed.

Funding: Wellcome Trust, National Institutes of Health, NIHR, MRC, BHF, CR-UK, Kadoorie Foundation, MoST, NSFC.

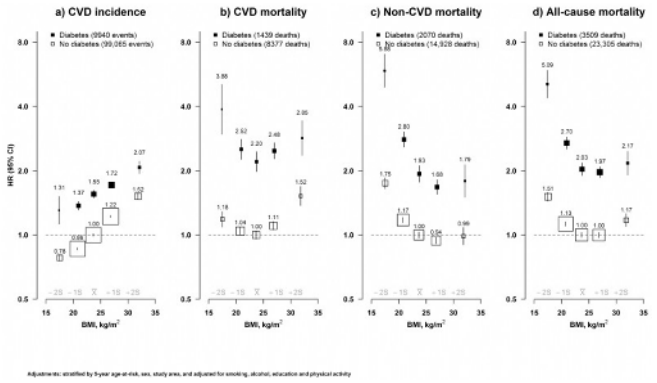

Fig. 1. Association of baseline BMI with a) CVD incidence b) CVD mortality, b) non-CVD mortality and c) all-cause mortality among individuals with and without diabetes.

PO1.172

Adherence to the dietary guidelines for the Spanish population and risk of overweight/obesity in a Mediterranean cohort: the SUN Project

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Introduction: The latest dietary guidelines for the Spanish population were updated in 2016 by the Spanish Society of Community Nutrition (SENC). Dietary guidelines play a key role in setting standards for nutrition policies and are the main reference for promoting healthy eating. Like other public health guidelines, they are influenced by political, economic, and social factors that might place other concerns ahead of the population's health. In order to determine their effectiveness on obesity prevention, we prospectively examined the association between adherence to the SENC dietary guidelines and the incidence of overweight/obesity in a large Spanish cohort.
Methods: The SUN Project is a dynamic, prospective, multipurpose cohort of Spanish university graduates initiated in 1999 with an overall retention rate of 91%. We followed 11,554 participants (73% women; median age: 32 y), initially free of overweight/obesity. The adherence to recommendations of the SENC food and hydration pyramids (SENC FP and HP) was calculated at baseline and after 10 years of follow-up through the energy-adjusted ratio of consumed to recommended daily servings of ten food groups (grains and byproducts, fruits, vegetables, dairy, protein-rich foods, olive oil, red and processed meat, sweets, salty snacks and spreadable fats; fermented alcoholic beverages and water) and four beverage groups (water, low/non-caloric, caloric and nutritive and caloric and non-nutritive), wherein higher scores indicated greater adherence. Cox models were used to assess the incidence of overweight/obesity (BMI≥25 kg/m^2) and adjust for potential confounders.
Results: After a median follow-up of 10.3 years, 2282 new cases of overweight or obesity were identified. Baseline adherence to the SENC FP score was only marginally associated with a reduced risk of overweight/obesity (multivariable-adjusted HR for the fifth quintile vs. the first quintile: 0.86; 95% CI: 0.74–1.01; p-trend: 0.046). This association reached statistical significance when repeated measurements of diet were taken into account (HR: 0.84; 95% CI: 0.72–0.98; p-trend: 0.010). No consistent trends were found for the SENC HP.
Conclusion: Taken together, these results from a large prospective cohort of Spanish graduates suggest that adherence to the SENC dietary guidelines is only partly effective in preventing long-term weight gain, so there is large scope for improvement. Further studies considering both the FP and HP should be carried out to confirm our findings and strengthen guidelines accordingly.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Carlos III Health Institute, the European Regional Development Fund, the Navarra Regional Government and the University of Navarra.

PO1.173

Assessment of alimentary anthocyanidins intake in overweight students

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Introduction: Anthocyanidins are the subclass of flavonoids and make up the largest group of water-soluble natural pigments. Their biological role is associated with the ability to increase the expression of cellular antioxidant enzymes, thereby preventing the activation of lipid peroxidation, which is important to consider in overweight people using diets with a lower energy value. The aim of the study was to analyze the structure and frequency of inclusion of food products containing anthocyanidins, and to assess the level of consumption anthocyanidins in young people with overweight and obesity.
Methods: The study involved 123 students, 22 of them with overweight and obesity (13 men and 9 women, mean BMI 28.7±2.63, mean age 22.3±0.76) consisted target groop. It was used a questionnaire based on the 24-hour diet recall, which included the most important sources of anthocyanidins in the region diet: red apples, bananas, nectarines, peaches, black plums, blackberries, raspberries, blueberries, black currants, black grapes, and nuts (pistachios, pecans, hazelnuts). To quantitatively assess the alimentary intake of anthocyanidins was used the USDA database of its content in food products.
Results: In the diet of the students were dominated such sources anthocyanidins as bananas and apples, which were consumed of 50% and 31.8% of students, respectively. Other sources of anthocyanidins were registered in the diet of a smaller number of respondents: hazelnuts (22.7% of students), grapes (18.2%), pistachios (13.6%), raspberry jam (9.1%), black currants (4.5%), peaches (4.5%) and pecans (4.5%). None of the overweight students included in the diet black plums, blackberries, raspberries, blueberries. Only from one student was noted an anthocyanidin amount in the diet of 94.3 mg, which corresponds to the recommended amount (more than 50 mg/day). A high level of anthocyanidins in its diet is associated with the consumption of a large portions of bananas and raspberry jam. In other students the amount of anthocyanidins in the diet (20.56±10.64 mg/day) was below the optimal level.
Conclusion: The study showed that overweight students do not include in their diets the main sources of anthocyanidins, which leads to deficiency of their consumption. Anthocyanidins adequate level in the diet can be achieved by a regular (6-7 times per week) using their conventional sources (red apples, bananas, nectarines, peaches) and periodically (1-2 times per week) other significant sources (some fruits and berries, but not jams). Wherein, nuts cannot be recommended as sources of anthocyanidins in overweight people due to high fat content.

Conflict of Interest: The authors declare no conflict of interests.

Funding: Research was conducted without sponsorship.

PO1.174

The association between obesity degree, glycemic status and risk of heart failure in 9,720,220 Koreans

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Background: Recent studies suggest the association between diabetes and increased risk for heart failure (HF). However, the association between obesity status, glycemic status and risk for HF is not known. In this study, we analyzed whether the risk for HF increases in subjects according to baseline glycemic status, and whether this increased risk is associated with obesity degree in 9,720,220 Koreans.
Methods: Using the data from Korean National Health Insurance System, we analyzed the risk for development of HF according to baseline glycemic status (normoglycemia, impaired fasting glucose (IFG) and diabetes) in 9,720,220 Koreans without HF at baseline in a median follow-up period of 5 years. The subjects were divided into 5 groups according to baseline body mass index (BMI) and waist circumference (WC).
Results: Those with impaired fasting glucose (IFG) showed 1.08-fold and those with diabetes showed 1.86-fold increased risk for development of HF compared as normoglycemic subjects. When the risk was analyzed according to obesity degree, compared as normal group (BMI 18.5-kg/m^2), underweight group (BMI<18.5 kg/m^2) showed 1.39-fold increased risk for HF, and those with BMI>30 kg/m^2 showed 1.15-fold increased risk for HF, and this was similarly observed when the subjects were divided according to WC. This significant increased risk for HF in underweight and obese subjects was similarly seen when the subjects were divided into three groups of normoglycemia, IFG and diabetes.
Conclusion: The risk for HF increased as the glycemic status worsened from normoglycemia to diabetes. This increasing risk for HF was more prominent in underweight and obese subjects compared as those with normal weight.

PO1.175

Metabolically healthy obesity (MHO) in the Malmö Diet Cancer Study cohort – epidemiology, characteristics and prospective risk

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Introduction: Metabolically healthy obesity (MHO) continues being a controversial topic among researchers. Furthermore, the underlying mechanisms and contributing factors behind this phenotype still remain unclear. Our aim was to further investigate the traits and risk of MHO, using a new approach, defining MHO by subjects being non-hospitalized for several decades in mid-life (Tremmel M, et al., Obesity Medicine 2018).
Method: A cross-sectional analysis was carried out in a subsample of 3,812 obese subjects (BMI ≥30 kg/m^2), selected from the Malmö Diet Cancer Study (MDCS) cohort. Subjects with MHO (n = 214) were defined by having no records of hospitalization in the Swedish hospital discharge register during a follow-up period of approximately 25 years, between 1991 and end of 2016. Hospitalization due to normal deliveries or external injuries was excluded. MHO subjects were further compared to subjects with metabolically unhealthy obesity (MUO, n = 3,598), as well as to non-obese, matched controls. Moreover, we plan to determine prospective risks based on national registers to validate MHO.
Results: There was a significant difference in physical activity (PA) level as well as educational level, where MHO subjects reported a significantly lower proportion of sedentary life style (MHO 13.2 % vs. MUO 23.4 %, p = 0.003) as well as higher PA Score (7,768 vs. 7,000, p = 0.001), and a larger proportion holding a university degree (18.0 % vs. 9.1 %, p = 0.001). Furthermore, MUO subjects had significantly higher HbA1c (MUO 5.29 ±1.14 % vs. MHO 4.88 ±0.57 %, p = 0.011) and fasting blood glucose (p = 0.002) compared to their MHO counterparts, but there was no significant difference in a genetic risk score for type 2 diabetes, GRS DM2 (0.6 ±0.05 vs. MUO 0.6 ±0.05, p = 0.85) between the two groups. Prospective risk analyses for incident morbidity and mortality events in MHO individuals are ongoing.
Conclusion: MHO individuals were more likely to report a less sedentary lifestyle as well as a higher educational level compared to MUO individuals. This supports the notion of MHO individuals being 'fat and fit'. Moreover, lower levels of both HbA1c and fasting glucose were seen in individuals with MHO. This indicates a less risk of hyperglycaemia and transition to diabetes in spite of obesity.

Conflict of Interest: None Disclosed.

Funding: The study was funded by Skåne University Hospital Funds and Foundations (Sweden).

PO1.177

Association between abdominal obesity and increased risk for development of hypertension regardless of physical activity: a nationwide population-based study

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The presence of abdominal obesity and lack of physical activity are both risk factors for development of hypertension. The aim of this study was to analyze the risk of developing hypertension according to baseline waist circumference (WC). In total, 16,312,476 non-hypertensive participants who were covered by the National Health Insurance Service (NHIS) from 2009 to 2012 in Korea were included in the study. The participants were divided into 6 groups according to the level of baseline WC with a 5-cm interval starting from 80 cm in men and 75 cm in women. The risk for future development of hypertension was assessed in 2015 using the claims data on the diagnosis of hypertension and prescription of anti-hypertensive medications. Approximately 7.8% of the participants developed hypertension over a median follow-up of 5.48 years. The proportion of participants who developed hypertension significantly increased from 4.2% in the WC level 1 to 17.5% in the WC level 6. After adjusting for confounding factors, level 6 of the baseline WC had a higher hazard ratio (HR) for the development of hypertension among the 6 levels of baseline with level 3 as the reference (1,736; 95% confidence interval [95% CI]: 1.72–1.753). The participants with abdominal obesity had a significantly higher HR than those without abdominal obesity regardless of whether they engage in high- or moderate-intensity physical intensity (1.741; 95% CI: 1.718–1.764). WC had a linear association with the development of hypertension based on this large nationwide population-based cohort study, which was not influenced by physical activity.

PO1.178

In a retrospective cohort study of clinic attendees with type 2 diabetes in South London, prevalence of obesity at first visit, but not subsequent mean BMI, is associated with increased prevalence of nephropathy through 10 years of follow-up

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Obesity and type 2 diabetes (T2DM) frequently co-exist and share commonalities in their aetiologies and pathogenesis. The role of obesity, and

weight loss, in the natural history of diabetic kidney disease is uncertain. Ethnicity has a known role in the epidemiology of diabetic complications, including nephropathy, yet most research subjects are drawn from a narrow range of ethnicities limiting the generalisability of published data. This study investigated the impact of obesity on the cumulative occurrence of nephropathy in a diverse inner city population.

The King's Health Partners Diabetes Data Warehouse collects data from secondary care clinical databases for patients attending diabetes outpatient clinics at participating hospitals. 5283 patients with T2DM who attended an outpatient clinic in either 2006 or 2007 and who had associated BMI data were identified. Data for the subsequent 10 years were extracted pertaining to demographic characteristics including age, sex, ethnicity, London Borough, and Index of Multiple Deprivation decile, all recorded diagnostic codes from inpatient episodes relevant to the renal complications of diabetes and incidences of diabetic nephropathy being recorded as a diagnosis in outpatient clinic. Pathology data relating to HbA1c, urinary albumin:creatinine ratio, creatinine and eGFR (MDRD) were also collected.

Subjects were categorised as obese (BMI ≥30 kg/m^2) or non-obese (BMI <30 kg/m^2) on the basis of first recorded BMI. The mean average BMI over the course of follow-up was calculated. Subjects were deemed to have evidence of nephropathy if they met eGFR diagnostic criteria for chronic kidney disease stage 3a or worse or who had a recorded inpatient diagnostic code relating to diabetic nephropathy. Subjects who were obese at first visit were significantly more likely to have evidence of nephropathy during follow-up (Pearson chi-square test, p = 0.026), while mean average BMI as a continuous variable was not significantly associated with the same outcome (logistic regression, OR 1.006, 95% C.I. 0.997-1.014). Ethnicity, gender, age, mean systolic BP and evidence of retinopathy were also significantly associated. The association of initial obesity and nephropathy remained statistically significant after adjustment in a logistic regression model incoporating these variables.

These data suggest that the presence of obesity, as defined by BMI ≥30 kg/m^2, is an independent risk factor for the development of nephropathy in the mixed-ethnicity cohort with T2DM in South London. The lack of a statistically significant association of BMI as a continuous variable suggests there may be a risk threshold rather than linear relationship. Significant limitations in this study include a lack of primary care and medication data.

PO1.179

Semi-vegetarians' body fat indices, metabolic risks and cardiovascular disease in Koreans

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Objective: Several studies have shown that plant-based vegetarian diets have advantages in the aspects of type 2 diabetes, hypertension, obesity and cardiovascular risks. However, in Korea, the benefit of plant-based diet in obesity has not thoroughly researched. The aim of this cross-sectional analysis was to find out the differences of fat accumulation using dual energy x-ray absorptiometry (DXA) and the metabolic risks and cardiovascular diseases (CVDs) in representative Korean adults.

Method: This analysis was based on the data obtained from the Fourth and Fifth Korea National Health and Nutrition Examination Survey (KNHANES IV-V). Among this, 18 198 adult data with DXA measurements, were analyzed. Because strict vegans are very rare in Korea, the comparative analysis was executed between semi-vegetarians and regular eaters. Semi-vegetarian was defined the person who eat dairy products or eggs freely, as well as fish, chicken, and meat once a month or less by food frequency questionnaire. Survey analysis method, t-test and Wald test were used for the comparison of characteristics between semi-vegetarians and regular eaters.

Results: The proportion of semi-vegetarians (mean (SE)) were 1.65 (0.19) % in men, 1.07 (0.19) % in pre-menopausal and 6.58 (0.53) % in post-menopausal women. Semi-vegetarians were older than regular eaters in men and post-menopausal women. In men, BMI, waist circumference, body fat and trunk fat were lower in semi-vegetarians than in regular eaters. In post-menopausal women, body and trunk fat in kg were lower in semi-vegetarians than the others. In men, diabetes was more frequent in semi-vegetarians. In pre-menopausal women, metabolic syndrome was more frequent in semi-vegetarians. In post-menopausal women, hypertension, metabolic syndrome and CVDs were more frequent in semi-vegetarians. Adjusting age, hypertension was less frequent in semi-vegetarians in men, and CVDs were less frequent in semi-vegetarians in pre-menopausal women. There were no other differences of the prevalence of comorbidities between semi-vegetarians and regular eaters.

Conclusion: Semi-vegetarians' body and trunk fat in kg were lower than those of regular eaters in men and post-menopausal women. Hypertension was less frequent in semi-vegetarians in men, and CVDs were less frequent in semi-vegetarians in pre-menopausal women.

Tab. 1. Comparison between regular eaters and semi-vegetarians.

	Total	Men		Pre-menopause		Post-menopause	
		Regular	Vegetarian	Regular	Vegetarian	Regular	Vegetarian
Age(year)	44.83	44.38*	55.51*	35.44	37.83	61.83*	68.36*
WC(cm)	80.86	84.09*	81.08*	75.01	77.73	82.43	82.98
BMI(kg/m2)	23.59	24.02*	22.83*	22.57	23.53	24.25	24.2
Body fat(%)	27.45	21.99*	20.47*	31.98	31.34	34.43	33.69
Body fat(kg)	17.27	15.56*	13.03*	18.51	18.49	19.86*	18.77*
Trunk fat(%)	28.51	24.21*	22.48*	30.91	30.77	35.96	35.18
Trunk fat/ Leg fat	1.73	1.93	2.03	1.34	1.5	1.87	1.85
BMI> = 25(%)	31.46	36.16	27.01	21	24.84	37.63	35.86
BMI> = 30(%)	4.09	3.9	2.09	4.3	3.63	4.61	5.5
HTN(%)	23.27	25.33	28.99	5.12	6.03	46.64*	57.1*
DM(%)	8.67	9.93*	17.85*	2.61	2.05	16.45	16.7
Dyslipidemia(%)	36.18	43.79	46.26	18.29	26.72	47.41	46.72
MS(IDF,%)	14.17	15.13	14.41	6.5	8.27	26.06*	33.45*
MS(ATP,%)	21.58	23.76	25.09	8.71*	19.6*	39.28*	50.39*
CVD(%)	3.03	3.62	4.14	0.48	0	6.49*	10.05*

Regular: regular eaters, Vegetarian: semi-vegetarians, WC: waist circumference, BMI: body mass index, HTN: hypertension, DM: diabetes, MS: metabolic syndrome, IDF: international diabetes federation, ATP: adult treatment panel, CVD: cardiovascular disease. *: P<0.05 by t-test or Wald test.

Management and Intervention

PO1.180

No change in fat free mass one month after bariatric surgery in morbidly obese subjects (a pilot study)

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Introduction: Bariatric surgery is a well-established treatment of morbid obesity. However, the multidisciplinary program is still a new approach in Bulgaria. The aim of this study was to evaluate the early changes in anthropometric parameters and fat mass (FM) and fat free mass (FFM) in morbidly obese subjects following bariatric surgery.

Methods: A total of 36 patients who underwent laparoscopic bariatric procedures (22 Roux-en-Y gastric bypass, six sleeve gastrectomies, and eight mini (omega) gastric bypass) in Alexandrovska University Hospital from September 2016 to November 2018 were retrospectively studied. Body weight, height, BMI, FM (%, kg) and FFM were collected before and one month after the bariatric surgery. The cohort comprised both genders (16 male, 20 female) with mean age - 41 years, mean preoperative body weight – 147 kg, mean height – 171 cm, mean preoperative body mass index (BMI) - 49.7 kg/m^2, mean preoperative FM % and kg – 51.2 and 71.4 respectively, mean preoperative FFM – 67.9 kg.
Results: There was a statistically significant decrease in body weight (mean body weight change – 14 kg, p< 0.0001), BMI (mean change -4.4 kg/m^2, p< 0.0001), FM % (mean change - 4.6, p = 0.02), FM kg (mean change – 13.6, p< 0.01). No statistical difference in preoperative and postoperative FFM kg (p = 0.9) was detected.
Conclusion: Fat free mass seems to be preserved at the first month after the surgery. Thereafter, the role of the dietician as part of the multidisciplinary approach is crucial to teach the patient to increase its daily protein intake to 60-80 g.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Grant #D-70/03.05.2018 by Medical University of Sofia.

PO1.181

Postoperative impact of bariatric surgery and weight loss on functional capacity and cardiovascular risk factors

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Introduction: Obesity is a chronic disease leading to health disorders, poor quality of life and morbidity (1). Bariatric surgery, especially Roux-en Y gastric bypass (RYGB), has become the most frequently used therapy for morbid obesity (2). In comparison with nonsurgical treatment, surgery results in more extensive body weight loss and better control of co-morbidities(3). The aim of this study was to examine the effects of surgically induced weight loss on cardiopulmonary function six months after the procedure, as well as the effect of such an intervention on well known risk factors for cardiovascular diseases.
Methods: This is cross-sectional study with 66 morbidly obese patients (BMI ≥40 kg/m^2 or BMI ≥35 kg/m^2 with present co-morbidities), comparing their cardiopulmonary function prior to and six months after RYGB. All patients who underwent RYGB were followed up for 6 months for possible adverse events and then assessed with cardiopulmonary testing.
Results: The substantial amount of weight loss (29.80±13.27 kg) after RYGB surgery was associated with significant reduction of co-morbidities, especially diabetes and sedentary life style. (p = 0.005, p = 0.002 respectively). The number of drugs taken for hypertension treatment was reduced. Regarding functional capacity there was significant increase in peak oxygen uptake (VO2 peak, p = 0.003), duration of exercise testing, metabolic equivalents (exercise time and METs, p<0.001) and in peak O2 pulse. These findings were particularly pronounced in a group of patients who had lost more than 18% of initial weight.
Conclusion: Reduction of body weight after RYGB surgery is associated with significantly improved cardiorespiratory function 6 months after surgery, especially in patients who lost more than 18% of their initial body weight. In addition, substantial decreases in body weight and BMI after surgery were also associated with a reduction of cardiovascular risk factors such as diabetes mellitus, smoking, hypertrygliceridemia, as well as sedentary life-style. These results show that there is a significant relationship between weight loss and improvement of anaerobic capacity after bariatric treatment.

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Conflict of Interest: None Disclosed.

Funding: None funding.

PO1.182

Zinc deficiency in obese patients submitted to bariatric surgery

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Introduction: Zinc is a trace element essential for various physiological processes, including transmembrane transport, enzymatic activity and intracellular signaling. Zinc deficiency may be associated with skin changes, gastrointestinal disorders, immune dysfunction, and neuropsychological effects. The objective of this study was to characterize the prevalence and the predictors of zinc deficiency after bariatric surgery.
Methods: We evaluated 1063 morbidly obese patients submitted to bariatric surgery (87.5% women, 42.5 ± 10.7 years, baseline BMI 44.0 ± 5.7 kg/m^2). Serum zinc levels were assessed one year after surgery. We classified as zinc deficiency as a serum levels <70 μg/dL or use of zinc supplements. Statistical analysis was performed with t-test, chi-square test, simple logistic regression and multiple logistic regression.
Results: One year after surgery, the prevalence of zinc deficiency was 34.6%. 76.3% of patients were taking multivitamin supplements and 5.8% were supplemented with zinc. Patients submitted to gastric bypass had a significantly higher prevalence of zinc deficiency in comparison with other types of surgery (gastric bypass 38.6% vs sleeve gastrectomy 30.1% vs. laparoscopic adjustable gastric band 22.5%, p = 0.001). The prevalence of zinc deficiency did not vary significantly with sex, age, diabetes or age at onset of obesity. On the other hand, patients with higher BMI prior to surgery had a higher prevalence of zinc deficiency one year after surgery [odds ratio 1.39 (1.12-1.74) per +10 kg/m^2 of BMI, p = 0.003].
Conclusion: Zinc deficiency is common after bariatric surgery. Patients with a higher BMI prior to surgery and patients submitted to gastric bypass are more likely to develop zinc deficiency one year after surgery. Our results suggest that monitoring zinc levels and early supplementation with zinc in subgroups at higher risk should be a priority in the follow-up of patients undergoing bariatric surgery.

PO1.183

Association of preoperative Helicobacter pylori status with comorbidities and outcomes in bariatric surgery candidates – a retrospective study

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Introduction: Numerous studies have associated Helicobacter pylori (H. pylori) with several biochemical markers or comorbidities, including high sensitivity C-Reactive Protein (hs-CRP), type 2 diabetes or obesity. Since H. pylori is frequently encountered in bariatric surgery candidates, this study aimed to determine the association between H. pylori and both preoperative comorbidities and postoperative outcomes.
Methods: A retrospective database study was performed, including patients undergoing a gastric bypass or sleeve gastrectomy between 2010 and 2016, and that had preoperative screening for H. pylori by gastroscopic obtained biopsy or 13C urea breath test. When screened positive, eradication was performed. Statistical analysis was performed using a student's t-test, chi-square or Mann-Whitney U test as appropriate. The association between weight loss and H. pylori was determined using a mixed linear effects model.
Results: Out of 410 patients included, 120 (29.3%) tested positive for H. pylori (Table 1). Remarkably, H. pylori was diagnosed significantly more often in patients that underwent the urea breath analysis, than following histopathological staining on endoscopically acquired gastric biopsies (p = 0.031). Of all investigated preoperative parameters, only preoperative BMI, liver steatosis and endoscopically confirmed esophagitis were significantly associated with increased incidence of H. pylori. HbA1c values tended to be higher in patients diagnosed with H. pylori, but a significantly higher prevalence of H. pylori infections could not be objectivated in patients with type 2 diabetes (p = 0.167). hs-CRP levels, often described to be increased in H. pylori positive patients, were not associated with the H. pylori infection itself. However, elevated hs-CRP levels were observed in patients with endoscopic markings of gastritis (0.80 ±0.75 vs. 1.08 ±1.20, p = 0.044).
Finally, at one year follow-up, patients with preoperative H. pylori appeared to achieve less total weight loss (%TWL, p = 0.016), however without any effect beyond one year and without influencing absolute weight loss. To correct for potential confounding, a mixed linear effects model including preoperative BMI was performed, which confirmed no significant difference in %TWL between patients with or without a preoperative H. pylori infection (p = 0.935).
Conclusion: Although regularly reported in literature, in our study H. pylori infection was not significantly more common in patients with type 2 diabetes, nor associated with elevated HsCRP levels. In contrast, elevated hs-CRP levels were associated with gastritis, which was virtually always encountered in case of H. pylori positivity. Remarkably, patients undergoing a Urea breath test were more likely to be diagnosed with H. Pylori.

Tab. 1.

Table 1 – Overview of the association of H. Pylori with pre and postoperative parameters.

	H. Pylori Screening Negative (n=290)	H. pylori Screening Positive (n=120)	p-value
Patient Characteristics			
Mean Age (years, SD)	42.66 (12.96)	42.86 (11.94)	0.885
Male Gender (n, %)	91 (31.38)	43 (35.83)	0.382
Mean preop. BMI (kg/m², SD)	41.17 (4.47)	42.67 (5.60)	**0.004**
Mean preop. Weight (kg, SD)	117.34 (17.25)	120.11 (19.20)	0.154
Active Smoker (n, %)	60/286 (20.98)	33/119 (27.73)	0.459[1]
Inactive Smoker (n, %)	76/286 (26.57)	18/119 (15.13)	**0.029**[1]
Surgical Characteristics			
Gastric Bypass (n, %)	280 (96.55)	107 (89.17)	
Sleeve Gastrectomy (n, %)	10 (3.45)	13 (10.83)	**0.003**[2]
Revision from Lap. Banding (n, %)	25 (8.62)	8 (6.67)	0.508
Open procedures (n, %)	9 (3.10)	4 (3.33)	0.904
Comorbidities			
Diabetes Mellitus Type II (n, %)	77 (26.55)	40 (33.33)	0.167
Mean Preop. HbA1c (mmol/mol, SD)	41 (11.9)	43 (14.2)	0.064
Mean Preop. HbA1c (%, SD)	5.88 (1.09)	6.12 (1.29)	0.062
Arterial Hypertension (n, %)	112/287 (39.02)	44/120 (36.67)	0.656
Liver steatosis (n, %)	188/273 (68.86)	91/112 (81.25)	**0.013**
Preop. Total Cholesterol (mg/dl, SD)	192.84 (41.51)	194.17 (36.07)	0.532
Preop. Triglycerides (mg/dl, SD)	166.15 (127.64)	157.97 (91.27)	0.763
Preop. HDL (mg/dl, SD)	48.55 (14.62)	46.38 (12.09)	0.162
Median hs-CRP (mg/dl, IQR)	0.59 (0.91)	0.59 (0.80)	0.873
Endoscopic preop. Gastritis (n, %)	57/214 (26.64)	24/74 (32.43)	0.339
Endoscopic preop. Esophagitis (n, %)	96/209 (45.93)	21/73 (28.77)	**0.010**
Histopathological preop. Gastritis (n, %)	111/212 (52.36)	69/71 (97.18)	**<0.001**
H. Pylori Detection			
Histopathological Diagnosis (n, %)	208 (71.72)	73 (60.83)	**0.031**
C13 Urea Breath Test (n, %)	82 (28.28)	47 (39.17)	
Postoperative Outcomes			
Diabetes Remission (ADA Criteria)			
Complete Remission (n, %)	31/56 (55.36)	19/26 (73.08)	0.126
Partial Remission (n, %)	33/56 (58.93)	19/26 (73.08)	0.216
% Total Weight Loss (%, SD)			
1 year after surgery	29.37 (8.06)	26.35 (9.88)	**0.016**
2 years after surgery	27.93 (8.58)	28.65 (9.62)	0.660
Absolute Weight Loss (kg, SD)			
1 year after surgery	34.39 (10.14)	32.36 (13.76)	0.212
2 year after surgery	32.97 (10.77)	33.85 (13.52)	0.677

SD, Standard Deviation; Preop., preoperative; BMI, Body Mass Index; HsCRP, High Sensitivity CRP; HDL, High Density Lipoprotein; IQR, Interquartile Range; ADA, American Diabetes Association. [1]Compared to lifetime non-smokers. [2]Compared to Gastric Bypass (limited cohort). Analysis performed using student's t-test, Chi-Square or Mann-Whitney U when appropriate.

Overview of the association of H. pylori with several pre- and postoperative outcome parameters.

PO1.184

The efficacy of probiotics in patients undergoing bariatric surgery - systematic review

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Introduction: Bariatric surgery (BS) is the most effective treatment with regard to weight loss. To enhance the sustainability of results certain interventions such as administration of probiotics - living micro-organisms - may be applied. Published randomized controlled trials (RCTs) present controversial results, thus performing the systematic review is to assess the efficacy of probiotics applied to patients undergoing BS is warranted.
Methods: We searched electronic databases (Ovid MEDLINE, Embase, CENTRAL, Web of Science) and registers of clinical trials (ClinicalTrials.gov, European Trials Register, WHO International Trials Registry Platform) using adequate strategies without any restrictions. Studies designed as RCTs, where probiotics at any dose were applied to patients undergoing BS were included. The primary outcomes were weight loss measured as change in e.g. weight/BMI/percentage of excess weight loss and change in quality of life. Secondary outcomes were: change in gastrointestinal symptoms and frequency of adverse effects. Title/abstract, full text screening and data extraction were performed in pairs by independent reviewers and any conflicts were resolved by discussion or help from the third reviewer. Additionally, we searched the references of included studies and references of any identified systematic review/meta-analysis during the screening process. We used the Cochrane Risk of Bias Tool for risk of bias assessment. The study protocol was submitted to the PROSPERO database: CRD42018105257

Results: Searches yielded 1998 results which after deduplication yielded 1728 abstracts to screen. The screening resulted in 23 references of which 13 (5 studies) qualified for extraction. Study flow is presented on **Fig. 1.** Altogether, 226 patients (75% women) were recruited and duration of interventions ranged from 2 weeks to 6 months. Interventions comprised individual supplements of Clostridium butyricum, Bifidobacterium longum, Lactobacillus, as well as complex preparations of up to 11 different species of probiotics. The outcomes were reported inconsistently among included trials with %Excess weight loss being the most commonly reported outcome (4 studies).
Conclusion: This topic does not seem to be well explored and high quality RCTs in this area are needed. Currently we are awaiting for additional data and clarifications from authors that may enable quantitative analysis. Detailed analyses will be presented during the conference.

Conflict of Interest: None Disclosed.

Funding: Authors are beneficiaries of European Operational Programme Knowledge Education Development 2014 – 2020 – grant for presenting the results of the project "Systematic insight into efficacy of probiotics in bariatric and psychiatric patient" – which encompasses this paper.

Fig. 1. - Study Flow Diagram - PRISMA

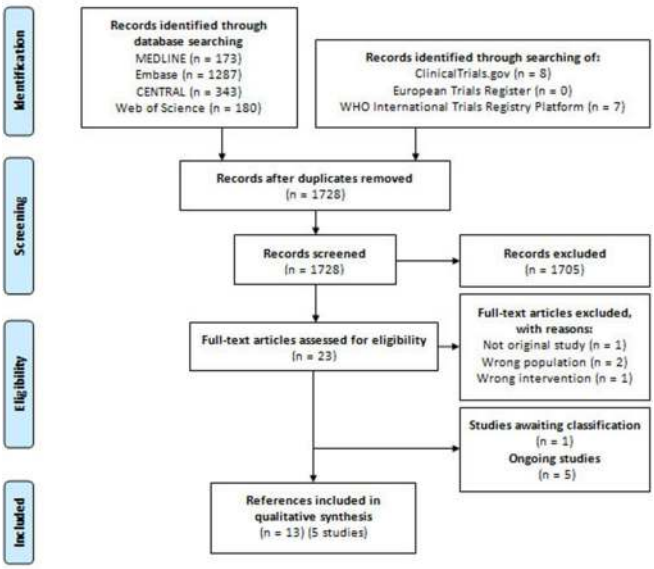

Fig. 1. PRISMA flow diagram.

PO1.185

IL-6 on Obesity - Will Bariatric Surgery play any role in varying serum levels?

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Introduction And Objective: Overweight/obesity is prevalent in modern populations, causing deleterious changes in the body. Adipose tissue is rich in inflammatory mediators, namely interleukin-6 (IL6), which has an effect on metabolism, contributing to cardiovascular risk. We intend to analyze if bariatric surgery will have a favorable effect on IL6 levels in obese patients.
Methods: Prospective analysis of the metabolic profile and inflammatory markers in patients undergoing gastric bypass in Y-Roux (BGYR), before and one year after surgery. Statistical analysis performed in SPSS V24.
Results: We included 19 patients, mean age 41.5 ± 11.1 years, 84.2% of the female gender. There was a significant reduction in weight (110.6 vs 80.6 kg) and BMI (42 vs 30.5 kg/m^2) before and after surgery (p-0.00). There was also a significant reduction in levels of IL6, CRP and increased levels of adiponectin (p <0.05). There was a positive correlation between IL-6 levels and those of CRP and cholesterol (rs -0.66, p-0.003 and rs = -0.61, p-0.006, respectively) prior to surgery and between levels of IL6 and triglyceride levels (rs = 0.54, p-0.016) after surgery. There was also a significant correlation between weight loss and BMI in the variation of IL6 levels (rs = -0.49, p -0.035 and rs = -0.57, p -0.01, respectively).
Conclusion: BGYR is a treatment with a favorable effect on weight loss and metabolic profile. Weight reduction, with loss of adipose tissue, appears to decrease levels of IL6, as well as those of CRP, thereby improving the chronic inflammatory state and consequently reducing cardiovascular risk.

PO1.186

HbA1c is associated with significant increase of Ca and PTH in obese diabetic persons: influence of bariatric surgery

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Background: Diabetes mellitus (DM) has a known impact on bone metabolism, being associated with increased risk of fractures. Despite this, studies evaluating the role of diabetic status on total calcium (Ca) and parathormone (PTH) levels after bariatric surgery (BS) are lacking.
Methods: Retrospective study of obese patients submitted to BS comparing patients with and without DM before and 36 months (36m) after BS. A multiple linear regression adjusted considering the outcome of the variation of Ca and PTH levels with surgery, according to diabetic status was performed.
Results: We studied 661 obese patients (36.6% with DM) submitted to three different types of BS [60% gastric bypass (GB); 24% gastric sleeve (GS); 16% gastric banding]. Diabetic patients before and 36m after any type of surgery had higher levels of circulating PTH (49.7±24.7 vs 53.0± 24.45pg/mL, p = 0.004) and Ca (4.65±0.01 vs 4.69± 0.01 mEq/L, p = 0.026). Diabetic status 36m after GB was associated with higher PTH levels (57.2±26.5 vs 52.5±26.25pg/mL, p = 0.034). GB in diabetics induced at 36m a significant increase of PTH compared with non-diabetics (Non-diabetics -2.85 ± 25.32 vs Diabetics +6.1±38.18pg/mL, p = 0.009). After adjustment for age, sex, body mass index before surgery, weight loss, Ca and Vitamin D levels 36m after GB, the association of the variation of PTH with diabetic status remained significant (β adjusted ΔPTH levels/bypass:10.07, 95%CI 0.28-19.87 p = 0.044). After the addition of HbA1c levels 36m after GB to these variables, the presented association lose significance (β adjusted ΔPTH levels/bypass:8.82, 95%CI -0.99-18.63 p = 0.078). Diabetic status 36m after GS was associated with higher Ca plasma levels (4.76±0.16 vs 4.66±0.19mEq/L, p = 0.007). Despite this association, GS in diabetics did not induced different variation of Ca levels compared with non-diabetics (Non-diabetics -0.08 ±0.02 vs Diabetics -0.05±0.04 p = 0.363).
Conclusion: Diabetic patients submitted to GB had higher circulating PTH levels 36m after BS that seemed to be mediated by HbA1c levels.

PO1.187

Effectiveness of ursodeoxycholic acid in the prevention of cholelithiasis after sleeve gastrectomy

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Introduction: The use of ursodeoxycholic acid (UDCA) to prevent gallstone formation after sleeve gastrectomy (SG) is still debated. Furthermore, no study has assessed the effectiveness of UDCA on gallstone formation after the first postoperative year.
Objectives: To compare the incidence of cholelithiasis (CL) at 1 and 3 postoperative years after SG between patients treated or not with UDCA.
Methods: From January 2008, a postoperative ultrasound monitoring was scheduled for all patients who underwent bariatric surgery in our institution. Patients with preoperative intact gallbladder who performed at least one ultrasound at 1 year after SG were included. We compared the incidence of CL between patients operated before October 2013 who did not receive UDCA, and those operated from October 2013 who received UDCA 500 mg once daily for 6 months postoperatively.
Results: The incidence of CL at 1 year after SG was 28% in the 46 non-treated and 3.5% in the 143 treated patients ($p < 0.001$). UDCA reduced the need of cholecystectomies from 11% to 1.4% ($p = 0.012$). Thus, the number of patients needed to treat to avoid a cholecystectomy was about 10. Only 2 patients (1.4%) stopped UDCA for adverse effects. No gallstone appeared at 3 years in the 61 patients who performed an ultrasound at this time. In the 189 patients included in the study, only preoperative body mass index >50 kg/m^2 and absence of UDCA treatment were associated with gallstone formation. In multivariate analysis, only absence of UDCA treatment was associated with presence of CL ($p<0.001$).
Conclusion: UDCA 500 mg once daily for 6 months is effective to prevent CL at mid-term after SG and well tolerated. We recommend UDCA treatment in all patients after SG with intact preoperative gallbladder.

Conflicts of Interest: None.

Funding: No Funding.

PO1.188

Diabetes remission after biliopancreatic diversion is more likely in patients with traits of "metabolic health"

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Introduction: The role of bariatric surgery in bringing type 2 diabetes into remission is well recognized.The aim of the present study was to identify the characteristics that are typical for patients prone to type 2 diabetes mellitus (T2DM) remission after biliopancreatic diversion (BPD).
Methods: The study included 42 patients with a long history (≥10 years) of obesity: 21 patient with T2DM and 21 patients without T2DM (metabolically healthy obese, MHO group). All patients were examined at baseline, T2DM patients were also examined 9 months after BPD. Methods included anthropometric measurements, body composition, HbA1c, mixed meal test in T2DM patients, OGTT in control group. Insulin resistance (IR) was measured by hyperinsulinemic euglycemic clamp and HOMA-IR. T2DM remission rate was assessed at 5 months after BPD, when patients reached stabilization of glycemia (≤6.5 mmol/l at fasting state, ≤8 mmol/l postprandial) and HbA1c (≤6.5%) the initial glucose-lowering therapy was gradually cancelled. According to HbA1c results at 9 months after surgery T2DM group was divided into 2 subgroups: remission of T2DM (normoglycemia without medical therapy) and stable T2DM (normoglycemia with glucose-lowering therapy). The results were checked for statistical significance using the Mann–Whitney U test. The values are given as median and interquartile range (Me [Q1; Q3]).
Results: BPD resulted in remission of T2DM in 81% patients. The baseline characteristics of anthropometric and metabolic indices are presented in Table.
Conclusion: T2DM remission was more common in patients with characteristics similar to MHO: preserved insulin secretion, decreased IR and less visceral adiposity.

Conflict of Interest: None Disclosed.

Funding: This study was supported by Russian Science Foundation (RSF grant no.

Tab. 1. The baseline characteristics of anthropometric and metabolic indices.

	T2DM remission (Ia)	Stable T2DM (Ib)	MHO (II)
n	17	4	21
Age (yrs)	44.0 [41.0; 48.0]	48.0 [43.0; 51.0]	43.0 [38.5; 47.0]**
Type 2 DM duration (yrs)	8.0 [6.5; 12.0]	9.5 [7.5; 12.5]	-
Obesity duration (yrs)	17.5 [10.5; 21.0]	19.0 [11.0; 24.0]	15.0 [12.0; 21.0]
BMI (kg/m^2)	39.3 [34.93; 43.45]	40.9 [37.4; 48.0]	41.6 [36.2; 46.5]
HbA1c (%)	7.6 [7.1; 8.3]	8.4 [7.5; 9.0]	5,50 [5.25; 5.70]*,**
HOMA-IR	11.58 [6.31; 14.10]	14.76 [5.12; 31.56]	4.26 [2.94; 7.18]*,**
M value (mg/kg/min)	1.45 [1.10; 2.30]	0.87 [0.51; 1.16]□	1.93 [1.21; 2.54]**
Insulin, 0 min (mcU/ml)	15.30 [12.76; 34.56]	17.2 [15.1; 40.5]	19.3 [13.2; 30.3]
Δ30-0 min insulin (mcU/ml)	101.6 [69.2; 129.5]	94.1 [61.9; 111.2]	113.8 [56.3; 144.3]**
Total amount of adipose tissue (%)	45.3 [41.3; 47.8]	47.7 [43.2; 49.4]	45.7 [42.6; 47.9]
Area of visceral adipose tissue (cm^2)	210.5 [160.5; 250.0]	255.0 [200.5; 310.0]□	190.0 [140.5; 210.5]**

□p<0.05 between Ia and Ib; *p<0.05 between II and Ia; **p<0.05 between II and Ib.

PO1.189

What are the deficiencies responsible for the most common nutritional symptoms after bariatric surgery?

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Background: Several studies have shown that bariatric surgery (BS) induces nutritional deficiencies. Many patients complain of nutritional symptoms after BS, including hair loss, cramps and paresthesia, but their link with biological alterations has been poorly studied. As a result, the treatment of these symptoms is based more on beliefs shared by physicians and patients than on scientific data.
Objectives: To assess in a large cohort the link between nutritional symptoms and biological parameters both in the short (ST < 1 year) and long term (LT ≥ 3 years) after the 2 most common procedures, Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG).

Methods: Nutritional status, assessed by clinical symptoms and biological parameters (including vitamins B1, B3, B6, B9, B12, A, E, D, minerals and protein parameters), was prospectively recorded in our database. All subjects with complete clinical and biological assessment from 2011 to 2018 were included: 429 subjects (BMI 45±14 kg/m^2; 48% RYGB) were studied at ST (6±1 months) and 459 subjects (BMI 46±8 kg/m^2; 79% RYGB) at LT (56±20 months).
Results: After BS, weight loss was 24±6 % at ST and 31±8% at LT and 97% and 78% of subjects were taking multivitamins, respectively. The proportion of patients with hair loss decreased from 65% at ST to 35% at LT and did not differ between SG and RYGB. In contrast, the proportion of patients with cramps and paresthesia increased from 7 to 32% and from 11 to 18% at LT, respectively and was not significantly more frequent after RYGB. In subjects with hair loss, the postoperative weight was 6 kg lower than in subjects without hair loss both at ST and LT ($p<0.001$) and caloric intake at ST was lower (989±279 vs. 1084±351 Kcal/d; $p = 0.001$). Blood parameters of protein metabolism (including urea, creatinine, uric acid and prealbumin were lower both at ST ($p<0.01$) and LT ($p<0.05$) in subjects with hair loss, as for ferritin ($p<0.05$) and hemoglobin ($p<0,01$), whereas neither zinc nor group B vitamins levels were significantly different. Any of the nutritional parameters tested was clearly associated with cramps and paresthesia.
Conclusion: After BS, the most frequent nutritional symptom is hair loss. This symptom is essentially linked to iron and protein deficiencies. Thus, diet counselling and adequate supplementation in proteins and iron are required after BS to avoid hair loss. For other symptoms, the causes are less clear and probably more heterogeneous.

PO1.190

Outcomes of bariatric surgery in a tertiary hospital in Madrid, Spain: 5 years follow-up in a single center

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Introduction: Bariatric surgery (BS) results in substantial weight reduction (WR) and amelioration of majority of comorbidities. However, the best results are often oversized due to limited follow-up. Therefore, it is important to assess outcomes at mid-long term.
Methods: We tried to establish if WR is different considering sex, age, type of surgery (ToS), co-morbidities and years passed since surgery and to define the time in which the participants experienced weight regain after reached nadir weight (NW).
We retrospectively analyzed our database to identify patients who underwent BS between January 2011 and December 2013 in University Hospital La Paz in Madrid.
At baseline, we recorded anthropometric, clinical and analytical variables. Weight was recorded yearly for five years and percent excess of weight loss (PEWL) and percent excess of body mass index (BMI) loss (PEBMIL) were calculated.
To compare variables, we calculated t test, $\chi 2$ test and multiple linear regression. A $p<0.05$ indicates statistical significance.
Results: 119 patients were submitted to BS, the mean age was 46.1 ± 9.9 years, 64.3% were female and mean BMI was 46.9 ± 7.4 kg/m^2. Gastric bypass was the most frequent technique (83.9%). At baseline, type 2 diabetes (T2D) was present in 41.9% of patients, hypertension (HT) in 48.4%, dyslipidemia (DL) in 29%, liver steatosis in 33.3%, obstructive sleep apnea in 35.5% and metabolic syndrome (MS) in 94.1 %.
Globally, NW was attained at 2 years, with a mean BMI of 31.8 ± 5.4 kg/m^2; the PEWL was 62.5 ± 19 % and the PEBMIL was 71.2 ± 22.4 %. At 5 years, mean BMI was 36.4 ± 5.7 kg/m^2, PEWL was 42 ± 23.8 % and PEBMIL was 51.2 ± 24.4 %. At 5 years, T2D, HT, DL and MS was present in 11.1 %, 25%, 20% and 33% of patients, respectively.
At NW, there were no difference in PEWL and PEBMIL taking into consideration sex, ToS and presence of T2D and MS at baseline.
At the end of follow-up, there were no differences in PEWL and PEBMIL with respect of ToS and presence of T2D and MS at baseline. The proportion of HTA, DL and MS was not different from the proportion at the beginning; only the proportion of T2D was different ($p<0.05$). Nevertheless, mean BMI was better at five years ($p<0.05$).
When categorizing age as a dichotomous variable or ordinal, we didn't find significant differences or lineal or quadratic trend in terms of PEWL or PEBMIL.
Conclusion: BS is an effective method for WR, it achieves the best results at 2 years of the procedure and last at least until 5 years of follow-up, although to a lesser extent. With regard of resolution of co-morbidities, the impact is less clear, and it seems that it improves them without attaining complete remission.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.191

Intussusception during pregnancy following roux-en-y gastric bypass: a literature review

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Introduction: Roux-en-Y gastric bypass (RYGB) is the gold standard bariatric procedure for morbid obesity. Most patients who undergo this procedure in UK are females; commonly of childbearing age. The resultant rapid weight loss is associated with improved ovulatory function and patients commonly regain fertility post-operatively. This study reports published cases of intussusception during pregnancy as a complication that can occur following RYGB.
Methods: A complete literature search was performed using PubMed / Medline using the keywords "pregnancy", "intussusception" and "gastric bypass". Further works were added following a manual search references contained within the relevant identified articles. Patients were included who had undergone an open or laparoscopic Roux-en-Y gastric bypass (RYGB) and later developed small bowel intussusception during pregnancy.
Results: Thirteen females with a mean age of 30.4 years were identified across 11 case reports. Intussusception occurred at a median of 4 (range 1 – 14) years following surgery. All patients presented with abdominal discomfort with 85% experiencing vomiting also. CT and MRI scans confirmed intussusception in all 7 cases in which they were used. In contrast, ultrasound was diagnostic in only 1 out 5 patients. The remaining 5 cases were diagnosed intra-operatively. Ten patients ultimately required resection of the affected portion of small bowel while only three were successfully managed with reduction alone. No maternal mortalities occurred across these cases. One infant died following post-operative delivery.
Conclusion: Intussusception is a rare but serious complication following RYGB. Presenting symptoms are often vague and non-specific. A high index of clinical suspicion is, as such, required. It is not yet clear whether pregnancy represents an independent risk factor for intussusception.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.192

Metabolic surgery for the treatment of type 2 diabetes: what proportion of patients is eligible, and how many are offered this option?

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Introduction: Bariatric surgery leads to profound glycemic improvements in patients with type 2 diabetes (T2DM). This finding has led to the adoption of the term "metabolic surgery", and the proposal of specific criteria for its employment in obese patients with T2DM by an expert consensus, the Diabetes Surgery Summit II (DSSII). The aim of the present study was to assess the percentage of T2DM patients visiting the outpatient diabetes clinic of a tertiary hospital who were eligible for bariatric surgery by DSSII criteria, and of these, how many had been informed of this option.
Methods: Data from all patients with T2DM who visited our diabetes clinic over 13 months were consecutively recorded, including anthropometric parameters, Hba1c, diabetes treatment, and existing comorbidities. A structured questionnaire was used for the collection of data on medical history, mental health, medical insurance, and socioeconomic status. Patients were considered eligible if the recommendation by DSSII criteria was to either "consider" or "recommend" metabolic surgery. Patients who fulfilled the criteria but had age-related, health, insurance, or socioeconomic reasons for which surgery could not be performed, were considered ineligible. Eligible patients were asked if they had ever been informed of the option for metabolic surgery by doctors in our clinic.
Results: Data were collected on 593 patients with T2DM. Of these, 97 (16.4%) were found to be eligible (E) for metabolic surgery, whereas 496 (83.6%) were non-eligible (NE). Eligible patients were significantly younger (ageE: 55.0 ±8.0 vs ageNE: 67.9 ±9.9 years, p<0.001), and had a higher BMI (BMIE: 38.6 ±6.3 vs BMINE: 29.9 ± 5.5 kg/m^2, p< 0.001). Significant differences between the groups were also found in HbA1c (HbA1cE: 8.0 ±1.9 vs HbA1cNE: 6.9 ±1.3%, p <0.001), diabetes duration (DDurationE: 9.4 ±8.0 vs DDurationNE: 13.7 ±9.3 years, p<0.001) and eGFR (eGFRE: 82.2 ±21.9 vs eGFRNE: 76.7 ±24.1 ml/min/1.73m^2, p = 0.027). Of the 97 patients deemed eligible for metabolic surgery, only 25 (25.8%) had been informed about this option. Between the informed (I) and non-informed (NI) groups, there were significant differences in age (ageI: 50.8 ±8.7 vs ageNI: 56.3 ±7.4 years, p = 0.007), and BMI (BMII: 43.1 ±8.9 vs BMINI: 36.9 ±4.1 kg/m^2, p = 0.001).
Conclusion: A considerable proportion of patients with T2DM are eligible for metabolic surgery. These tend to be younger, more obese, have worse glycemic control, better renal function and less long-standing diabetes. Only a few of the eligible patients are informed by physicians about this option. Doctors tend to consider metabolic surgery as possible treatment for younger and more obese patients, thus depriving it of many of those who would most probably benefit by it.

PO1.193

The loss of fat-free mass: an early event in patients with morbid obesity undergoing bariatric surgery

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Introduction: Bariatric surgery (BS) induces a significant and sustained weight loss in time, but apart from the reduction of body fat, you can lose muscle mass. The existing data in the literature on the evolution of fat-free mass (FFM) after BS are controversial. The analysis of body composition by bioimpedance (BIA) is a widely used method to evaluate FFM.
Methods: To evaluate, through BIA, the evolution of FFM in patients with morbid obesity undergoing BS.
Prospective study of patients undergoing BS in our center between April-September 2018. All patients underwent a 1-month post-BS study: physical examination, biochemical analysis, dietary interview and BIA. The BIA evaluated: fat free mass index (FFMI), fat mass (FM) and fat free mass (FFM).
Results: 44 patients were evaluated: 70.5% women, age 45.57 ± 10.6 years, BMI 44.7 ± 5.31 kg/m^2. 56.8% of patients underwent Roux-en-Y gastric bypass (RYGB) and 43.8% had vertical gastrectomy (VG). Average FFMI prior to the intervention was 24.16 ± 3.22 kg/m^2. Average weight loss per month was 12.74 ± 1.82kg. Patients undergoing RYGB had significantly lower levels of post-BS transthyretin than with VG (p = 0.029). However, the FFMI was 22.7 ± 2.9 kg/m^2 (p = 0.01), without significant differences between RYGB and VG (p = 0.712). The reduction of the FFM at 6 months compared to the start was 11 ± 2.11 kg.
The FFM at 6 months was directly correlated with the BMI (r = 0.466 p = 0.002), FFM (r = 0.975 p <0.001) and FFMI (r = 0.879 p <0.001) pre-BS.
The multivariate analysis discarded age, sex, surgical technique, BMI, FFMI, transthyretin levels, dietary questionnaire, as independent predictors of FFM loss at the post-BS month.
Conclusion: The study has demonstrated that the FFM goal is an early intervention in patients with obesity, morbid bursts of BS. However, this reduction has not been related with protein metabolic parameters, this suggests an independent mechanism.

PO1.194

Predictors of postoperative anemia in obese patients undergoing bariatric surgery

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Introduction: Bariatric surgery is a treatment option for obesity and anemia is one of its complications. The aim of this study is to verify which variables are associated with the incidence of anemia in the postoperative period.
Methods: Retrospective study of patients undergone bariatric surgery between June 2010 and July 2017. Anemia was defined according to WHO criteria; vitamin B 12 deficiency <200 pg/mL; folic acid deficiency <2.2 ng/mL and iron deficiency: serum iron <60g/dL, transferrin saturation <20% or ferritin <15 ng/mL. Binary logistic regression method was used.
Results: 1999 patients, 84.8% female, 15.2% male; 13.5% underwent surgery with gastric band placement; 29.9% gastric sleeve and 56.7% gastric bypass. The prevalence of anemia during 4 years of follow-up was 24.4%. The development of anemia correlates with the type of surgery performed and is more prevalent in patients who were submitted to gastric bypass (OR 2.166 95% CI 1.677-2.594 p <0.001) and in female patients (OR 2.066 CI 95 1.461-2.794 p <0.001). This difference remains statistically significant after adjustment for age, sex, BMI and anemia in the preoperative period. Deficiencies of vitamin B12, iron and folic acid in the preoperative period were not related to a higher incidence of anemia in the postoperative period (p = 0.343, p = 0.580, p = 0.573 respectively), as well BMI (p = 0.143 p = 0.288). Older patients have a higher incidence of anemia (p<0.043).
Conclusion: The incidence of anemia in the postoperative period of bariatric surgery represents a frequent complication. Patients who are female, older and undergoing gastric bypass are more likely to develop anemia. This complication should be actively sought by clinicians in the postoperative period.

PO1.195

Impact of depression on weight variation after bariatric surgery: a 3 years observational study

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Introduction: The association between obesity and depression has been repeatedly established. However, little is known about the impact that the diagnosis of depression before bariatric surgery (DDBS) may have on weight loss. **Objective:** To evaluate the impact of the DDBS on weight loss and to study predictors of weight variation 3 years after bariatric surgery (BS).
Methods: Retrospective study of patients submitted to BS between January/2010 and June/2017. Patients with no weight or current medication data or those submitted to revision surgery were excluded. Anthropometric and clinical data was collected.The diagnosis of depression was established based on taking anti-depressants prior to BS. Δweight = Weight 3 years after BS – weight prior to BS. Patients with and without a history of depression were compared using independent t test. A multivariate logistic regression model was created to evaluate predictors of success (variables included: age, sex and type of surgery).
Results: 846 patients were studied. 616 without history of depression and 230 with. At the end of the 3 years, those with DDBS presented lower weight loss compared to those without DDBS. Δweight was -29.9 Kg in individuals with DDBS and -34.1 Kg in those without DDBS, a difference that was statistically significant (p = 0.001). In the multivariate analysis, according to age and sex, it was also demonstrated that individuals with DDBS had on average + 2.8 Kg than those without DDBS after 3 years (β = 2.8, 95% CI 0.5 -5.1). When adjusted also for BS type, the effect remains statistically significant but lower (β = 2.3, 95% CI 0.3-4.3).
Conclusion: The diagnosis of depression before BS is a predictor of lower weight loss after the surgical procedure. Even after adjusting for confounding variables age, gender and BS type, this effect remains.

Conflict of Interest: Not applicable.

Funding: Not applicable.

PO1.196

Multidisciplinary approach to therapy metabolic syndrome and obesity as a pledge the effectiveness of their treatment

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Bariatric surgery is a surgical treatment of obesity, and metabolic surgery is the treatment of a metabolic syndrome In developed countries the leading role of metabolic and bariatric surgery in the treatment of metabolic syndrome and obesity is indisputable.
The purpose of the research: to demonstrate effectiveness multidisciplinary approach to the treatment of metabolic syndrome andobesity.
Materials and Methods: Analysis of the status of 22 patients with Obesity and metabolic syndrome, which are performed by the bariatric surgery. A comparative analysis of the efficiency of the barite method with previous conservative methods was conducted treatment. They were determined in the dynamics during the preoperative period body weight and body mass index (BMI), arterial pressure, waist circumference, insulin level, glucose, HOMA-IR, cholesterol levels, LDL, HDL, testosterone level, state of menstrual function in women, level of satisfaction from the conducted treatment. Dynamic analysis included retrospective observation for 12 and 6 months before surgery and 6 and 12 months after surgery.
Research Results: Most of the patients undergoing bariatric surgery had obesity with BMI that exceeded 35 kg/m^2. Only in 2 patients BMI fluctuated within 25-30, but they also had signs of MS. Constant increase blood pressure (in the range from 140/90 to 190/110 mm Hg) had 72.7% of patients, and periodic hypertensive crises - 45.5%. Waist circumference indicators fluctuated in the range of 92-136 cm in women and 109-168 cm in men. The HOMA-IR index in all patients exceeded the normative indexes. All of these patients took place insulin resistance. And in 27.3% of patients, type 2 diabetes was diagnosed and they were treated (insulin therapy was performed in 4.5%, Oral medications were used by 22.7%). Violations in the lipidogram during the last year before operations were 86.3% of patients.
Virtually all patients decided on an operation, trying to avoid full disability, reduce risk. Only 3 patients pursued an aesthetic goal.
6 months after surgery, the average weight loss was 14 kg, and a year later - 19 kg. The BMI decreased on average from 39.6 kg/m^2 to the operation to 36.8 kg/m^2 and 34.1 kg/m^2
in accordance. A year later, blood pressure was completely normalized in 56.3% of patients.
The HOMA-IR index was normalized in 63.6% of patients, and in 27.3% did not exceed the limit of 25% of the deviation. In most patients (59.1%) one year after surgery total cholesterol normalization, in 31.8% - substantially decreased. The level of triglycerides in 81.8% normalized, and in 18.2%, it was close to norm. 12 months after surgery36.4% of patients observed a continuation of decline body weight, and in 59.1% body weight stabilized.

PO1.197

The efficacy of probiotics in patients undergoing bariatric surgery - a systematic review

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Introduction: Bariatric surgery (BS) is the most effective treatment with regard to weight loss. To enhance the sustainability of results certain interventions such as administration of probiotics - living micro-organisms - may be applied. Published randomized controlled trials (RCTs) present controversial results, thus performing the systematic review is to assess the efficacy of probiotics applied to patients undergoing BS is warranted.
Methods: We searched electronic databases (Ovid MEDLINE, Embase, CENTRAL, Web of Science) and registers of clinical trials (ClinicalTrials.gov, European Trials Register, WHO International Trials Registry Platform) using adequate strategies without any restrictions. Studies designed as RCTs, where probiotics at any dose were applied to patients undergoing BS were included. The primary outcomes were weight loss measured as change in e.g. weight/BMI/percentage of excess weight loss and change in quality of life. Secondary outcomes were: change in gastrointestinal symptoms and frequency of adverse effects. Title/abstract, full text screening and data extraction were performed in pairs by independent reviewers and any conflicts were resolved by discussion or help from the third reviewer. Additionally, we searched the references of included studies and references of any identified systematic review/meta-analysis during the screening process. We used the Cochrane Risk of Bias Tool for risk of bias assessment. The study protocol was submitted to the PROSPERO database: CRD42018105257
Results: Searches yielded 1998 results which after deduplication yielded 1728 abstracts to screen. The screening resulted in 23 references of which 13 (5 studies) qualified for extraction. Study flow is presented on **Fig. 1.** Altogether, 226 patients (75% women) were recruited and duration of interventions ranged from 2 weeks to 6 months. Interventions comprised individual supplements of Clostridium butyricum, Bifidobacterium

longum, Lactobacillus, as well as complex preparations of up to 11 different species of probiotics. The outcomes were reported inconsistently among included trials with %Excess weight loss being the most commonly reported outcome (4 studies).
Conclusion: This topic does not seem to be well explored and high quality RCTs in this area are needed. Currently we are awaiting for additional data and clarifications from authors that may enable quantitative analysis. Detailed analyses will be presented during the conference.

Conflict of Interest: None Disclosed.

Funding: The authors are beneficiaries of European Operational Programme Knowledge Education Development 2014 – 2020 – grant for presenting the results of the project "Systematic insight into efficacy of probiotics in bariatric and psychiatric patient".

PO1.198

The impact of bariatric surgery on obstructive sleep apnea

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Introduction: Obesity is the most important risk factor for obstructive sleep apnea (OSA). This disorder is associated with metabolic changes and increased cardiovascular morbidity and mortality.
Methods: Retrospective analysis of the clinical records of patients with OSA followed at an obesity medical consultation in University Hospital, between September 2017 and August 2018. The following variables were considered: age, sex, anthropometric and biochemical parameters, type of surgery, apnea-hypopnea index (AHI) and the use of noninvasive ventilation (NIV), in the pre- and postoperative period at 6 and 12 months. Statistical analysis was performed using SPSS v. 23. A p value less than 0.05 was considered statistically significant.
Results: Of the 70 patients with OSA, 27 were submitted to surgery. In this group, 15 were female (55.6%). The mean age was 55.9 years ± 9.83. The mean body mass index (BMI) in the preoperative period was 46.04 kg/m^2 ± 7.34. There was no statistically significant correlation between AHI and BMI in the preoperative period. A statistically significant weight loss was observed in patients submitted to gastric bypass and sleeve gastrectomy at 6 ($p = 0.005$, $p = 0.005$) and 12 months ($p = 0.003$, $p = 0.028$), respectively. There was no statistically significant difference in mean weight loss between the two surgical types. 37.5% of patients discontinued NIV in the first 12 months postoperatively. There was no statistically significant association between the type of surgery and the use of NIV in the postoperative period ($p = 0.680$), as well as the mean weight loss at 6 months in patients with or without NIV in the postoperative period ($p = 0.732$). There were statistically significant reductions in fasting blood glucose, uric acid, total cholesterol and LDL in those submitted to gastric bypass.
Conclusion: This study demonstrated the importance of bariatric surgery in OSA control, evidenced by the reduction in the use of NIV in the postoperative period. The type of bariatric surgery as well as the weight loss did not influence the NIV discontinuation in the postoperative period.

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None Disclosed/Payment was received from any organization for the submitted work.

No Funding/Research relating to this abstract was funded.

PO1.199

Micronutrient deficiencies and nutritional status following bariatric surgery: 5 years follow-up in a tertiary hospital in Madrid, Spain

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Introduction: Micronutrient deficiency is an important complication associated with both obesity and bariatric surgery (BS), especially in the first year of postoperative follow-up, among them iron deficiency appears to be the most common. In some patients, the protein compartment could be affected too.
Methods: We aim to evaluate the nutritional status of patients submitted to bariatric surgery at long term and to establish if there is a difference taking into consideration sex and type of surgery.
We retrospectively analyzed our database to identify patients who underwent BS between January 2011 and December 2013 at University Hospital La Paz in Madrid. We assessed blood levels of hemoglobin, micronutrients and level of somatic proteins in the preoperative period and yearly until the fifth year of follow-up.
To compare variables, we calculated t test, χ^2 test. A $p<0.05$ indicates statistical significance.
Results: 119 patients were submitted to BS, the mean age was 46.1 ± 9.9 years, 64.3% were female and mean BMI was 46.9 ± 7.4 kg/m^2. Gastric bypass was the most frequent technique (83.9%).
At baseline, 3.2% of patients had anemia, 3.1% had iron deficit. There was deficit of vitamin B12, vitamin D, vitamin A and vitamin E in 7%, 91.5%, 14.6% and 28% of patients, respectively; none of them had deficit of folic acid. 5% had moderate hypoalbuminemia and 20% had low levels of prealbumin.
Through the years, percentage of vitamins deficit remained as it follows: B12 between 6 and 20%, folic acid between 4 and 6%, D between 53 and 83%, A between 13 and 28%, E between 8 and 15%. Protein compartment was affected until the second year of follow up, normalizing their levels thereafter.
When comparing numeric variables, we found differences in albumin at first year ($p<0.05$), in ferritin levels ($p<0.05$) at second year and vitamin A ($p<0.05$) at third year and after.
There was not a difference in the distribution of anemia and low levels of iron takin into consideration sex and type of surgery.
Conclusion: Micronutrient deficiency is common in patients with BS with high percentage of deficit at 1 and 2 years since surgery, nevertheless it persists during all the follow-up, despite daily supplementation and periodic assessment. It appears that fat-soluble vitamins are the most compromised, sometimes requiring additional supplementation. Protein compartment are affected until the first or second year of follow-up, corresponding with the period of greatest weight loss.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.200

Does pre-operative BMI impact on the short term weight loss after bariatric surgery?

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Introduction: Bariatric surgery is now widely being made available to obese population to counteract the health and economic impact of obesity. There is a multitude of factors that operate to control the success of these highly specialised procedures. This study aims to look at the impact of starting body mass index on the percentage excess weight loss after bariatric surgery.

Methods: A retrospective review of prospectively maintained database of patients undergone laparoscopic sleeve gastrectomy (LSG) and roux en y gastric bypass (LRYGB) between January 2012 and December 2015 was carried out. Patient demographics initial weight and BMI were recorded. Pearson correlation test was used to assess for any correlation between the initial BMI and %EWL 2 years after bariatric surgery.
Results: 229 patients were identified 165 were female. Median age was 47 yrs (20-70). 166 patients had LSG and 63 LYRGB. Median initial BMI for LSG was 53 kg/m^2 (36.9-79.2) and the median % EWL at 2 years was 53% (-45-125). There was a weak negative correlation between initial BMI and % EWL in LSG (r = -0.085).
Median initial BMI for LRYGB was 50.8 kg/m^2 (38.8-78.5) and the median % EWL at 2 years was 56% (7-102). There was a weak negative correlation between initial BMI and % EWL in LRYGB (r = -0.14)
Conclusion: Initial BMI seems to have a negligible negative relationship with weight loss in the short term after bariatric surgery.

Conflict of Interest: none.

Funding or grants: none were involved in this abstract.

PO1.201

Gastric sleeve and reflux: symptomatic relief outcomes after cruroplasty

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Introduction: Gastric sleeve is one of the most common bariatric surgeries done all over the world. One of the potential side effects and relative contraindications is the presence of gastricesophagic reflux
Methods: A retrospective cohort study was developed including all the gastric sleeves preformed between 1-10-2016 and 30-9-2018 which had no major post operative complications (Clavien Dindo <3). Two groups were created depending if they had also cruroplasty during the sleeve procedure
Results: 73 patients were included in this study, of which 38.3% (28) had GERD symptoms. 8 were submitted to cruroplasty. 5 of 6 (83.3%) patient which were symptomatic and had cruroplasty improved with the treatment comparing to the control group (59% [13/22]) (p 0.276, CI 95%)
Conclusion: according to the data available cruroplasty seems to reduce the GERD symptoms although a prospective study and larger sample are needed

Conflict of Interest: None.

Funding: No Funding.

PO1.202

Effect of weight loss after bariatric surgery on inflammatory biomarkers in obese patients

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Introduction and Objectives: Obesity is associated with a chronic inflammatory state secondary to changes in adipokine production. One of these adipokines is adiponectin, with an anti-inflammatory effect that appears to be decreased in obese patients, with significant risks and consequences. Bariatric surgery is a currently recognized technique for the treatment of obesity, with a favorable effect on weight loss and metabolic profile. The aim of this study is to analyze whether bariatric surgery has a favorable effect on the levels of inflammatory biomarkers in obese patients.
Methods: Prospective analysis of patients undergoing Roux-en-Y gastric bypass (RYGB) by obesity. Clinical and laboratory data were analyzed before and 1 year after surgery. Statistical analysis performed in SPSS V24.
Results: 43 patients were included; mean age was 43 ± 12 years, 81.4% were female. There was a significant reduction in weight (110.5 vs 76.1 kg) and Body mass index (BMI) (41.6 vs 28.6 kg/m^2) before and after surgery (p-0.00). There was also a significant reduction in triglyceride, total cholesterol, C reactive protein (CRP), and adiponectin levels (p <0.05). In the pre-surgery analysis, there was a negative correlation between adiponectin levels and triglyceride and CRP levels (rs = -0.42, p-0.005 and rs = -0.325, p-0.038, respectively), as well as positive correlation between CRP levels and total cholesterol levels (rs = 0.326, p-0.038). After surgery there was a negative correlation between adiponectin levels and weight (rs = 0.315; p-0.04). There was no significant correlation between weight loss/BMI in the variation of levels of adiponectin, CRP, cholesterol or triglycerides.
Conclusion: RYGB appears to increase adiponectin levels and reduce CRP levels, contributing to an improvement in the inflammatory state of obese patients. The fact that there was no significant correlation between weight loss and BMI and the variation in the levels of these biomarkers may suggest that changes in the inflammatory profile of these patients are multifactorial and not only explained by weight loss.

PO1.203

Modern minimally invasive method for treatment of postoperative leaks after laparoscopic sleeve gastrectomy

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Background and Aims: Due to High occurrence of obesity cases and rising of competency among the obsess population, laparoscopic sleeve gastrectomy (LSG) is a procedure, which has been increasingly applied all over the world. But there is no adopted algorithm for the management of the leaks complicating this operation. The aim of a trial was to explore and implement minimally invasive methods in dealing with postoperative leaks after sleeve gastrectomy.
Material and Methods: Two patients were underwent laparoscopic sleeve gastrectomy. Both were released home on day 3. In 7-10 days after operation patients had fever 39 C. Patient X had X-ray done, that showed hydrothorax to 6 ribs on the left side, and gastroscopy showed – failures 0.5 and 0.8 cm. Patient Y had MRI done, that showed a relatively homogeneous fluid content in T2, delimited by the external wall of the resection line and the adipose tissue of greater omentum, and gastroscopy showed – failure 0.6 cm.
We decided to perform endoscopic clipping. During endoscopy we clipped fistulas with 3 clips each and strengthened this line with acrylic glue. And under control of ultrasound we drained abdominal cavity to the exact place of leak.
Results: Temperature has dropped the exact day of a drainage.
On a second day after procedure no fluid in the drainage – it was removed.
Conclusion: The most often, though dreadful complication of sleeve gastrectomy is gastric leak, which implies a long hospital stay, morbidities and sometime mortalities. Its management is variable, with no standard algorithm to follow.
We offer endoscopic clipping in combination with fistula draining as a convenient non-invasive method for treating joint failure after laparoscopic sleeve gastrectomy.

PO1.204

An evaluation of impact of lifestyle interventions on body weight in postpartum women: a systematic review and meta-analysis

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Introduction: While a number of randomised controlled trials (RCTs) have investigated interventions to reduce postpartum weight retention, little is known about the impact of these interventions. This is a systematic review to assess the penetration, implementation, participation and effectiveness (PIPE) of lifestyle interventions in postpartum women.
Methods: We searched 5 databases to identify lifestyle intervention RCTs in postpartum women (within 2 years post-delivery) published up to January 2018. Program impact was evaluated according to the Penetration, Implementation, Participation and Effectiveness (PIPE) impact metric.
Results: 33 trials (42 publications) were included (n = 4960 women, age 18-34 years). Only one study provided sufficient information for population penetration rate calculation (2.5%). Participation rate was calculated for five studies (0.94% to 86%). All studies provided implementation information but over half had low program fidelity due to no reported intervention manual or structured curriculum, checklist or other measures of quality-of-assurance. Effect was reported in twenty-three studies with a pooled mean difference (MD) (95% confidence interval, CI) of -2.21 (-2.98 to -1.43) kg change in body weight (23 RCTs, 1781 participants). Lifestyle intervention also resulted in significant improvements in BMI (MD -0.96 kg/m^2, 95% CI -1.42 to -0.51, 15 studies, 748 participants, I2 = 63%), energy intake (MD -697.20 [95% CI -1220.29, -174.10, 11 RCTs, 846 participants]) and physical activity (SMD 0.62 [95% CI 0.32, 0.91, 19 RCTs, 1773 participants]).
Conclusion: The lack of reporting, and possibly collection of, population penetration and participation data in RCTs is concerning and the limited evidence suggests very low population impact. Despite large numbers of efficacy RCTs being conducted in postpartum women, no useful information exists to inform the implementation of weight management in this population. This work highlights the inadequacy of RCTs in the development of complex interventions suitable for implementation. Future research should consider additional methods to deliver real-world, implementable solutions to postpartum weight management.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Australian National Health and Medical Research Council and National Heart Foundation fellowships.

PO1.205

The effect of a weight management group intervention applying methods of cognitive behavior therapy (PsyKognObe) on eating behavior and weight management in patients with mood disorder

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Introduction: Mood disorders, especially depression, and obesity are major public health challenges. About 70% of depressed patients are overweight or obese. The association between depression and obesity is bidirectional. Depressive symptoms increase emotional eating and binge eating, and decrease cognitive restraint of eating. Eating behavior plays an important role in the success of weight management. Those succeeding in weight maintenance have been found to have higher cognitive restraint of eating and lower levels of emotional eating, impulsive eating and binge eating.
Objective: To investigate how weight management group intervention, which applies the methods of cognitive behavioral therapy (CBT) (PsyKognObe), affects eating behavior and weight management in overweight or obese patients with mood disorders.
Methods: This 4-month pilot intervention consisted of 9 x 90 min group visits. CBT-methods were used during the intervention. Study population consisted of overweight or obese (body mass index > 28) subjects aged 18–65 years with mood disorders (n = 9). No control group was used. Three-Factor Eating Questionnaire-18 (TFEQ-18), Binge Eating Scale (BES) and Intuitive Eating Scale-2 (IES-2) were used to assess participants' eating behavior. Successful weight management was defined as weight loss or weight maintenance during the intervention. Mood symptoms were assessed with Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) questionnaires. Assessments were conducted at baseline, after 4 and 12 months.
Results: Control over eating improved during the intervention: binge eating decreased and cognitive restraint of eating increased statistically significantly. Eating for physical rather than emotional reasons increased and emotional eating decreased, but the changes were not statistically significant. However, during the follow up, emotional eating increased statistically significantly. There was a statistically significant difference in binge eating between those succeeding (n = 4) and failing (n = 3) in weight management. Change in weight was not statistically significant. The average weight loss was -2.6 ± 5.8% in 4 months and -1.0 ± 3.6% in 12 months. The percentage of weight loss among those who succeeded was -6,0 ± 5,5% in 4 months, with a non-significant difference to those who failed. Increase in the control of eating was associated with weight loss. No significant change in mood and anxiety symptoms was reported.
Conclusion: Dietician-led group intervention model using CBT-methods can positively affect eating behavior and stop weight gain in patients with mood disorder. However, more support is needed for eating-related emotion management.

Conflict of Interest: None.

Funding: No funding.

PO1.206

Plate planner method increases weight loss speed in CBT program

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Introduction: Obesity is a biopsychosocial disease, therefore people need to change all 3 spheres of their life to make weight loss stable – biological, psychological and social. CBT has proved to be effective as method of weight loss and work with eating disorders. We want to find out, how to increase the efficiency of our CBT-method (where we used only method of caloric restriction and food diaries earlier) with new dietary recommendations, known as plate planner.
Methods: Our method has been working since 2001. Earlier we used only direct caloric restriction to 700-1100 for women and 1000-1500 for men without any others dietary recommendations. In 2017 we added to our program new type of food skills, known as plate planner: every meal must consist of 25% protein (meat, chicken, fish, eggs), 25% carbohydrates (potatoes, spaghetti, bread) and 50% fruits and vegetables. New method means using of strictly directed amount of different types of food, and total amount of calories is counted to be at the same levels as before. In this survey we want to compare the efficiency of our method with and without dietary recommendations among men and women. We have compared the results of our patients in 2016 without dietary recommendations (19 psychotherapeutical groups, 126 women and 13 men) and in 2017 with dietary recommendations (20 psychotherapeutical groups, 109 women and 23 men) in the city of Tomsk, Russian Federation.

Results: The initial average body weight in women was almost the same – 92,48 kg in 2016 and 92,69 kg and 2017. The initial average body weight in men increased from 115,23 kg in 2017 to 124,99 kg in 2017. Average weight loss speed in total increased: from 5,4% to 6,05% from initial body mass after 1 month, from 10,84% to 11,38% after 3 months and from 13,8% to 14,2% after 6 months. We have found some difference by gender. In male there was significant weight loss speed increasing: after 1 month from 5,68% to 7,01% from initial body weight, after 3 months – from 10,96% to 13%, and after 6 months – from 11,5% to 15,54%. In women difference was less significant: after 1 month from 5,37% to 5,85%, after 3 months from 10,83 to 11,04 and after 6 months from 14,03% to 13,92% from initial body weight.
Discussion: Our data show increasing of weight loss speed after 1 and 3 months in both groups, and after 6 months in men. Majority of participants say they feel more satiated using new recommendations. We also suspect increasing of results stability after weight loss, but we have to do more survey to prove it.

Conflict of Interests: None Disclosed.

Funding: No Funding.

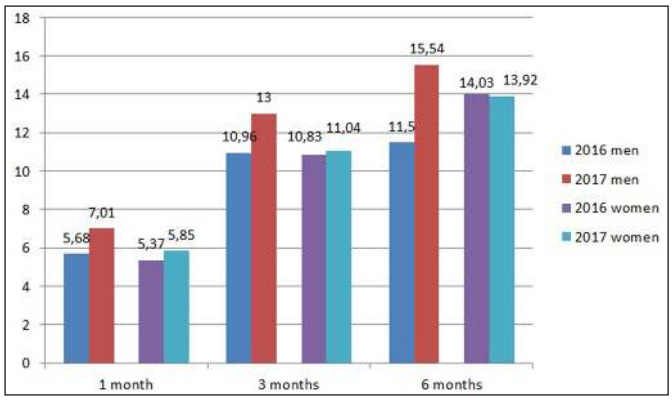

Fig. 1. Average weight loss speed in % from initial body mass among men and women.

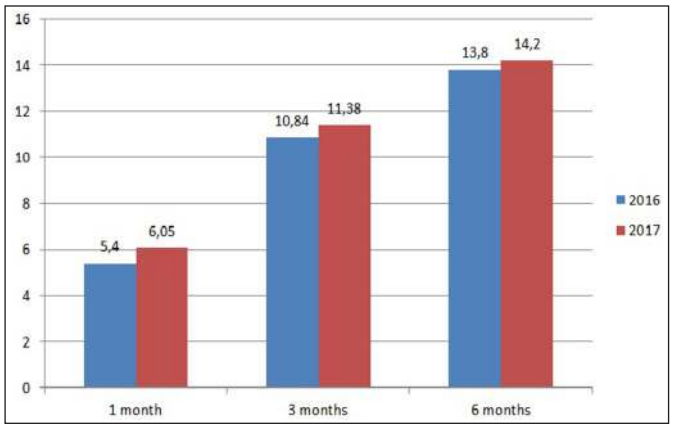

Fig. 2. Average weight loss speed in % from initial body mass in total.

PO1.207

Weight cycling, weight loss expectations and confidence to manage weight in adults with obesity attending a tier 3 weight management service

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Introduction: Confidence to manage weight may be informed by previous weight cycling. Baseline weight loss expectations often exceed recommendations and may predict attrition during weight management programs (WMPs).
Methods: Baseline data were gathered in a Tier 3 WMP using a modified National Weight Control Registry questionnaire [1]. Questions included frequency of weight cycling (defined as number of times the person had previously lost ≥10kg) and weight loss expectations. Confidence in ability to manage weight was rated from 1 to 7. Data were analysed using Microsoft Excel 2010 (Microsoft, Washington, USA) and IBM SPSS, V25 and presented as mean±standard deviation.
Results: Participants (n1051) were predominately female (65.9%), mean age was 47.7±11.9 years, and mean BMI was 51.2±8.6 kg/m^2. Most (62.3%) had weight cycled at least twice, with 13.2% never having weight cycled and 24.8% reporting 5 or more previous weight cycles. Wight cycling was more frequent in females (X2 (4,N = 1051) = 12.525,p = .014), and older patients (F (4,1046) = 3.834,p = .004). Confidence in managing weight score was 4.85 ± 1.66. Weight cycling at least once vs. never was associated with significantly greater confidence in managing weight (X2 (24,N = 1051) = 50.226,p = .001).
A significant number of participants didn't have a specific weight loss target for the next 6 (43.7%) or 12 (41.2%) months. Of those who did, weight loss expectations for the next 6 and 12 months were 17.2±9.7 kg and 32.4±17.4kg respectively. Expectations were within the 10% target recommended as an initial weight loss goal (14.5kg based on baseline weights) [2] for 6.5% (n68). Expectations exceeded the 10% target for 52.3% (n550). Weight loss expectations were not associated with weight cycling (X2 (8, N = 1051) = 6.291, p = 0.615), or confidence in managing weight (X2 (12, N = 1051) = 10.328, p = .58)
Conclusion: Most patients in a Tier 3 Weight Management Service have weight cycled previously, highlighting the challenge faced by individuals with obesity in maintaining weight loss. Achieving weight loss previously, even if it not maintained, is associated with increased confidence in weight management, which is associated with improved outcomes [3] Weight loss expectations of both the healthcare professionals and person with obesity should be discussed at baseline in WMPs.

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PO1.208

Weight loss maintenance with and without cognitive behavioral treatment of obesity

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Obesity is the failure of normal weight regulation and energy regulation mechanisms leading to an increase in the body "fat mass set point". Complex evidence based obesity treatment approach is generally built on four basic pillars - diet therapy, physical activity, lifestyle change and pharmacotherapy or bariatric surgery. Both diet pattern changes and ordination of regular aerobic physical activity lead to life style change. One of the most common approach to lifestyle change is cognitive behavioral treatment (CBT). STOB program, based on CBT principles, eliminate inappropriate eating habits and teach an obese patient to replace inappropriate thoughts and self-blaming with a positive approach. The usual duration of STOB program is 12-week structured program. Participants meet weekly. After the diagnosis of obesity, motivation, the real goals, profits and losses during weigh reduction program is dscussed. In the next lesson patients work with with food diary. how to change the energy value, the composition of food and the modern technological modification. Next lesson

is targeted to physical activity and energy expenditure. Physical acitivity helps to increase the sense of well-being and improves patient self-control. In general, aerobic exercise is adjusted according to the body mass index and patient co-morbidities. Next lessons works with identification and active control of external/internal meal triggers, self-çontrol techniques, negative automatic thoughts suppression and identification of mistakes in thinking. Last lessons are learning how to like your body, reward yourself, weight regain prevention, feedback about the most helpful techniques and tools learned during the STOB course.
Retrospective analysis via questionare was performed 1-5 years after course completion. The average weight loss is 6.5 kg / 12 weeks. In combination with diet, they not only reduce weight, 65-70% of the weight reduction remain one year after treatment. In contrast to other weight reduction programs, without CBT remain one year after treatment 5-10 % of the weight reduction.
Complex evidence based obesity treatment approach based on the CBT principles, applied in overweight reduction courses does not only concern what patient eat but also how to apply theoretical knowledge in everyday practice. 5 % weight loss maintenance 1-5 years after course in retrospective analysis confirm 45 % of patient undergoing course. Practical skills gain through cognitive behavioral course lead to weight loss maintenance. CBT is crucial for weight loss maintenance. Treatment built only on diet and physical activity result in weght regain in one year. Cognitive behavioral lifestyle changes is the most important tool for long-term effectiveness of obesity treatment.

PO1.209

A systematic review of lifestyle interventions using social networks for weight management during pregnancy and postpartum

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Background: Maternal obesity is associated with adverse maternal and child outcomes. Interventions focusing on individual behaviour change have had a modest impact on clinical outcomes. An alternative approach would be to include social networks to support change.
Objective: To investigate the use of social networks within lifestyle interventions for weight management among pregnant and postpartum women that are overweight or obese.
Methods: Six databases were searched as well as citations and references of included studies. Studies were included if interventions had a social network (SN) component, e.g. used support from peers or family, alongside a diet and/or physical activity intervention for limiting gestational weight gain (GWG) or for postpartum weight change. When possible, random effect meta-analyses were carried out.
Results: 21 studies (11 with pregnant women, 8 with postpartum women, and 2 with both) were included. Interventions were heterogeneous but most were group-based and delivered face-to-face. Interventions either advised on obtaining social support from an existing SN (e.g. family), arranged support through a created SN (e.g. a group of mothers) or a few directly involved the participants' partner in the intervention. Women in the intervention groups had lower GWG (Mean Difference -1.36, 95% CI -2.12 to -0.61; participants = 2271; studies = 9; I2 = 48%) than those in the control groups. In subgroup analyses, longer intervention and group-based interventions were more effective. Women in the intervention groups had greater postpartum weight loss at post-intervention (Mean Difference -1.51, 95% CI -2.45 to -0.57; participants = 1432; studies = 8; I2 = 60%) than women in the control groups. In subgroup analyses, shorter interventions and group-based ones were more effective.
Conclusion: Interventions included social support from existing or created SN but this varied in intensity. Although some interventions have started to recognise and include the social dimension there is still a lack of interventions that purposefully use network data for promoting behavioural change. Interventions were effective for limiting GWG and for postpartum weight loss but due to limitations in methodological quality, lack of intervention details and heterogeneity, especially in relation the social network component, it was not possible to identify which aspects of social networks' support were most effective. Further high quality interventions that seek to involve SN are required particularly using digital and group-based delivery modes.

Conflict of Interest: None Disclosed.

Funding: The authors were funded by the UK Medical Research Council (MC_UU_12017-11; MC_UU_12017-14) a MRC studentship (award ref. 1797042) and a MRC strategic award (MC_PC_13027).

PO1.210

Service evaluation of a new referral pathway for weight management from surgical services

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Background: BMI limits for gynaecology and orthopaedic surgery are commonly set locally by surgeons, advising self-directed weight loss methods, without referral to specialist services. Most patients fail to achieve sufficient weight loss. We have evaluated the feasibility/acceptability of pre-surgical referral for weight management, with funding for 20 patients for an intensive weight-management programme, Counterweight-Plus (CWT-Plus).
Methods: Clinical data were analysed for 46 consecutive patients who exceeded pre-defined BMI limits for surgery (gynaecology≤30 kg/m², orthopaedics≤35 kg/m²), and accepted referral for CWT-Plus.
Results: Of 46 patients sent appointment letters for screening, 13 (28%) did not reply. Thus 33/46 (72%) attended for weight-management screening, where 4 were excluded (2 had previous bariatric surgery, 1 for personal reasons, 1 already attending slimming group), and 29 commenced weight management. Interestingly, 10 patients elected to follow the Counterweight-Programme (CWT 1:1), a conventional lifestyle programme; leaving 19 accessing CWT-Plus. At their surgical appointment 42/46(91%) were female: mean (SD) age 47.4 (10.9) years, weight 115.6 (19.9) kg, BMI 43.3 (6.0) kg/m². Weights were 30.5 (16.2) kg above pre-defined upper BMI limits for surgery. In total 12/46(26%) received surgery, after median (IQR) weight loss 10.4 (32.0-2.4) kg, at BMI 35.8 (33.5-39.1)kg/m². Of the 13 who did not engage, 3 received surgery after 0 to -12.0 kg weight change. In those excluded 1 received surgery after weight gain of 1.8kg; all were above their BMI limit at surgery. Of the 29 accessing weight management 8 received surgery, after median (IQR) weight losses 23.3 (43.1-5.2), with 6 above and 2 below BMI limits. Of those receiving surgery 6 followed CWT-Plus and 2 CWT 1:1. Unexpectedly, 4/29(14%) avoided surgery after losing 18.6 kg-23.9kg, which eliminated gynaecological symptoms. At surgery, orthopaedic patients (n = 6) lost median(IQR) 27.7 (47.5-2.5) kg, gynaecology (n = 6) lost 6.4 (15.3-0.4) kg, with waiting times to surgery 85.5 (44.0-94.2) and 30.5 (24.0-59.0) weeks, respectively.
Conclusion: This small evaluation probably reflects widespread practice. Referral from gynaecology and orthopaedic services for an effective weight management programme is acceptable to patients and clinical staff. Current pre-surgical weight loss targets are often unachievable, and sometimes disregarded. Evidence-based BMI criteria for surgery, weight management options, and patient expectations, need better alignment.

Conflict of Interest: ML has provided medical consultancy to Counterweight Ltd, a spin-out company from The Robert Gordon University, Aberdeen, Scotland, UK. NB has shares in Counterweight Ltd.

Funding: NHS Forth Valley endowments.

PO1.211

The real happy study: protocol for a prospective assessment of the real-world effectiveness of the hapifed program - a healthy approach to weight management and food in eating disorders

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Introduction: The prevalence of obesity with comorbid binge eating behaviour is growing at a faster rate than that seen for either obesity or eating disorders as separate conditions. Approximately 6% of the population are affected and they potentially face a lifetime of poor physical and mental health outcomes and an inability to sustain long term weight loss. Current treatments are inadequate in that they typically address either obesity or eating disorders exclusively, not the combination of both conditions. By treating one condition without treating the other, relapse is common and patients are often left disappointed with their lack of weight loss. An integrated approach to treating these individuals is needed to prevent a worsening of the comorbidities associated with excess body weight and eating disorders. A new therapy has recently been developed, named HAPIFED, which addresses both overweight/obesity and comorbid binge eating behaviour with the combination of behavioural weight loss therapy and cognitive behaviour therapy – enhanced (CBT-E). We aim to evaluate the effectiveness of the HAPIFED program in treating individuals with overweight or obesity and comorbid binge eating behavior in a real-world setting.
Methods: The HAPIFED program promotes strategies for healthy weight management such as nutritious foods choices and eating according to physical hunger and satisfaction, combined with healthy physical activity. It aims to reduce binge eating and compensatory behaviour such as excessive physical activity, fasting, self-induced vomiting or misuse of laxatives or diuretics; and to promote healthy self-evaluation that is not dominated by concerns related to food, eating, weight or shape. We plan to recruit 246 individuals who are participating in the HAPIFED program as part of their prescribed healthcare. Data will be collected using online questionnaires at baseline and program completion (approximately 7 months) with follow-up at 12, 24 and 36 months. Anthropometric, eating disorder, dietary and psychosocial parameters will be evaluated. The co-primary outcomes are the proportion of participants that have lost ≥5% of their baseline body weight at 12 months after program commencement and the proportion of participants that have a global score on the Eating Disorder Examination Questionnaire that is less than 1 standard deviation (1.25) above the Australian community norm of 1.52 (i.e. below 2.77) at 12 months after program commencement.
Results: This study is ongoing and results are not available at this time
Conclusion: This study seeks to provide evidence of the 'real world' effectiveness of the HAPIFED program and to generate results that are applicable to clinical practice.

Conflict of Interest: None Disclosed.

Funding: No funding.

PO1.212

Obesity: which one counts more?

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With the limited availability of effective treatment of weight management, the identification of potentially relevant modifiable risk factors may lead to the development of better preventive approaches to obesity. Recent evidence suggests that sleep may also deserve attention.
The aim of our study is to analyze body composition in relation to quality sleep and duration, dietary intake and the level of physical activity.
52 obese participant were enrolled in this study, the sleep quality was assessed by Pittsburgh sleep quality index(PSQI), physical activity were estimated by the international physical activity questionnaire(IPAQ) short form and daily food inquiry were collected. We analyzed also body composition via bio-impedance analysis then calculated Skeletal muscle mass index SMI (sum of lean mass of 4 limbs divided by height^2) and fat mass index(fat mass divided by height^2) in association with the measure of handgrip strength(hand dynamometer).
The mean duration sleep was 7 hours and 69.2% was suffering from troubled sleep (PSQI > = 5).
The mean PSQI score value was 6.8 and the more altered components are respectively subjective sleep quality,sleep latency and habitual sleep efficiency.
For activity level, 36.5% of participants were inactive (<600 MetEq.W-1), 38.5% were minimally active and 25% were classified as high active.
The mean of calories intake was 2791 +/- 593 per day. The mean protein index was 1.2 g/Kg of ideal weight/day.
The percentage of appendicular skeletal muscle mass was 23.11%, the ratio of fat mass to lean mass was 0.85 and the ratio of fat mass to appendicular skeletal muscle mass was 2. The mean handgrip strength 28.7 Kg and 15.4% were classified as having a low HGS.
We found a significant relation between low HGS and PSQI value (p = 0,026), sleep latency (p = 0.033), and lean mass (p = 0.045). The sleep duration was correlated to tobacco use (p = 0.007), intensity of physical activity (p = 0.03). Furthermore, we found a correlation between activity level, the BMI (p = 0.03) and sleep disturbances (p = 0.04).
As obesity practitioner we should reconsider the concept of physical activity and pay more attention to characterize exercise and diagnose sleep disturbance as part of obesity care.

PO1.213

The experience of delivering a healthy energy balance-related behaviour preschool intervention study - Toybox Study Malaysia in Borneo

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Introduction: Toybox is a school-based intervention programme targeting physical activity, sedentary behavior, snacking and drinking in improving healthy energy balance-related behaviour among rural preschool children in Borneo. This study aims to improve behaviour change in reducing childhood obesity and create a better environment involving both school and home settings.
Methods: The study was of quasi-experimental design involving rural kindergartens in Sarawak, Borneo. A total of 15 kindergartens were randomly selected and allocated as 7 intervention schools (n = 178) and 8 control schools (n = 162). Pre- and post-intervention data was collected including socio-demographic data; drinking, snacking, physical activity and sedentary behaviours; anthropometric measurement; medical history, cognitive functioning skill (Raven's Color Progressive Matrices), gross motor development (Test for Gross Motor Development) and objectively-measured physical activity (Actigraph). A six-month intervention, focusing on water drinking, healthy snacking, physical activity and reducing sedentary behavior, was implemented with the help of teachers who have undergone the project's train-the-trainers programme. Process evaluation was carried out using checklist, logbooks, survey, interview and

focus group discussion to assess adherence, exposure, quality of delivery, participant responsiveness, context, and programme differentiation.
Results: Data was captured using multiple methods and tools to triangulate the findings. Due to the complexity of the methods and data, challenges such as response bias, incompleteness of data, logistics issues, recall errors and the additional burden on the teachers were encountered. However, using more than one method was helpful in answering the objectives of the process evaluation.
Conclusion: This paper described the process evaluation implemented under the Toybox Malaysia programme in Borneo where the findings indicate the importance of implementing an intervention project based on the local setting. It also further supported the importance of having a structured process evaluation using multiple methods to capture the relevant information.

Conflict of Interest: None.

Funding: UK MRC Newton Ungku Omar Fund research grant (MR/P013805/1).

PO1.214

Weight loss maintenance (WLM) after total diet replacement (TDR) using a low energy formula-diet: a service evaluation of Counterweight-Plus at 12 and 24-months

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Background: Formula TDR programmes for weight loss, including behavioural support, provide safe and effective interventions for obesity. Weight-regain is of concern; however, criteria for assessing WLM vary and few real-world evaluations exist. We audited Counterweight-Plus (CWT-Plus) regain from the end of TDR (where the greatest proportion of participants had reached their lowest weight); comparing with programme criteria: regain <2kg and <4kg and recently published criterion: regaining ≤25% of initial weight loss, both at 12-and 24-months.
Methods: CWT-Plus incorporates three stages: TDR, food-reintroduction (FR) and WLM; delivered by dietitians in community settings. Dietitians collected anonymised data from patients who commenced CWT-Plus between 2013-2017 and who achieved ≥5kg/3% weight loss during TDR. Attenders were those who maintained CWT-Plus engagement up to 12-and 24-months while non-attenders were those no longer engaging with CWT-Plus but had weight data available from existing healthcare records. Analyses were conducted by an independent statistician.
Results: During the evaluation period, 363 accessed CWT-Plus, 290 lost ≥5kg/3% on TDR, and 264(73%) and 196(54%) were eligible for evaluation at 12-and 24-months respectively. Limited data were available for non-attenders. Mean(SD) baseline characteristics for all: age 48.5(11.9) years, weight 124.2(30.5)kg, BMI 44.5(9.8)kg/m², 27% were male, and 34% had diabetes. For all with data at 12-months (n = 178) and 24-months (n = 111), mean(SD) weight losses were 12.9(11.0)kg, 11.5(13.8)kg and programme retention was 177(67%), 90(46%) respectively. Attenders had higher mean(SD) weight losses at the end of TDR 12.9(13.1)kg vs. non-attenders 6.4(15.3)kg (mean difference: 6.51kg; 95%CI: 12.68, 0.34; p<0.05). At 24-months attenders maintained more weight loss compared to non-attenders (mean difference: 3.95kg; 95%CI: 6.07, 1.83; p<0.01). For all patients with data, those regaining <2kg were 82(31%) and 38(19%) and regain <4kg were 106(40%) and 53(27%), at 12-and 24-months respectively. Those regaining ≤25% of initial weight loss were 102(39%) and 50(25%) at 12-and 24-months respectively.
Conclusion: Non-attenders with data from existing healthcare records maintained good weight loss at 24-months. The WLM criteria (regaining ≤25% of initial weight loss), produced similar outcomes to the CWT-Plus target (<4kg regain) at both 12-and 24-months; so, may not be of additional value. New methods to collect data on programme 'non-attenders' should be explored.

Conflict of Interest: ML has provided medical consultancy to Counterweight Ltd. ABH, HR and NB have shares in Counterweight Ltd, and ABH is an employee of Counterweight Ltd.

Funding: No funding.

PO1.215

Acceptability of a novel text message delivered intervention for weight loss and maintenance of weight loss in the postpartum period: the Supporting Mums study

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Introduction: Pregnancy and postpartum are risky periods for the development of obesity. Postpartum behaviour change is challenging due to the demands of parenthood. Mobile technologies could offer a low intensity, flexible and individualised approach to behaviour change during this time. This study examined the acceptability of a 12 month, theory-based, tailored, SMS-delivered intervention supporting weight loss and maintenance of weight loss in women with overweight and obesity in the postpartum period versus an active control delivering child development messages.
Methods: Two-arm pilot RCT which recruited UK women, within two years of giving birth, with a BMI ≥25 kg/m². The intervention was delivered by automated text messages. Acceptability outcomes, according to pre-defined progression criteria, were examined using study records, questionnaires at 3, 6, 9 and 12 months and interviews at 3 and 12 months. Acceptability of the intervention was assessed through group-specific retention rates at 12 months, satisfaction ratings, and women's views on the intervention content and the perceived benefits of the intervention (thematic analysis).
Results: Of the 100 women recruited to the pilot RCT, 51 women were randomised to the intervention group. During the follow-up period, 9/51 (17.6%) women became pregnant and had to withdraw for that reason. Excluding pregnancies, 36/ 42 (85.7%) women in the intervention group were retained at the 12 month follow-up. Of those completing follow-up at 12 months, mean text message satisfaction score was 91.7% very/ mostly satisfied. Interviews at 3 months (n = 35) and 12 months (n = 12) found that women viewed the intervention positively in terms of text content. There were individual preferences for content types e.g. practical vs. motivational, but the variety of messages delivered allowed women to utilise their preferred advice. Some women said the timing of delivery was not always convenient, especially as their lifestyle patterns changed across the course of the 12-month intervention delivery. However, using this mode of delivery allowed the information provided to be retained and accessed at women's convenience, and participants valued the salience of the messages which acted as a constant reminder, motivation and support to adopt healthier behaviours. Some women reported weight loss and dietary and activity behaviour changes as a result of the intervention. All women interviewed at 12 months said that they would recommend the intervention to other mothers and they highlighted the need for women to receive weight management support in the postpartum period.
Conclusion: The intervention was acceptable to postpartum women. This evidence supports the decision to proceed to testing this intervention in a full trial.

PO1.216

Traditional Chinese medicine intervention based on herbal formula XRHZ may contribute to managing body weight in Chinese simple obese patients

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Introduction: Obesity is a worldwide serious healthy issue. Recently, the prevalence of obesity increases rapidly. However, only orlistat is approved as oral anti-obesity medication by Chinese government. Traditional Chinese Medicine (TCM) herbal therapy has been proved effectiveness in weight management by meta analyses. It also showed some disadvantages, like short observation and low jadad score.
Methods: A 12-week randomized, double-minded, placebo-controlled study was designed to evaluate the effectiveness of a TCM intervention in simple obese patients charactered by TCM Syndrome of dampness-heat accumulation in spleen and stomach. All subjects were randomly assigned to take XRHZ granule or placebo granule once daily. They were followed every 2 weeks by out-patient clinic, instructed by nutritionist to perform calorie-restrict diet and encouraged to adhere to 150 minutes moderate-intensity exercise per week recorded by sports bracelet. This study was registered in Chinese Clinical Trial Registry (No. ChiCTR-IOR-17013779).
Results: Of the 75 subjects randomized, 68 (age 39.7±11.6 yrs, BMI 33.1±4.8 kg/m^2, male 47.6%) were included in the ITT analysis. The BW, BMI, WC, fat mass index (FMi) and trunk fat mass percent (TFM%) in XRHZ group were reduced by 4.2 kg, 1.4 kg/m^2, 6 cm, 1.2 kg/m^2 and 2.1%, those in placebo group were reduced by 1.2 kg, 0.4 kg/m^2, 2 cm, 0.2 kg/m^2 and 0.7% respectively. There were significant differences in BW, BMI, WC and FMi between two groups. Adverse events were minor in both groups.
Conclusion: TCM Intervention based on herbal formula XRHZ may help Chinese simple obese patients manage body weight, waist circumstance and fat mass.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Shanghai Municipal health Commission(2016LQ018) and Shanghai Science and Technology Committee (17401935200).

PO1.217

Adapting the ToyBox Study for application in Malaysian kindergartens

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Introduction: As obesity rates continue to rise in Malaysia, early life intervention may be the key to preventing later life health complications. This study was conducted to assess the feasibility of adapting a European kindergarten-based family-involved intervention programme for implementation in Malaysian kindergartens.
Methods: The ToyBox Study programme aims to improve four key energy-balance related behaviours, namely drinking water, choosing healthy food and snacks, increasing physical activity, and reducing sedentary behaviour. We conducted the project in three phases: (i) Preparation, which involved adaptation of European ToyBox-Study components into Malaysian context, (ii) Implementation, which was conducted in selected urban and rural kindergartens, and (iii) Evaluation, which involved assessment of feasibility and effectiveness in comparison to control kindergartens. Pre- and post-intervention assessments included behaviour change, physical activity, dietary intake and health-related outcomes as measured by questionnaires, accelerometry and anthropometry.
Results: The adaptation of Toybox Study materials and questionnaires was completed in 2017, and included focus group discussions and Theory of Change workshops with kindergarten teachers and parents of preschoolers. Materials were translated into the Malay language and included Malaysia-specific content, such as types of food, and context, such as the introduction of the #SukuSukuSeparuh Healthy Eating Plate. The modules prepared were Teachers' Guide, Jom Minum! (Let's Drink!), Jom Aktif! (Be Active!), Makanan dan Snek Sihat (Healthy Food and Snacks), and Tingkahlaku Sedentari (Sedentary Behaviour). The feasibility study was conducted throughout year 2018 at 15 urban preschools in Kuala Lumpur and Selangor, and 7 rural ones in Sarawak, with 18 and 8 control preschools at the respective locations. Baseline and outcome measures were assessed at the beginning and towards the end of the 2018 school year.
Conclusion: The European ToyBox-Study programme was successfully adapted and implemented at selected kindergartens in both urban and rural Malaysia. This presentation will share some preliminary outcomes from the ToyBox Study Malaysia. We are hopeful that the ToyBox Study programme will help preschoolers and their families achieve healthier behaviours, and are optimistic that it can be sustained and be adopted by other kindergartens in Malaysia.

PO1.218

Self-monitoring behaviours among adults with obesity attending a tier 3 weight management service

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Introduction: Self-monitoring (SM) has been identified as the foundation of behavioural weight loss interventions. SM in behaviour change is strongly connected to self-regulation theories and is central to this process[1]. Historically, significant connections have been shown between this method, and weight-loss[2].
Methods: We examined the use of SM techniques in a sample of adults attending a Tier 3 Weight Management Service in two separate SM areas; diet and self-weighing. Data was collected at baseline and 6 months as part of a standard questionnaire which asked 'How often do you use of a food diary/tracker to monitor what you are eating' and 'How often do you currently weigh yourself?'. Analysis was conducted using Microsoft Excel 2010 (Microsoft, Washington, USA) and IBM SPSS Version 25.0. Data was expressed as mean ± standard deviation.
Results: Data for baseline and 6 month SM was available for n502 (62.4% female). Mean age at baseline was 45.92±11.84 years. Mean weight at baseline was 145.69±28.28kg. Mean BMI at baseline was 51.23±8.36kg/m^2.
At baseline 20.3% checked weight at least once per week. At 6 months this was 34.3%.
SM weight did not differ significantly across gender ($p = 0.307$). However, significantly less women never checked their weight compared to males (25.2% and 32% resepectively) ($p = 0.026$). Baseline weight was significantly higher in individuals who reported never SM their weight vs. those who SM at least once a week (149.8kg vs. 141.65kg respectively) ($p = 0.006$). At 6 months, more men than women never SM using a food diary (62.4% vs. 50.2% respectively), however this was not found to be statistically significant ($p = 0.057$).
Conclusion: This appears to be one ofthe first analyses of dietary and weighing self-monitoring techniques in adults with obesity attending a Tier 3 Weight Management Service in Ireland. It is important to raise awareness of the efficacy of self-monitoring as a weight management strategy as it may be associated with baseline weight. Reasons for not monitoring weight or food intake should be explored at the beginning of weight management programmes, as specific challenges such as access to appropriate scales or poor literacy may apply. Healthcare professionals

can utilise these techniques in practice to support patients in the development of self-regulatory behaviours.

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PO1.219

The role of choreotherapy (curative dances) in the treatment and prevention of obesity: 35 years experience

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Aim: The purpose of this study was to follow up retrospectively the results of the 35 years' experience in using of choreotherapy (curative dances) in the treatment and prevention of obesity in Bulgaria.
Materials and Methods: 20 356 subjects with overweight and obesity were followed up. They were treated with diet (1460 kcal/ daily) and high activity regime (2863 kcal mean daily energy expenditure). The treatment was carried out in the special centrums for treatment of obesity at the Black sea coast: Balchik, Albena, Nessebar and Kiten.
Results: The curative dances session lasted for about 125 minutes every day. The average energy expenditure achieved during the session was 650 kcal for male subjects and 550 kcal for female subjects. The results showed a significant reduction in body weight, body mass index, fat mass, waist circumference in both genders. Further, an improvement in metabolism and cardiovascular function was demonstrated.
Conclusion: Choreotherapy is an important approach to increase the physical activity level as well as for a better psychoemotional condition in overweight/ obese subjects.

PO1.220

Effects of weight loss on sweet taste perception following cognitive behavioral therapy in women with obesity

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Introduction: Current evidence suggest that obesity is associated with alteration of taste perception, which could contribute to increased food intake. Further, bariatric surgery is reported to change hedonic sweet taste perception after operation. The purpose of this study was to determine if non-surgical cognitive behavioral therapy (CBT)-based weight loss can cause a change in the taste perception in women with obesity.
Methods: This case-control study consisted of 51 women aged 21-64 years. Twenty-seven women were assigned to an obese (OB) group (body mass index, BMI: 29.8 ± 0.5kg/m^2), while 24 women with normal weights were assigned to a normal control (NC) group. The OB group underwent a 30-week weight loss intervention using CBT-based group therapy. Several variables related to taste perception, psychological variables and appetite related hormonal levels were measured before and after the intervention.
Results: The OB group showed a 14.6% weight loss after the intervention. At baseline, women from the OB group preferred significantly higher sucrose concentrations than the NC group; however, this difference was no longer significant after the weight loss intervention. The persistent pleasure related to sweet taste and reduced desire for other taste, even after repeated exposure to sweetness in the OB group, normalized to levels comparable to those seen in the NC group. We found a significant correlation between the log values of the sucrose concentrations and serum leptin levels in the OB group after adjusting for confounding factor, such as BMI, depressive symptom score and trait-anxiety scores.
Conclusion: Weight loss induced by CBT-based non-surgical intervention normalized the increased sucrose preference and palatability in women with obesity. Weight loss-induced decrease in serum leptin levels may be associated with this shift in taste perception.

PO1.221

Physical activity level among Greeks who seek dietitian's advice

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It is well known that a sedentary lifestyle combined with poor nutrition consist of the leading factors to several non- communicable diseases. Moreover, according to WHO "physical inactivity is identified as the fourth leading risk factor for global mortality". The purpose of this study was to investigate the physical activity profile and characteristics of Greek adults that seek dietitian´s advice. The study was conducted among adults who sought dietitian´s advice to lose weight in a private dietitian´s office between the years 2015-2017. The individuals included in the study were people who visited at least for 4 weeks in a row their dietitian. The dietitian had to fill in a questionnaire while discussing with the adult clients. The questionnaire included questions about anthropometric characteristics, personal goals, previous weight loss attempts, eating habits, physical activity and others.
According to WHO, adults aged 18–64 years should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week, or 75 minutes of vigorous-intensity aerobic physical activity or an equivalent combination of moderate- and vigorous-intensity activity. Data from the WHO Global Health Observatory from 2010 for the Greek adult population show that 84.6% meet the recommended physical activity levels for health set out by WHO in the Global Recommendations on Physical Activity for Health, with males being much more likely to meet the physical activity recommendations than females. Current study shows that these percentages are much lower in the overweight and obese Greek adults. In addition, these people seem to avoid even simple activities like walking to work or using the stairs instead of the elevator. Most of these groups of people have tried for some periods of their life to increase their physical activity but they didn't manage to remain physically active for long-term. Moreover, current study confirms that single people tend to spend more time for physical activity compared to people with family. For most of the obese and overweight adults who participated in the study, lack of physical activity was also a characteristic of their adolescent lifestyle.
Physical inactivity characterizes both male and female overweight and obese Greek adults. It is usually part of their minor lifestyle. Lack of time is the most common reason reported for the physical inactivity. On the other hand, finding an interesting physical activity that combines training and socializing seems to be an accepted solution by the majority of currently inactive people to manage to have a physical activity for long-term.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.222

Game of Stones: a feasibility trial of a narrative Short Message System (SMS) and financial endowment incentive intervention to support weight loss in men with obesity

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Introduction: UK men are more likely to be overweight or obese than women and are underserved by current evidence-based weight management programmes. Systematic review evidence suggests that men often require different interventions to women. The aim of this study was to test the feasibility and acceptability of 'Game of Stones' in a pilot randomised controlled trial. Game of Stones provided a novel approach where narrative SMS supported men to use evidence-based behaviour change techniques to lose weight through following the weight loss journey of the main protagonist over 12 months. Additionally, some received a financial endowment incentive, informed by loss aversion theory, which involved securing money by achieving weight loss targets at three, six and 12 month appointments.
Methods: Adult men with a BMI ≥30 kg/m^2 and/or waist ≥40 inches were recruited via community venues or GP practices and randomised to three groups;
i) Narrative SMS only
ii) Narrative SMS and incentive
iii) Wait list control
Strategies to optimise retention included offering appointments flexibly (e.g. after work or at convenient venues), appointment reminder texts and a £20 voucher for all attendees at 12 months. At three, six and 12 months weight and waist circumferences were measured objectively alongside self-completed questionnaires (e.g. study satisfaction and intervention helpfulness ratings) and qualitative interviews (n = 83) guided by the framework approach.
Results: The pre-specified target of 105 men from across the socioeconomic spectrum were recruited within 4 months. Retention (79/105; 75%), study satisfaction (mean scores of 77.0-87.3/100) and SMS helpfulness ratings (mean scores of 3.3-3.4/5) demonstrated acceptability at 12 months. Polarised views on the narrative SMS were expressed during interviews, including extremely positive, indifferent and some strongly negative views. Incentives were acceptable, but men often did not report them as motivational and emphasised that improving their health was their primary incentive. Attendees lost some weight at 12 months in both control (-1.00%, SD5.31) and SMS only (-1.51%, SD4.65) groups, with higher weight loss in the SMS and incentives group (-3.51%, SD5.83).
Conclusion: The narrative SMS and financial incentive interventions were acceptable and feasible to deliver. Based on participant feedback, some intervention components could be refined to improve acceptability and retention in a definitive multi-site randomised control trial.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the National Institute for Health Research.

PO1.223

Game of Stones: developing and testing an endowment financial incentive intervention to support men with obesity to lose weight

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Introduction: Commitment contracts linking financial incentives to behaviour change show promise and in theory, losses are more motivating than gains (loss aversion). However not everyone can afford to commit money up front, hence this type of intervention may be inequitable. Our aims were to i) co-produce with men with obesity a novel loss aversion endowment incentive for weight loss that does not involve participants depositing their own money ii) assess acceptability and feasibility of the incentives to men from across the socioeconomic spectrum in the Game of Stones pilot randomised controlled trial (RCT).
Methods: The incentive strategy was developed based on an online Discrete Choice Experiment (DCE) survey (n = 1045 men with obesity) used to elicit men's preferences for different configurations of the financial incentive (e.g. scheduling, frequency and magnitude) to optimise uptake and engagement. A 12-month feasibility RCT tested SMS with incentives, SMS alone and wait list control. Qualitative interviews (26 at 3 months; 14 at 12 months) sought to understand participant's experiences of the incentives.
Results: Based on the DCE results, money was linked to weight loss targets of 5% at three (£50), 10% at six (£150) and 10% at 12 months (£200), with the total money available (£400) reducing if targets were not met. Some, but not all, of the money available at six and 12 months could be secured with weight loss of 5-10%. Of 105 adult men with obesity, 36 were randomised to SMS with incentives, of which 23 (63.9%) attended at 12 months. Nineteen men in the incentives group lived in more deprived areas and more of these men (n = 14) completed the study than men living in more advantaged areas (8/16). Qualitative findings suggest that some perceived the incentives as losses, but many referred to gaining rewards for meeting targets. Eleven attendees at 12 months received money having met weight loss targets, of which three met all the targets and secured the full £400.
Conclusion: The endowment incentives were feasible to deliver and some trial completers lost weight. However conveying loss aversion was challenging. For men from across the socioeconomic spectrum the endowment structure is acceptable and shows promise for further testing in a full trial.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the National Institute for Health Research.

PO1.224

Effect of a group intervention program based on Mindfulness and Acceptance and Commitment Therapy on the physical and psychological well-being of overweight and obese individuals (Mind&Life Program)

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Introduction: The prevalence of overweight and obesity is increasing so much that nowadays excess weight is considered a worldwide public

health problem. Usual treatments for weight control include dietetic restriction and physical activity instructions which even if they produce a significant weight loss in the short term, they are ineffective in the long term. Mindfulness and Acceptance and Commitment Therapy (ACT) are deemed as third wave behavior therapies that are becoming more and more relevant in the last days. Mindfulness involves being conscious of the present moment experiences with openness and acceptance and ACT is focused specifically on reducing experiential avoidance towards one's inner experiences with the objective to promote valued actions.
Objectives: Assess the effectiveness of Mind&Life program in the physical and psychological wellbeing, as well as in weight loss, physiological parameters, physical activity, emotional eating and weight self-stigma of adults with overweight or obesity.
Methods: A randomized clinical trial of 5 months of duration controlled by a control group. Participants will be 110 adults between 20 and 65 years old with overweight and obesity (BMI ≥25) receiving medical treatment at Primary Care Centers and will be randomly assigned to either of two conditions: (a) Control group will receive the treatment as usual (TAU), comprising of 5 sessions consisting on dietetic and physical activity recommendations in a monthly basis, and (b) Experimental group will receive the same TAU plus Mind&Life psychological intervention consisting of 15 sessions. The following measurements will be evaluated at baseline prior to randomization, at post-intervention (5 months), at seven months post-intervention follow-up and at two years' post-intervention follow-up: anthropometric and body composition data; biochemical data in blood; waist circumference; blood pressure; eating habits; level of physical exercise; general health; emotional eating; quality-of-life; weight self-stigma; experiential avoidance; self-criticism level; self-compassion level and mindfulness abilities.
Conclusion: This study examines the effectiveness of a Mindfulness and ACT based intervention program in the physical and psychological wellbeing of people with overweight or obesity. Findings are expected to support the implementation of this intervention program in the treatment of obesity together with usual treatments, so as to provide an integrated treatment that will help improving the quality of life of individuals and maintaining the results in the long term.

PO1.225

The effect of lifestyle counselling on dietary behavior of pregnant women – secondary results of the randomised controlled GeliS trial

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Introduction: An increasing number of women gains weight excessively during pregnancy. As excessive gestational weight gain (GWG) is linked to numerous adverse health consequences for mothers and their offspring, there is a clear need to develop effective strategies targeting GWG that are feasible in "real-life" settings. The main aim of the GeliS study ("Gesund leben in der Schwangerschaft"/ Healthy living in pregnancy) was to examine the effect of lifestyle counselling conducted alongside routine antenatal care on excessive GWG. A further aim was to evaluate the effect of the intervention on dietary behaviour during pregnancy.
Methods: The GeliS study is designed as a prospective, cluster-randomised, open intervention trial. Focusing on a healthy balanced diet, regular physical activity and self-monitoring of weight gain, the intervention comprised three structured and individualised counselling sessions during pregnancy and one session after delivery, given by specifically trained gynecologists, midwives and medical assistants. Participants in the control group received routine antenatal care and condensed information on a healthy lifestyle during pregnancy. Information about dietary behaviour was collected via a validated food frequency questionnaire (DEGS-FFQ) in both groups before the 12th week and after the 29th week of gestation respectively.
Results: Although the GeliS lifestyle intervention could not be shown to be effective in reducing the proportion of women with excessive GWG, some effects on dietary behavior were observed. Overall food, energy and macronutrient intake was not influenced by dietary counselling. However, the counselling resulted in a higher consumption of vegetables and fish and a reduction in the soft drink intake in the intervention group. Specific behaviours such as choice of oils, fat-reduced and whole-grain products also improved due to lifestyle counselling. Overall dietary quality, rated by means of a Healthy Eating Index based on the DEGS-FFQ, was not significantly influenced by the intervention.
Conclusion: Despite a missing modification of GWG, lifestyle counselling in the routine perinatal care setting was effective in changing several aspects of the dietary behavior of pregnant women. Potential long-term effects of these changes on maternal and infant outcomes will be evaluated in a 5-year follow-up.

PO1.226

An educational intervention to increase referrals of patients with type 2 diabetes from primary care to weight management (Small Talk Big Difference): results of a randomised controlled trial

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Introduction: Despite strong evidence that weight management improves outcomes for patients with type 2 diabetes, many clinicians in primary care do not raise the issue of weight during consultations. Reasons for this include lack of knowledge of available programmes, lack of confidence in raising the issue, and a belief that it would take too long within an already busy consultation.
Methods: The Small Talk Big Difference intervention was developed using the Behaviour Change Wheel; it consists of a 1 hour online e-learning package for primary care clinicians (including the benefits of weight management, weight management interventions, communication skills for raising the issue and motivational interviewing), a patient leaflet, consultation guide and implementation checklist. Primary care practices in NHS Greater Glasgow and Clyde, Glasgow, UK, were offered the intervention via routine health board newsletter, then randomised to receive it immediately or after a 4 month delay. Referral rates to weight management services were assessed 3 months before and after the intervention.
Results: At least 1 clinician from 97 practices (781,521 patients; 50,072 with T2DM) requested access to the intervention (48 immediate/ 49 delayed). 24/48 immediate practices completed the training (50%). 93% of those completing agreed/ strongly agreed that "raising the issue of weight with my patients with type 2 diabetes and co-existing obesity will become a normal part of my work". The immediate group had 182 (65 T2DM) referrals pre and 270 (82 T2DM) post vs 261 (89 T2DM] pre and 265 (90 T2DM) post in the delayed group. There was no difference in the ratio of referrals of people with T2DM between groups (1.27 vs 1.07; p = 0.46). There was a difference in change in referrals of all patients between groups (+1.8 vs +0.1; p = 0.029).
Conclusion: This is the first randomised trial of a theory-based behavioural intervention with the aim of improving clinicians' communication skills related to obesity and increase referrals to effective programmes. For a highly pragmatic study, uptake and completion was high. There was no difference in the referral of people with T2DM but there was an increase in total referrals. Overall referral rates remained low. Variation in completion, baseline referrals, clinician-role and practice size may have an effect and interactions will be explored. While this educational

intervention shows promise, it is likely that additional measures such as financials incentives will be required to achieve larger changes.

Conflict of Interest: None.

Funding: This project was supported by a Joint Working Agreement between NHS Greater Glasgow and Clyde, the University of Glasgow (with an unrestricted educational grant from Janssen), MSD, and Astra Zeneca.

PO1.227

Blood pressure levels and cardiovascular events in early to middle-aged adults with new-onset hypertension: a nationwide population-based cohort study

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Background: The relationship between incidence of cardiovascular diseases and degree of blood pressure (BP) control needs to be determined in patients newly diagnosed with hypertension in early and middle-aged adulthood. This study aimed to determine whether BP baseline levels on follow-up are associated with cardiovascular diseases in early and middle-aged new-onset hypertensive adults.
Methods: This is a retrospective cohort study using Korean National Health Insurance Service data. Data recorded for adult patients newly diagnosed with hypertension from 2009 to 2012 were extracted. The follow-analysis comprised January 2013 through December 2016. 176,943 hypertensive patients prescribed antihypertensive drug treatment within 1 year of diagnosis and re-examined after two years were selected. Patients with preceding cardiovascular diseases or aged ≥ 65 years were excluded. Primary outcome was an incidence of stroke or myocardial infarction. Multivariate Cox proportional hazards regression model was used to compare the hazard ratio (HR) of stroke or myocardial infarction according to BP range.
Results: Of 145,697 patients newly diagnosed with hypertension and taking antihypertensive drugs, 43,581 (30%) were unable to control systolic BP(SBP) at ≤ 140 mmHg and 41,542 (29%) had a diastolic BP (DBP) ≥ 90 mmHg. An increased risk of ischemic stroke was associated with a SBP of 150-159 mmHg (HR 1.439; 95% CI, 1.102-1.879) and a DBP of 100-109 mmHg (HR 1.702; 95% CI, 1.363-2.122). Among mid-life hypertensive adults aged above 20 years and below 50, a SBP of above 150 mmHg and a DBP of above 110 mmHg were associated with an increase in the risk of myocardial infarction. Additionally, a higher proportion of patients with poor BP control were smokers and heavy drinkers.
Conclusion: BP level is a significant risk factor for major cardiovascular diseases even in new-onset hypertensive middle-aged adults. Unhealthy lifestyle may contribute to the development of hypertension.

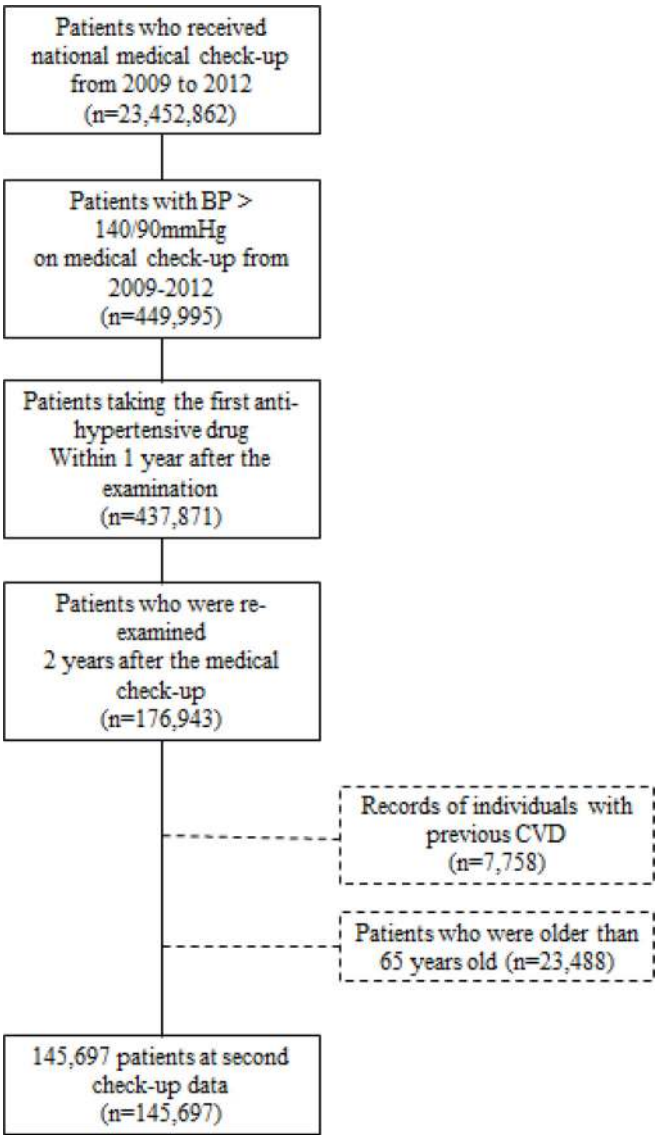

Fig. 1. Flowchart of Cohort Selection.

PO1.229

Inflammation markers and association with obesity severity

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Introduction: Obesity represents an important proinflammatory state that leads to multiple cardiovascular comorbidities and to an increased risk of death. In this study, our goal was to identify markers of inflammatory activity associated with different degrees of obesity.
Methods: Retrospective study of 216 obese patients followed in obesity consultations. The following clinical and analytical parameters were collected: age, sex, height, weight, body mass index (BMI), waist circumference (WC), high sensitivity C-reactive protein (hsCRP), ferritin, platelet and leukocyte counts, platelet–lymphocyte ratio (PLR), neutrophil–lymphocyte ratio (NLR), and comorbidities (arterial hypertension, dyslipidemia, diabetes mellitus/prediabetes, metabolic syndrome, depression, smoking). The patients were divided in 3 groups, based on their BMI. Statistical analysis was performed with SPSSvs22, using non-parametric tests, with a significance level of 0.05.
Results: hsCRP was the only inflammatory marker with a positive correlation with weight ($r = 0.243$; $p<0.001$), BMI ($r = 0.371$; $p<0.001$) and WC

(r = 0.335;p<0.001). Statistically significant differences were observed between the 3 classes of obesity in terms of hsCRP value (p<,001). The class III presented a median value (Md = 6.87), superior than class I (MD1 = 1.88) and II (Md2 = 4.60). hsCRP and NLR did not show significant differences in neither of the comparisons executed between individuals with and without the comorbidities above mentioned (p>0.05). The other inflammation markers presented significant differences in at least one of the comorbidities.

Conclusion: In this study, hsCRP was the only inflammation marker positively correlated with abdominal and global obesity and with significantly higher values associated with more severe degrees of obesity. In addition, hsCRP has shown not be influenced by the presence of comorbidities usually associated to obesity and that, by themselves, contribute to proinflammatory states. Therefore, hsPCR might be a better marker for stratification of cardiovascular risk in the obese population in detriment of other inflammatory parameters.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO1.230

Ocular pressure in non-glaucomatous obese patients and its relationship with body composition, diabetes/arterial hypertension status, blood viscosity, and serum cortisol: single-centre experience

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Introduction: A positive association between obesity and intraocular pressure (IOP) has been reported, however clear pathophysiological explanation is lacking.

Aim: To determine IOP among non-glaucomatous obese patients and its relationship with body composition, diabetes/arterial hypertension status, blood viscosity and morning basal serum cortisol.

Subjects and Methods: The study included 50 non-glaucomatous obese adults (80,0% female) aged 19-70 years (median age 44 years) consecutively referred to Obesity outpatient clinic at CHC Rijeka within a 1-year period. Exclusion criteria were: (i) patients receiving corticosteroid therapy and/or anti-glaucoma therapy. Body composition parameters were assessed by bioelectrical impedance analysis (Model Seca® mBCA 515 Medical Body Composition Analyzer, Hamburg, Germany). IOP was measured by Goldmann applanation tonometry. Cut-off point between normality and pathology was set at 21 mmHg. Data were analyzed using Statistica v13.3 (StatSoft Inc., Tulsa, Oklahoma, United States).

Results: Six out of 50 participants (12%) had diabetes mellitus (DM), 20 participants (40%) had arterial hypertension (AH). Mean (±SD) IOP was 16,0±2,0 mmHg. Average body composition data were: weight 119.0±25.1 kg, height 168.1±9.9 cm, body mass index (BMI) 42.0±7.4 kg/m^2, waist circumference (WC) 124.2±16.5 cm, fat mass (FM) 57.4±14.6 kg, FM% 48.1±4.7%, fat-free mass (FFM) 61.6±13.1 kg, FFM% 51.9±4.7%, skeletal muscle mass (SMM) 30.3±7.1 kg, visceral adipose tissue (VAT) 6.3±4.3 L. Mean (±SD) laboratory data were: RBC 4.9±0.3 x 1012/L, Hb 140.4±10.2 g/L, Hct 0.40±0.03 and morning basal serum cortisol 469.8±146.7 nmol/L (reference range: 171-536 nmol/L). Statistical analysis using Pearson's correlation revealed that IOP is significantly positively correlated with morning basal serum cortisol (r = 0.28, p = 0.049) and age (r = 0.32, p = 0.024). No significant correlation was found between IOP and BMI (r = -0.22, p = 0.119), WC (r = -0.12, p = 0.395), FM% (r = -0.18, p = 0.222), FFM% (r = 0.18, p = 0.222), SMM (r = 0.03, p = 0.858), VAT (r = -0.11, p = 0.456), RBC (r = 0.01, p = 0.966), Hb (r = 0.09, p = 0.550) or Hct (r = 0.14, p = 0.329). There was no significant difference in IOP based on gender and diabetes/arterial hypertension status (DM+ 17.0±2.0 vs DM- 15.9±2.0 mmHg, p = 0.339; AH+ 16.3±1.7 vs AH- 15.9±2.2 mmHg, p = 0.470).

Conclusion: IOP should be routinely checked in obese patients with chronic hypothalamic-pituitary-adrenal axis hyperactivity (functional hypercortisolism). However, further studies are necessary to confirm/determine the clear pathophysiological link between obesity and IOP.

PO1.231

Evaluation of nutritional status with Nutritional Risk Screening 2002 and Subjective Global Assessment at hospital admission

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Rationale: Nutritional risk and malnutrition are highly prevalent among hospitalized patients. Therefore, assessing patients' nutritional status may be useful in predicting patients with increased morbidity and mortality. This study aims to evaluate the two test NRS 2002 and SGA to assess the nutritional status.

Methods: This prospective study was conducted since September 2016 to December 2017 and included 214 patients, 115 male and 99 female (age 65.2±15.4 y, 59.1±17.9y; body weight 74.7±15.9 kg, 67.9±16.3 kg; BMI 25.5±4.6 kg/m^2, 26.6±6.3 kg/m^2) admitted to the departments of Medicine and Surgery of Federico II University Hospital coming from the Emergency Unit. The SGA and NRS 2002 were administered to all patients within 72 h of admission.

Results: According to SGA, 45.2% of male patients are considered well nourished (score a), 49.6% moderately malnourished (score b), and 5.2% severely malnourished (score c), whereas with NRS, 89.5% considered well-moderately nourished (score<3), and 10.4% severely malnourished (score ≥ 3). About female patients according to SGA, 56.6% are considered well nourished (score a), 49.6% moderately malnourished (score b), and 4.0% severely malnourished (score c), whereas with NRS, 94.9% considered well-moderately nourished (score<3), and 5.1% severely malnourished (score ≥ 3). The 31.3% of patients are overweight and 21.5% obese.

Conclusion: SGA and NRS appear to be effective to identify different individuals as malnourished or at risk for malnutrition at hospital admission in addition to typical important nutritional parameters.

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Conflict of Interest: None Disclosed.

Funding: No funding/research relating to this abstract.

PO1.232

Fat-free mass and fat mass indexes in a large cohort of morbidly obese patients by bioelectrical impedance analysis (BIA)

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Introduction: In clinical and research settings, the two most commonly used tools for body composition analysis are bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DXA). Although extensive research relatively few studies using BIA and including subjects with class I/II/III of obesity are available. The purpose of this study is to investigate body composition by bioelectrical impedance analysis (BIA) in a wide cohort of obese patients, analysing the difference in fat mass (FMI) and fat-free mass indexes (FFMI) by sex, age and obesity degree.
Methods: We enrolled obese patients undergoing clinical care for obesity and obesity complications at San Giuseppe Hospital Istituto Auxologico Italiano-IRCCS Piancavallo (VB) and elderly obese (>65 years of age) admitted to the Santa Margherita Hospital in Pavia for a total of 10,669 obese patients with age ranging from 18 to 90 years. BIA 101/s (Akern - Firenze, Italy) was used for impedance analysis and FM and FFM indexes calculated (Kg/m^2). The study protocol was approved by the Ethical Committee of Istituto Auxologico Italiano IRCCS and it was performed according to good clinical practice guidelines.
Results: A total of 4,223 patients were excluded for abnormal hydration and body fluids distribution. BIA assessments were analysed by sex, BMI and age classes in a total of 6,446 obese patients (n = 2,623 male with mean (SD) BMI 42.32 (7.23) Kg/m^2 and mean (SD) age 52.64 (15.42) years and N = 3,823 obese women with mean (SD) BMI of 43.44 (7.40) Kg/m^2 and mean (SD) age 53.28 (15.58) years. In a same BMI class an age-dependent decrease in Rz/m and Xc/m BIA assessments was observed. The FMI and FFMI values increased both at the increase of BMI. By gender analysis, men showed, for each class of BMI, FFMI values higher than women, on the contrary, in the highest FMI values were observed in the women group. The FFMI and FMI cut-off points for men and women in each BMI considered class were then established.
Conclusion: We observed that FFMI and FMI values increased at the increase of BMI both in women and men. The FFM decrease was only evident when FFM was expressed as percentage of weight, rather as FFMI (Kg/m^2), in age and BMI dependent manner. Based on these observations the free fat mass loss in obesity should be questioned and better investigated together with tests of muscular function.

Conflicts of Interest: The authors declare no conflict of interest.

Funding sources: There was no funding resource for this study.

PO1.233

Development of predictive equations for ectopic fat deposits in Asian Indians

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Background: Ectopic fat deposition may be associated with organ dysfunction and increased metabolic risk. Accurate quantification of these fat deposits may not be possible in routine clinical setting. We quantified ectopic fat deposits in Asian Indian subjects using MRI scan and developed equations using simple parameters to predict the ectopic fat deposits.
Methods: This cross-sectional study included 170 subjects (97 males, 73 females) in the age group of 18-55 years, 90 with and 80 without metabolic syndrome (MetSynd), defined according to the harmonizing definition of MetSynd with Asian specific criteria for waist circumference. Body composition was measured by BIA method and MRI was used to quantify hepatic, epicardial and pancreatic fat deposits. Biochemical measurements included OGTT, lipids and fasting insulin. Stepwise regression analysis was undertaken using age, gender, BMI and waist circumference (WC) to develop equations to predict these ectopic fat deposits.
Results: Hepatic and Epicardial fat quantity was higher in subjects with MetSynd. Hepatic fat and pancreatic fat were independently associated with insulin levels after adjusting for other anthropometric parameters. Using stepwise regression analysis the following equations were developed:
Epicardial fat = 1.213 + 0.118 (Age)-1.561(gender) + 0.155(BMI);
R2 = 0.321; Adj R2 = .0309
Hepatic fat = -0.953 - 0.01(Age) + 0.203(gender) + 0.043(WC);
R2 = 0.123; Adj R2 = 0.108
Pancreatic fat = -0.502 + 0.024(Age) - 0.414(gender) + 0.083(BMI);
R2 = 0.188; Adj R2 = 0.155
For gender: Males = 1, Females = 2.
Conclusion: Ectopic fat deposits are significantly associated with insulin resistance and accurate measurements are cumbersome. The equations developed using simple parameters may be useful to predict the ectopic fat deposits in clinical setting and may be helpful for risk stratification and institution of appropriate management strategies.

PO1.234

Unexpected results of gastric sleeve pathological exams

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Introduction: Due to the gastric sleeve procedure a variable amount of the stomach is excised. This provides a large number of supposedly benign specimens to be evaluated. This study's objective is to evaluate the results of the gastric sleeve anatomopathological specimens including the incidence of neoplasms
Methods: Evaluation and revision of electronic health records of all patients submitted to bariatric surgery (sleeve gastrectomy) between January 1st 2013 and December 17h 2018
Results: Four Gastrointestinal Stromal Tumor (GIST) and 2 leiomyomas were found in 194 anatomopathological specimens.
Conclusion: Despite the relatively small group of patients, incidentally pathological findings may occur in a significant manner (3%). The most common tumor found was stromal type (GIST). All cases of them were completely excised with the gastrectomy specimen, and there was no need for adjuvant treatments or reintervention for this purpose.

Conflict of Interest: None.

Funding: No Funding.

PO1.235

Visceral-to-subcutaneous fat ratio as a predictor of the multiple metabolic risk factors for subjects with normal waist circumference in Korea

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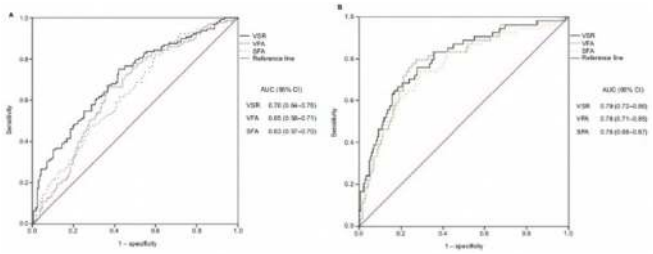
Introduction: Visceral obesity has been recognized as a predictor of metabolic risk factors. However,few studies have evaluated the metabolic risks in subjects with normal waist circumference(WC). We aimed to examine if the visceral-to-subcutaneous fat ratio (VSR) has diagnostic value to identify multiple metabolic risk factors in subjects with normal WC, compared with visceral fat area (VFA) and subcutaneous fat area (SFA).
Methods: This is a cross-sectional study in which we have compared mean VFA, SFA, and VSR according to each metabolic risk factor. We performed a receiver operating characteristic(ROC) curve analysis for VFA, SFA, and VSR to assess their accuracy in picking out two or more non-adipose factors for metabolic syndrome.

Results: For each metabolic risk factor, mean VSRs were significantly different between groups(risk-absent group vs risk-present group) in men and women, except for men with low high density lipoprotein. However, mean VFAs and SFAs showed no significant differences between groups. VSR showed superior diagnostic values in predicting at least two non-adipose metabolic risk factors in men and similar diagnostic value in women. Areas under ROC curves for VSR and VFA were 0.705 and 0.649 in men (P = 0.028) and 0.798 and 0.785 in women (P = 0.321).

Conclusion: For men with a normal WC, VSR appeared to effectively predict the presence of multiple metabolic risk factors. Thus, VSR may serve as an indicator for identifying men who have a normal WC and multiple metabolic risk factors.



Abbreviations: ROC, receiver operating characteristic; VSR, visceral-to-subcutaneous fat ratio; VFA, visceral fat area; SFA, subcutaneous fat area; AUC, area under curve.

Fig. 1. ROC curves for VSR, VFA, and SFA to identify at least two components of metabolic syndrome other than waist circumference in normal waist-circumference.

Tab. 1. Baseline characteristics of study participants according to sex.

Variable	Normal range	Men (n = 296)	Women (n = 239)	P-value
Age (years)		52.1±9.9	50.6±9.7	0.089
BMI (kg/m^2)	<25	24.0±2.2	22.4±2.1	<0.001
WC (cm)	Men <90, women <85	83.1±4.9	76.6±5.2	<0.001
SBP (mmHg)	<130	128.2±11.7	118.0±13.5	<0.001
DBP (mmHg)	<85	81.9±9.0	74.2±9.5	<0.001
Triglyceride (mg/dL)	<150	132.0±108.3	89.8±60.1	<0.001
HDL-cholesterol (mg/dL)	Men ≥40, women ≥50	52.9±13.0	60.3±14.3	<0.001
FBS (mg/dL)	<100	103.8±29.1	93.3±14.4	<0.001
Taking antihypertensive, n (%)		50 (16.8)	19 (7.9)	0.002
Taking OHA, n (%)		25 (8.4)	7 (2.9)	0.007
High BP, n (%)		183 (61.8)	73 (30.5)	<0.001
Hyperglycemia, n (%)		116 (39.1)	49 (20.5)	<0.001
High TG, n (%)		80 (27.0)	21 (8.7)	<0.001
Low HDL-cholesterol, n (%)		36 (12.1)	51 (21.3)	0.004
At least two risk factors other than central obesity, n (%)		128 (43.2)	54 (22.5)	<0.001
Metabolic syndrome, n (%)		41 (13.8)	37 (15.4)	0.595
VFA (cm^2)		133.3±74.5	84.9±43.2	<0.001
SFA (cm^2)		121.0±60.5	157.2±52.6	<0.001
VSR		1.34±3.63	0.54±0.25	<0.001

Notes: Values are presented as mean ± standard deviation or number (%). P-values were calculated using independent t-test for the continuous variables and chi-square test for categorical variables. High BP: blood pressure ≥130/85 mmHg or taking medication for previously diagnosed hypertension; hyperglycemia: fasting blood sugar 100 mg/dL or taking medication for previously diagnosed diabetes; high TG: serum triglycerides ≥150 mg/dL; low HDL-cholesterol: serum high-density lipoprotein cholesterol <40 mg/dL in men and <50 mg/dL in women. Abbreviations: BMI, body mass index; WC, waist circumference; SBP, systolic blood pressure; DBP, diastolic blood pressure; HDL, high-density lipoprotein; FBS, fasting blood sugar; OHA, oral hypoglycemic agent; BP, blood pressure; TG, triglyceride; VFA, visceral fat area; SFA, subcutaneous fat area; VSR, visceral-to-subcutaneous fat ratio.

Tab. 1. Comparison of adjusted mean VFA, SFA, and VSR by metabolic risk factors.

Variable		Men			Women		
		Absent	Present	P-value	Absent	Present	P-value
VFA (cm^2)							
	High BP	120.5±6.7	130.6±5.7	0.253	89.6±3.1	100.9±4.4	0.044
	Hyperglycemia	125.9±5.4	127.5±6.9	0.855	89.9±2.9	105.2±5.4	0.015
	High TG	123.1±4.9	136.8±8.4	0.155	92.3±2.6	105.1±8.1	0.131
	Low HDL-cholesterol	125.1±4.5	137.7±12.2	0.329	91.0±2.9	101.1±5.2	0.093
	At least two risk factors	120.3±5.5	135.7±6.7	0.075	89.3±3.0	104.8±5.1	0.011
	Metabolic syndrome	124.5±4.6	141.3±11.6	0.172	90.1±2.9	106.7±6.1	0.020
SFA (cm^2)							
	High BP	137.0±6.0	133.3±4.5	0.594	189.7±6.0	190.6 ±6.7	0.898
	Hyperglycemia	139.0±4.7	127.9±5.6	0.104	192.3±5.6	184.5 ±7.8	0.335
	High TG	138.2±4.5	127.1 ±6.3	0.142	191.2±5.3	179.1 ±11.1	0.265
	Low HDL-cholesterol	135.3±4.1	130.4±9.4	0.631	193.7±5.7	182.2±7.4	0.135
	At least two risk factors	140.6±5.0	128.2±5.1	0.067	194.4±5.9	182.3±7.2	0.121
	Metabolic syndrome	136.3±4.2	126.4±8.8	0.306	192.5±5.8	184.5±8.2	0.380
VSR							
	High BP	1.05±0.04	1.18±0.03	0.018	0.53±0.01	0.62±0.02	0.010
	Hyperglycemia	1.07±0.03	1.21±0.04	0.008	0.53±0.01	0.67±0.03	0.001
	High TG	1.06±0.03	1.31±0.05	<0.001	0.55±0.01	0.72±0.04	0.001
	Low HDL-cholesterol	1.11±0.02	1.22±0.07	0.181	0.50±0.01	0.70±0.03	<0.001
	At least two risk factors	1.02±0.03	1.29±0.04	<0.001	0.52±0.01	0.69±0.03	<0.001
	Metabolic syndrome	1.09±0.02	1.35±0.07	0.001	0.53±0.01	0.69±0.03	<0.001

Notes: Values are presented as mean ± standard error and are adjusted for age and BMI. P-value was calculated using independent t-test. Abbreviations: VFA, visceral fat area; SFA, subcutaneous fat area; VSR, visceral-to-subcutaneous fat ratio; BP, blood pressure; TG, triglyceride; HDL, high-density lipoprotein; BMI, body mass index.

PO1.236

Body Mass Index documentation in routine general practice

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Introduction: Planning effective weight management services, including remission of type 2 diabetes, depends on having accurate, current Body Mass Index (BMI) data. National Survey data shows 29% of Scottish adults with BMI ≥ 30 kg/m^2. The Quality and Outcomes Framework in the United Kingdom aimed to incentivise recording of BMI ≥ 30 kg/m^2, However reviews demonstrate under reporting, with only 37% adults having BMI recorded in the last year and 79% BMI ever recorded. Routine BMI documentation in Scottish primary care is unresearched.
Method: Electronic Health Records of adults ≥16 years (n = 77 591) from 12 General Practices, constituting a broadly socio-economically representative Scottish Health and Social Care Partnership, were searched for BMI ever recorded and BMI recording for a current 2 year period.
Results: BMI was ever recorded for 75% of adults. 31% had recordings for 01/04/2016-31/03/18, with breakdown by BMI category: <18.5: 2%: 18.5-24.9: 27%, 25–29.9: 33%, 30–39.9: 31% and 40+: 7%. Figures for BMI 30-39.9 and 40+ were greater than those in Scottish Health Survey 2017 at 26% and 3% and Health Survey England 2017 at 25% and 4% respectively. Recording rate varied by practice (range 20-42%) and showed a marked increase over the second half of the time period.
Conclusion: More complete current routine BMI data is required for accurate planning and provision of weight management services. Underreporting may hinder stated public health aims of early detection and intervention of type 2 diabetes. It is important to monitor the quality of data in Electronic Health Records given their increasing use as a source in research and to estimate variation between real life prevalence rates and national health survey rates.

PO1.238

Comparison of three commercial methods for the determination of HbA1c in diabetic patients

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Introduction: It is essential that HbA1c is accurately measured both to perform the diagnosis of diabetes and to distinguish an optimal glycemic control, therefore, the laboratory professional must ensure that a change in this magnitude constitutes a clinical modification and not a variation The aim of this study was to compare three commercial methods (spectrophotometric, electrophoretic and chromatographic) for the determination of HbA1c in diabetic patients.
Methods: A descriptive, cross-sectional, observational study was carried out, using non-parametric statistics, with the main objective of comparing three commercial methods for HbA1c determination, using a sample of 200 volunteer patients who visited the university hospital laboratory of the BUAP, during the period September-October 2018. Volunteer patients had to comply with their request for HbA1c determination, in addition to their additional studies such as fasting serum glucose, lipid profile (total cholesterol, triglycerides, HDL, LDL, VLDL). Using this selection criteria, the study continued to be reinforced with extra patient data such as: weight, height, BMI and age. The methods used in the analytical phase for the comparison of techniques were: determination of HbA1c by spectrophotometry of the Siemens commercial house equipment Advia 1800, chromatographic method of the commercial house Bio Rad equipment D-10 and electrophoretic method of the commercial house Sebia equipment Capillarys 2 flex-piercing. The data were compared by Mann-Whitney U in the continuous variables and by X^2 or Fisher's exact test in categorical variables, using SPSS versión 21.0. The methods were compared by a Friedman test, and bivariate pairwise comparisons.
Results: The HbA1c comparisons for the three methods were statistically different between each one. In assessing the interaction of nutritional status and mixed dyslipidemia, changes in HbA1c values were observed in all methods, suggesting that BMI and triglyceride and cholesterol alterations influence patients' glycemia.
Conclusion: The method that showed the highest precision and accuracy for the determination of HbA1c was the electrophoretic one using the Sebia Capillarys equipment, which separates the hemoglobin fractions by their electrophoretic shift, making the value obtained more accurate, because it only considers the HbA1c value and no other variants of glycated hemoglobins

PO1.239

Levels of engagement as a predictor of long-term weight loss in over 1 million adults attending a commercial weight management programme

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Slimming World UK

Introduction: Level of engagement with weight management programmes has been associated with greater weight loss outcomes in the short term. However, less is known about longer term engagement and weight outcomes.
Methods: Data was analysed from new adult members joining Slimming World groups between January and December 2016. Self-reported heights, weekly group attendance data and directly measured weight using standardised, calibrated scales were analysed. Body Mass Index (BMI) was analysed at baseline, 3 and 12 months using the last observation carried forward method. Multivariate regressions were used to investigate percentage weight change in relation to attendance.
Results: 1,094,676 members met inclusion criteria with a mean age of 43.0 ±14.0 years and baseline BMI of 33.0 ±6.4 kg/m^2. Of the total sample, 7.6% of participants were male.
Mean weight change at 3 and 12 months was -5.0 ±3.6% and -6.0 ±5.8% respectively. Mean BMI change at 3 and 12 months was -1.6 and -2.0 kg/m^2 respectively. After adjusting for gender and start BMI and age within the regression model, level of engagement was found to be a predictor of weight loss at 3 months ($F(4,1094671) = 145,600$, $p<0.001$), with an adjusted R^2 of 0.46.
At 12 months, 11% (n = 120,107) of members had attended ≥75% of sessions. These members achieved a mean weight loss of -14.1 ±7.5% compared to -5.0 ±4.7% for those attending <75% of sessions ($t = -412.74$, $df = 132,320$, $p<0.001$). High attenders reduced their BMI by 5.1 kg/m^2 by 12 months. After adjusting for gender and start BMI, weekly attendance was found to be a significant predictor of weight loss at 12 months ($F(3,1094672) = 145,600$, $p<0.001$), with an adjusted R^2 of 0.45.
Logistic regression showed that the odds of achieving 10% weight loss at 12 months were 1.4 times higher for those who attended at least 50% of weekly sessions in the year.
Conclusion: Over 1 million new people attended Slimming World between January and December 2016. On average, members achieved a clinically significant 5% weight loss at 3 months. Those continuing to attend beyond 3 months continued to lose weight with attendance significantly predicting longer term weight loss. This emphasises the importance of encouraging participants to engage with the programme.

PO1.240

The cost-effectiveness of very low calorie diets for severe obesity: modelling study in the UK

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Background: There has been a continued increase in severe obesity in the UK. Current NICE guidance on weight management for obesity does not differentiate between obesity and severe obesity (obesity classes I, II and III). As part of the REBALANCE project, we study the cost-effectiveness of 1. Very Low Calorie Diets (VLCD) plus a weight management programme (WMP) and 2. A WMP alone (mainly dietary intervention) compared to a "do nothing" (i.e. baseline intervention which is a representation of current BMI trends). We also test the cost-effectiveness of adding a VLCD component to a WMP compared to a WMP alone (i.e. 2 vs. 1).
Methods: The UKHF microsimulation model was used to quantify long-term cost-effectiveness. Epidemiological data were used to assign incidence of 12 obesity-related diseases. Based on the accumulation of disease, we applied epidemiological data to calculate QALYs and the costs of healthcare. Changes in BMI for both interventions were obtained from a meta-analysis of randomised controlled trials. Our base case analysis assumed a BMI regain back to baseline over five years after the final follow-up at four years. Sensitivity analysis explored alternative weight regain assumptions. We calculated incremental cost-effectiveness ratios (ICERs) using a health services perspective.
Results: By 2046, compared to baseline, the WMP alone and the VLCD added to a WMP resulted in an estimated 19,053 ±208 and 19,482 ±208 fewer cumulative cases of disease per 100,000 individuals with a BMI ≥35 kg/m^2, which equates to £84.26 ±2.77 and £86.73 ±2.77 million avoided in cumulative direct healthcare costs per 100,000 individuals.
Both interventions were cost-effective compared to the natural progression scenario. The ICERs for the WMP alone and VLCD added to the WMP were £488 and £6,649, respectively. However, a VLCD added to a WMP was not cost-effective with an ICER of ~£121k per QALY gained. VLCDs were less likely to be cost-effective in a sensitivity analysis assuming a linear regain in BMI over time.
Conclusion: Based mainly on old trials, adding VLCDs to a WMP is not cost-effective. However, few trials collected long-term follow-up data, so assumptions around weight regain may bias the results.

PO1.241

Longer term weight outcomes following a 12-week referral to a multi-component lifestyle weight management programme across high BMI patients

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Slimming World UK

Introduction: Slimming World on Referral (SWoR) is a subsidised partnership between Slimming World and NHS and local government commissioners, providing a cost-effective, 12-week, tier-2 weight management intervention for patients. This analysis examines weight loss outcomes by baseline BMI category for new patients referred to Slimming World between January and December 2016.
Methods: Referrals to Slimming World were made through 80 different locally commissioned schemes across England. Objectively measured weight and self-reported heights were analysed and BMI calculated at baseline, 3, 6 and 12 months using the last observation carried forward method.
Patients were classified as 'continuers' if they continued to attend Slimming World after their initial referral period. Weight outcomes are shown for the whole cohort and for continuers. Analysis of co-variance (ANCOVA) was used to investigate the effect of baseline BMI category on weight loss outcomes at 3, 6 and 12 months.
Results: The number of patients referred to Slimming World between January and December 2016, who met inclusion criteria was 27,733, 15.5% of whom were male. Mean starting BMI for patients was 37.1 ±6.3 kg/m^2 ranging from 25 to 83.3 kg/m^2. 56.6% (n = 15,992) of patients had a starting BMI of ≥30.0 kg/m^2 and 26.9% of patients (n = 7,568) had a starting BMI that meets NICE guidance for tier-3 services (BMI ≥ 40.0kg/m^2) 54.3% (n = 15,063) were classed as continuers. Mean % weight change for all patients according to baseline BMI category is presented in Table 1.
Table 1: Mean weight change per BMI category
Conclusion: Clinically meaningful weight losses were achieved for patients referred to Slimming World at 3, 6 and 12 months across BMI categories. 26.9% of referral patients had a starting BMI that could trigger referral to services that could place greater burden on both the patient and NHS resources. If patients continued to engage with the programme after the initial referral period, weight losses of around 10% were achieved at 12 months.

Tab. 1. Mean weight change per BMI category.

		-	Mean % change +/- SD	-
BMI Category	Cohort (All/Continuers)	3 Months	6 Months	12 Months
25-<30	All (N = 2,313)	-5.4 ±3.7	-6.5 ±5.1	-6.6 ±5.4
	Continuers (N = 1071)	-7.3 ±3.3	-9.6 ±5.1	-9.7 ±5.7
30-<35	All (N = 9,637)	-5.7 ±3.8	-7.1 ±5.6	-7.4 ±6.3
	Continuers (N = 5028)	-7.6 ±3.5	-10.2 ±5.6	-10.7 ±6.7
35-<40	All (N = 8,287)	-5.6 ±3.8	-7.1 ±5.8	-7.6 ±7.1
	Continuers (N = 4579)	-7.4 ±3.5	-10.0 ±5.9	-11.0 ±7.6
40-<45	All (N = 4,469)	-5.5 ±3.8	-7.1 ±5.9	-7.7 ±7.5
	Continuers (N = 2521)	-7.3 ±3.5	-10.1 ±5.9	-11.2 ±8.2
45-<50	All (N = 1,902)	-5.6 ±3.7	-7.3 ±6.0	-8.1 ±7.8
	Continuers (N = 1161)	-7.1 ±3.4	-9.9 ±5.9	-11.2 ±8.3
50-<55	All (N = 707)	-5.3 ±3.6	-7.1 ±5.9	-8.0 ±8.1
	Continuers (N = 426)	-6.9 ±3.4	-9.8 ±5.9	-11.4 ±8.7
55+	All (N = 418)	-5.1 ±3.8	-6.8 ±5.9	-7.6 ±7.8
	Continuers (N = 266)	-6.8 ±3.3	-9.4 ±5.7	-10.6 ±8.1

Table showing mean weight change per staring BMI category at 3, 6 and 12 months.

PO1.242

Living and clinical conditions in female with restrictive anorexia nervosa long after interrupting specialized treatment

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Introduction: Anorexia nervosa outcomes outside of clinical follow-up have not been thoroughly investigated to date. This study aimed to assess long-term outcome indicators in a group of women with restrictive anorexia nervosa AN (AN-R) living in southern Italy.
Methods: A cohort of 117 women (mean age at the first visit 20.0 ± 5.2 years, body mass index 16.1 ±1.5 kg/m^2) with AN-R who were treated from January 2000 to December 2005 and who did not undergo any regular clinical observation in our outpatient unit in the last 10 years were asked to complete a questionnaire on their present living and clinical conditions (at least 10 years after their last observation at our outpatient unit).
Results: Forty-four (37.6%) out of 117 patients completed the questionnaire, forty-two (35.8%) could not be reached (i.e., changed address and phone number), and 30 (25.6%) denied participation.
A total of 47.7% (n = 21) of respondents were married or cohabiting, 55% (n = 24) obtained a university degree, and 55% (n = 24) were employed. The total mortality rate was 3.72%, corresponding to a standardized mortality

ratio (SMR) of 6.9. Ten patients had pregnancies with healthy children, and three patients experienced involuntary pregnancy interruptions.
Conclusion: Although the data cannot be considered conclusive due to the poor response rate of this selected group of AN-R patients, we speculated that, at least among the women who completed the questionnaire, the possibility of achieving long-term positive life goals may be the same as that of healthy age-matched women. The AN-related mortality rate, regarding the entire studied cohort, was lower than that in our past studies but is still considerably higher than that of the age-matched population.

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Conflict of Interest: None Disclosed.

Funding: No funding/research relating to this abstract.

PO1.243

A systematic review of long-term randomised controlled trial evidence of interventions for weight management in people with BMI ≥35 kg/m²: The REBALANCE Project

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Introduction: People with BMI ≥35 kg/m² are at increased risk of co-morbidities and psychological/social and economic consequences. Despite this, there is limited guidance for weight management programmes (WMPs) for adults with higher BMIs. The aim of this project was to systematically review the evidence for WMPs for the treatment of severe obesity.
Methods: Major electronic database and hand searches of published/unpublished literature from 1990 to April 2017. Randomised controlled trials (RCTs) of WMPs and orlistat with adults with mean/median BMI ≥35 kg/m² and >12 months follow-up were included.
Results: 131 RCTS were included. Few RCTs provided very long-term (>12 months) data or included people from disadvantaged or hard-to-reach groups. Roux-en-Y gastric bypass (RYGB) surgery produced the greatest long-term weight change [mean –20.23 kg, 95% confidence interval (CI) –23.75 to –16.71 kg, at 60 months]. WMPs with very low calorie diets (VLCDs) produced greater loss at 12 months compared with no WMPs. Adding a VLCD to a WMP gave an additional mean weight change of –4.41 kg (95% CI –5.93 to –2.88 kg) at 12 months. The intensive Look AHEAD WMP produced mean long-term weight loss of 6% in people with type 2 diabetes mellitus (at a median of 9.6 years). WMP without VLCDs were improved by including orlistat. Low carbohydrate/higher protein diets and meal replacements led to slightly better weight loss but only at 12 months. Group delivered WMPs were more effective than those delivered individually (mean difference –1.05 kg, 95% CI –2.04 to –0.06 kg) and provision of behavioural and intensive lifestyle therapy, intensive exercise sessions, frequent contact and additional support were also usually associated with better weight management. Weight loss was associated with improvements in cardiovascular risk factors and type 2 diabetes. Evidence for in-person versus remote WMP delivery and WMPs involving support from family members was limited. WMPs that focussed on healthy eating without a prescribed calorie intake or deficit were generally less effective.
Conclusion: RCT evidence demonstrated that long-term weight loss is better achieved with intensive interventions for people with BMI ≥35 kg/m² and is associated with health benefits.

Conflict of Interest: None.

Funding: NIHR HTA Programme.

PO1.244

BMI and risk of obesity-related outcomes in a large UK population-representative cohort: a CPRD/HES study

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Introduction: Overweight and obesity are known to increase the risk of some chronic diseases and cardiovascular events. Risks for individual outcomes across different study populations have been compared through meta-analyses. The present study estimates the risk for 12 outcomes in a single population-representative cohort in the UK.
Methods: This was a retrospective cohort study using Clinical Practice Research Datalink (CPRD) GOLD with linked Hospital Episode Statistics (HES) data between January 1st, 2000 and July 1st, 2018. Inclusion range for BMI was 18.5 to 45, coded in 5 groups 18.5-25kg/m² (reference); 25-30 kg/m²; 30-35 kg/m²; 35-40 kg/m² and 40-45 kg/m². The risk associations with 12 outcomes were estimated using Cox proportional hazard models with age as underlying time variable. Analyses were conducted via both simple models (adjusted for gender and smoking), and advanced models (adjusted also for co-morbidities present at baseline).
Results: The cohort consisted of 2,824,765 subjects with a baseline BMI recorded between 2000 and 2010. Median age and BMI at baseline were 51 years and 26.5 kg/m², respectively, and 57% were female. Hazard ratios (HR) for selected outcomes increased non-linearly: in the highest BMI group HRs [95%CI] for type 2 diabetes (T2D) and sleep apnoea were 12 [12,13] and 22 [21,23], respectively. HRs for all-cause mortality and other outcomes are presented in the Table. When adjusting for baseline co-morbidities, T2D had the strongest risk association with dyslipidaemia, hypertension, and chronic kidney disease (CKD). Hypertension at baseline had the strongest association with dyslipidaemia, CKD, and T2D. History of any cardiovascular (CV) event at baseline doubled the risk of unstable angina/myocardial infarction, stroke/transient ischemic attack, and heart failure.
Conclusion: Higher BMI is associated with higher future risk of serious health outcomes. Comparing BMI risk across a large number of outcomes in the same large population sample suggests that risk levels associated with BMI are different for different outcomes, and particularly high for T2D and sleep apnoea. Furthermore, the risk of outcomes is highly dependent from the set of co-morbidities present at baseline.

Tab. 1.

Outcome	BMI groups				
	18.5-25 (reference)	25-30	30-35	35-40	40-45
Type 2 diabetes	1.0	2.4 [2.4, 2.4]	5.2 [5.1, 5.3]	8.8 [8.6, 9.0]	12 [12, 13]
Sleep apnoea	1.0	2.4 [2.3, 2.6]	5.8 [5.5, 6.1]	12 [11, 13]	22 [21, 23]
Heart failure	1.0	1.2 [1.1, 1.2]	1.7 [1.6, 1.7]	2.5 [2.4, 2.6]	3.7 [3.6, 3.9]
Hypertension	1.0	1.5 [1.5, 1.5]	2.2 [2.2, 2.2]	2.9 [2.9, 2.9]	3.6 [3.6, 3.7]
Dyslipidaemia	1.0	1.5 [1.5, 1.5]	2.0 [2.0, 2.1]	2.6 [2.5, 2.6]	3.1 [3.0, 3.1]
Atrial fibrillation	1.0	1.1 [1.1, 1.1]	1.4 [1.4, 1.5]	1.9 [1.8, 1.9]	2.6 [2.5, 2.7]
All-cause mortality	1.0	0.8 [0.8, 0.8]	0.9 [0.9, 0.9]	1.1 [1.1, 1.1]	1.5 [1.4, 1.5]

PO1.245

Long term analysis of bariatric surgery on outcome and cardiovascular risk factors

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Introduction: Obesity is a leading public health problem in the 21st century (1). Roux en Y gastric bypass (RYGB) presents the most effective surgical method for significant and sustained weight loss in extreme obesity (2). The study examined how surgically induced weight loss is maintained after five years of follow up and how it effects on cardiovascular risk factors.
Methods: This is cross-sectional study with 66 morbidly obese patients (BMI ≥40 kg/m^2 or BMI ≥35 kg/m^2 with present co-morbidities), age 20 to 61 years, mostly women (77.3%) who underwent bariatric surgery, comparing their body mass and co-morbidities prior to and five years after R-en-Y bypass, as well as the global outcome of included patients.
Results: Five year survival rate of morbid obese patients after surgery was 97% presented by Kaplan-Meier analysis. The substantial amount of weight loss (33,73±18,34 kg) after RYGB surgery was seen in 94% patients, while 6% have increased body mass (5,50±2,12 kg) after that period. Reduction of body mass weight was associated with significant reduction of co-morbidities, especially diabetes and sedentary life style ($p = 0.005$, $p < 0.001$ respectively). The number of drugs taken for hypertension treatment was reduced (Fig 1), but number of smokers was increased.
Conclusion: Long term analysis after surgery showed that RYGB is a safe and an effective treatment for morbid obesity. Also substantial decreases in body weight and BMI after surgery were associated with a reduction of cardiovascular risk factors such as diabetes mellitus as well as sedentary life-style.

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Conflict of Interest: None Disclosed.

Funding: None funding.

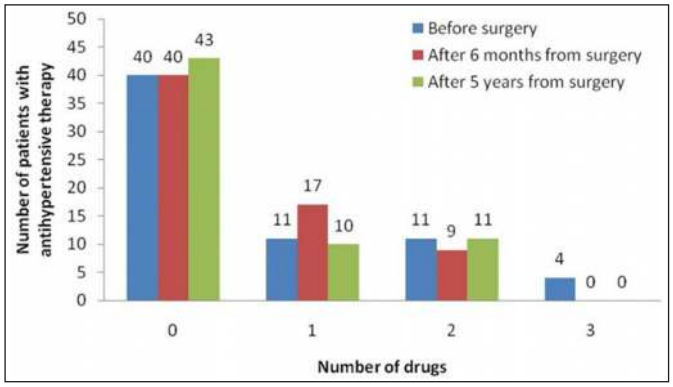

Fig. 1. Number of patients with antihypertensive drug before, six month and five years after bariatric surgery.

PO1.246

Bariatric surgery - 10 years of follow-up

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Introduction: Obesity is a chronic disease associated with multiple complications. Actually, bariatric surgery is the most effective treatment in severe obesity, with an evident reduction of morbidity and mortality of patients. Despite the extensive literature, there are few long-term follow-up studies.
Methods: Retrospective study, based on clinical records of patients undergoing bariatric surgery for 10 or more years, followed in the obesity consultation at the Endocrinology Department – Coimbra Hospital Centre. The following surgery benefits were evaluated: anthropometry, type 2 diabetes mellitus (DM), arterial hypertension and dyslipidemia. Statistical analyses were performed with the use of SPSS version 25.0, with a P value 0,05 indicating statistical significance.
Results: We selected 30 patients with complete follow-up. Mean age: 54.1 years ± 9.1; women percentage: 80%; mean follow-up: 12.2 years ± 1.6. Surgeries performed: 53.3% gastric bypass, 33.3% gastric band, 10% gastric sleeve and 3.3% duodenal-switch. At the preoperative period: mean of body mass index (BMI) - 50.2 kg/m^2 ± 6.9 and mean of fat mass percentage (FM%) - 56.2% ± 11.9. At one-year follow-up there was a decrease in the BMI ($p < 0.001$) and FM% ($p < 0.001$), maintained at five and ten-years follow-up. The percentage of excess weight loss (% EWL) in the first year was 66.0% ± 19.3, at 5 years was 62.0% ± 23.7 and at 10-years follow-up was 55.3% ± 23.0. There was a significant statistical difference between the %EWL at 10-years and one-year follow-up ($p = 0.004$). Weight loss (kilograms) and % EWL were always higher in the gastric bypass versus gastric band. Before surgery, 10% of patients had DM; in the first year - 0%; at 5 and 10 years - 6.6% had DM, with a reduction on diabetic drugs. Regarding arterial hypertension, in the preoperative period 80% of patients had high blood pressure; in the first year - 36.7%; at 5-years follow-up - 40%; at 10-years follow-up - 43.3%. Regarding dyslipidemia, in the preoperative period 76.6% of patients had dyslipidemia; in the first year - 33.3%; at 5-years follow-up - 53.3% and at 10-years follow-up -56.7%. There was a significant reduction on the number of patients with hypertension and dyslipidemia in the long-term follow-up ($p = 0.001$ and $p < 0.001$, respectively). There was also a significant reduction on the number of antihypertensive drugs ($p = 0,007$).
Conclusion: This study demonstrated that the improvement achieved in the anthropometric parameters was maintained in the long-term follow-up. Regarding the metabolic complications, there was also a significant improvement, with partial or total remission.

PO1.247

A two year follow-up study on the success rate of a diet program that is low in sugar, starch, saturated fat and sodium

Poon, P.

Independant

Lifestyle management is the treatment of choice to combat obesity and its related complications. Diet counseling is the main stage of lifestyle management. Exercise, stress management, sleeping hygiene, emotional eating and food addiction counseling are needed in addition to a good diet program to ensure that the diet is maintainable. The diet that was prescribed to the patients should be inexpensive, fulfill the nutritional need, and maintainable. A study was designed to determine the effectiveness of a diet program that is low in sugar, starch, saturated fat and sodium on weight reduction and weight maintenance. Result shows that when patients continue to attend the diet program, they were able to lose 10% of their initial weight on an average of 11 weeks and able to maintain the weight loss after two years. The average weight reduction after 2 years was 13.5%.

Basic and Experimental Science

PO2.001

Pentraxin 3 as a markers of endothelial dysfunction in young women with polycystic ovary syndrome (PCOS)

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Introduction: One of the consequence of PCOS is an increased risk of early development of cardiovascular diseases. Pentraxin-3 (PTX-3) is a new potential markers of endothelial dysfunction. The aim of the study was to assess PTX3 and markers of endothelial dysfunction in PCOS women.
Methods: Study enrolled 99 stable body mass PCOS women (17 normal weight, 21 overweight and 61 obese). Anthropometric measurements, and serum/plasma levels of glucose, insulin, lipids, estradiol, testosterone, sex hormone binding globulin, 17-OH progesterone, free androgen index, pentraxin-3 (PTX3), soluble intercellular (sICAM-1) and vascular cell adhesion molecule 1 (sVCAM-1), endothelin-1 and total nitric oxide metabolites (tNO) concentrations were assessed. Group were divided into tercile-subgroups according to PTX3 serum levels.
Results: Serum PTX3 tercile-subgroups significantly differed in respect to tNO, endothelin-1 and sVCAM-1, but not sICAM-1. The levels of tNO, endothelin-1 and sVCAM-1 were significantly decreased in subgroup with the lowest PTX3 levels than in both middle (tNO and endothelin 1) and upper tercile subgroups (all of them).
There were significant positive correlations between log10(PTX3) and log10(tNO) ($r = 0.34$, $p<0.001$), log10(endothelin-1) ($r = 0.41$, $p<0.001$) as well as sVCAM-1 levels ($r = 0.22$, $p<0.05$).
Conclusion: Circulating PTX-3 levels seem to be a marker of endothelial dysfunction in PCOS women.

PO2.002

The interaction effects of central adiposity, serum uric acid and vitamin D status on the systolic and diastolic blood pressure of adults with diabetes

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Background: diabetic patients with hypertension and visceral adiposity have significantly greater risk of cardiovascular events. Hypovitaminosis D and hyperuricaemia are independently related to the components of metabolic syndrome, including central obesity and hypertension, and possibly are risk factors for cardiovascular morbidity and mortality in patients with diabetes.
Objective: to explore the interaction effects of central adiposity, vitamin D status and uricaemia on systemic blood pressure in adults with diabetes.
Methods: this study analysed the data of 332 diabetic adults from the NHANES 2009-2010. Diabetes (DM) was defined as fasting glucose (FBS) level≥ 7mmol/L. Waist to height ratio (WHtR) was chosen as the measure of central adiposity. The appropriate strata, cluster, and weight statements were used to create a complex sample for analysis in SPSS. A general linear model procedure was conducted to analyse the main and interaction effects of WHtR, serum uric acid, serum vitamin D level on systolic (SBP) and diastolic (DBP) blood pressure, adjusting for age, gender, BMI, serum cholesterol, and urinary albumin levels. Thereafter, two and three-way interactions were explored across low vs high levels of uric acid and WHtR to identify the significant interaction effects.
Results: serum vitamin D2, age, and albuminuria could significantly predict SBP and DBP ($p<0.05$) whereas gender and BMI were significant predictors of SBP ($p<0.01$) and DBP ($p<0.05$), respectively. In addition, interactions of vitamin D2 with WHtR and uric acid showed significant effects on SBP and DBP($p<0.05$). High serum vitamin D2 was significantly associated with high SBP in normouricaemic diabetics ($p<0.01$) with WHtR ≥0.5. This association was negative but non-significant in other subgroups. In contrast, higher levels of vitamin D predicted significantly lower DBP in hyperuricaemic diabetics ($p<0.01$) with WHtR ≥0.5. Negative but non-significant relationships were also observed in other subgroups. In normouricaemic centrally obese subgroup, 10 nmol/L increment in serum vitamin D2 was associated with 3.7 mmHg increment in SBP while in hyperuricaemic centrally obese subgroup, 10 nmol/L rise in serum vitamin D2 was associated with 1.15 mmHg fall in DBP as compared to other subgroups.
Conclusion: The contrasting effects of vitamin D2 on SBP and DBP in diabetic adults depends on their uricaemia and adiposity states. The significant SBP raising effect of vitamin D2 is observed in centrally obese patients with normal uric acid levels whereas its DBP lowering effect becomes significant in centrally obese patients with high uric acid levels. Therefore, anti-hypertensive management of diabetic patients can be modified according to their adiposity, vitamin D and uric acid states.

PO2.003

Sleeve gastrectomy and Roux-en-Y gastric bypass improve hepatic mitochondrial dysfunction in diet-induced obese rats

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Background: Short-term lipid overload in hepatocytes stimulates the mitochondrial activity in order to protect against lipotoxicity. However, long-term metabolic adaptations of hepatic mitochondria are lost in nonalcoholic fatty liver disease (NAFLD) and steatohepatitis (NASH) due to structural, molecular and functional alterations causing a mitochondrial dysfunction. The impact of two bariatric surgery procedures, namely sleeve gastrectomy and Roux-en-Y gastric bypass (RYGB), in the hepatic mitochondrial dysfunction of diet-induced obese (DIO) rats was evaluated.
Material and Methods: Four-week-old male Wistar rats (n = 129) were fed a normal diet (ND) or a high-fat diet (HFD) for 4 months. DIO rats were subjected to surgical [sham surgery, sleeve gastrectomy and RYGB] or dietary interventions [pair-fed to the amount of food eaten by sleeve gastrectomy or RYGB group]. Hepatic mitochondrial dysfunction was determined by the analysis of the OXPHOS protein complexes by Western-blot and the mtDNA content by real-time PCR.
Results: Obesity was associated with lower ($P<0.05$) expression of mitochondrial OXPHOS protein complexes I-V, although mtDNA copy number remained unchanged in liver samples of HFD-fed rats compared to animals fed a ND. Interestingly, sleeve gastrectomy increased the mitochondrial copy number ($P<0.05$), as well as the expression of the OXPHOS complexes I to V ($P<0.05$). RYGB strongly enhanced the mtDNA

content (P<0.05) and only increased the OXPHOS complexes I and II (P<0.05) compared to sham-operated and pair-fed groups.
Conclusion: Our results provide evidence that both sleeve gastrectomy and RYGB improved obesity-associated hepatic mitochondrial dysfunction by increasing mtDNA content as well as the expression of OXPHOS complexes.

Conflict of Interest: None.

Funding: Supported by Fondo de Investigación Sanitaria-FEDER (PI13/01430, PI16/00221 and PI16/01217) from the Instituto de Salud Carlos III. CIBEROBN is an initiative of the Instituto de Salud Carlos III, Spain.

PO2.004

Metabolic fingerprint of insulin resistance in human polymorphonuclear leucocytes

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The state of insulin resistance (IR) that accompanies obesity translates into low grade chronic inflammation and dysfunction of the immune system. In this sense, the study of polymorphonuclears cells (PMN) could be useful, as they are the first ones immune cells that respond to inflammation, and can play a role starting the inflammatory cascade in response to obesity.
Objective: Determine the metabolic profile of PMNs in obese subjects and explore it's possible relationship with the IR.
Material and Methods: Clinical pilot study using PMN of 17 patients with obesity and IR, and 17 controls with normal weight and without IR, which were validated in an additional cohort, consisting of 10 patients and 10 controls. The IR was defined as HOMA-IR greater than 3. The PMN were isolated in peripheral blood extracted after 8 hours of fasting. For the analysis Metabolomic nuclear magnetic resonance was used and 48 metabolites were quantified.
Results: Of all the metabolites analyzed, it was observed that 2-amino-isobutyric acid, has a direct correlation with HOMA-IR (r = 0.61, p = 0.0004), BMI (r = 0.79, p = 0.0000007) and waist circumference (r = 0.75, p = 0.0000002), while the 3-Hydroxyisovalerate had a inverse correlation with the same parameters: HOMA-IR (r = -0.61, p = 0.0003), BMI (r = -0.59 p = 0.0003) and waist circumference (r = -0.67, p = 0.00004). No correlation was obtained with the metabolic profile in plasma.
Conclusion: Our results suggest that 3- hydroxyisovarianate and 2-Aminoisobutyrics represent key biomarkers in PMN of obese patients with IR. Our methodology could be an easy and reliable tool to monitor the effect of various IR treatment strategies.

PO2.005

Pentraxin 3 levels in young women with and without polycystic ovary syndrome (PCOS) in relation to the nutritional status and systemic inflammation

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Introduction: The aim of the study was to assess the associations between PTX3 levels in PCOS and Non-PCOS women in relation to nutritional status and circulating markers of inflammation.
Methods: Study enrolled 99 stable body mass PCOS women (17 normal weight, 21 overweight and 61 obese) and 61 Non-PCOS women (24 normal weight, 19 overweight and 18 obese). Body composition was assessed by bioimpedance and plasma levels of pentraxin-3 (PTX3), tumor necrosis factor - alpha (TNF-alpha), interleukin-6 (IL-6) and monocyte chemoattractant protein 1 (MCP-1) were measured. Homeostatic model assessment of insulin resistance (HOMA-IR) were calculated.
Results: Plasma PTX3, TNF-alpha and IL-6 levels and HOMA-IR were increased in PCOS when compared with Non-PCOS group (3.4 vs. 1.4 ng/mL; 0.97 vs. 0.72 pg/mL; 1.61 vs. 0.73 pg/mL and 3.6 vs. 1.3 p<0.001, respectively). There were positive correlations between log10(PTX3) and log10(BMI), waist circumference and fat percentage as well as log10(HOMA-IR) and free androgen index but negative with log10(Estradiol) levels in PCOS (r = 0.48; r = 0,45; r = 0.53; r = 0.40; r = 0.12 and r = -0.37, respectively). While in Non-PCOS the correlations between log10(PTX3) and log10(BMI), waist circumference and fat percentage, as well as log10(HOMA-IR) were negative (r = -0.38; r = -0.43; r = -0.34 and r = --0.38, respectively). The positive correlations between PTX3 and MPC-1 and log10(IL-6) were shown in PCOS group, only. In multivariate regression analyses, PTX3 levels variability in PCOS group, were proportional to log10(BMI), waist circumference and fat percentage, but inversely related to log10(Estradiol) levels. While in Non-PCOS, PTX3 levels were inversely related to all anthropometric parameters.
Conclusion: Our results show that the decrease in PTX3 levels observed in obese is distorted in PCOS by microinflammation, and possibly dysfunction of stroma adipose tissue and liver steatosis reflected by enhanced insulin resistance.

PO2.006

Relationship between plasma sclerostin levels and nutritional status, insulin resistance and hormonal disturbances in women with and without polycystic ovary syndrome

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Introduction: The aim of this study was to evaluate the circulating sclerostin levels in relation to nutritional status, insulin resistance and hormonal disturbances in PCOS women.
Methods: The cross-sectional study involved 99 PCOS women (17 normal weight, 21 overweight and 61 obese) hospitalized in Department of Endocrinology Gynecology from 2015 to 2018 with stable body mass during last 3-month period. Anthropometric measurements (body mass and height) were performed, and BMI was calculated according to the standard formula. Body composition was assessed by bioimpedance method. In addition concentration of glucose, insulin, estradiol, testosterone, SHBG and sclerostin levels were measured and HOMA-IR, FAI as well as estrsiol/testosterone index were calculated.
Results: Plasma sclerostin levels were significantly higher in obese than in normal weight and overweight subgroups (0.61 vs. 0.49 ng/mL, $p<0.001$ and 0.61 vs. 0.53 ng/mL, $p<0.01$, respectively). The study group was also divided to subroups in accordance to median of HOMA-IR values. Plasma sclerostin levels were significantly higher in subgroup with HOMA-IR values over median (0.65 vs. 0.52 ng/mL, $p<0.001$). There were significant positive correlation between plasma sclerostin levels and BMI, percentage of body fat and HOMA-IR values ($r = 0.40$, $p<0.001$; $r = 0.40$, $p<0.001$ and $r = 0.34$, $p<0.001$, respectively).
Conclusion: Circulating slerostin levels in PCOS women is related to nutritional status and insulin resistance but not to hormonal disturbances.

PO2.007

Low adiponectin levels and higher plasminogen activator inhibitor-1 and C-reactive protein levels at baseline predict higher risk of the central obesity in a Chinese population over six years of follow-up

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Objective: This study was aimed to examine whether the baseline levels of adiponectin (ADI) and inlammation makers including plasminogen activator inhibitor-1 (PAI-1), C-reactive protein (CRP), interleukin-6 (IL-6), and soluble tumour necrosis factor α-receptor 2 (TNF-αR2) at baseline were associated with the risk of incident central obsity over six years of follow-up.
Methods: A total of 1,172 participants with normal weight from Study on the Nutrition and Health of Aging Population in China, a population-based cohort study of 3289 Chinese individuals aged 50–70 years in Beijing and Shanghai were included in this study, and 253 of them developed the central obesity during 6 y of follow-up. Body mass index (BMI) was calculated as weight (kg)/[height (m)]^2. The Central obesity was diagnosized according to the WHO Asian-specific threshold for abdominal obesity (90 cm for menand 80 cm for women). Measurements of plasma levels of adiponectin and Inflammatory markers were carried out by following standardized protocols.
Results: Lower ADI levels and higher PAI-1 and CRP levels at baseline were significantly associated righer risk of incident central obesity during the six years of follow-up ($P< 0.007$). Comparing with the lowest quartiles, the relative risks (95% confidence interval) of the central obesity in the highest quartiles were 0.55 (95% CI [0.40, 0.76]; P-trend<0.001), 1.95 (95% CI [1.40, 2.72]; P-trend < 0.001), and 1.73 (95% CI [1.23,2.42]; P-trend = 0.015), respectively, for plams levels of ADI, PAI-1 and CRP after adjussting for age, sex, region, and residence. The results remained largely unchanged with further adjustment for physical activity, education, smoking, drinking and family history of choric diseases. However, no association was observed between plasma levels of IL-6 and TNF-αR2 and risk of the incident central obesity ($P>0.361$).
Conclusion: Plasma levels of adiponectin, plasminogen activator inhibitor-1 and C-reactive protein predict the relative risks of central obesity after adjustment for traditional risk factors in a population-based cohort study over six years of follow up.

PO2.008

Liver fat and adipocyte hypertrophy contribute to the relationship between iron storage and cholesterol levels

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Introduction: Higher serum ferritin concentration, a marker of iron storage, is linked to obesity and dyslipidemia. Animal studies suggest that iron overload leads to increased liver cholesterol synthesis and hypertrophic adipocytes that are prone to cholesterol imbalance. However, human evidence for these associations is limited.
Methods: In a cross-sectional study 115 healthy subjects (42 males, 73 females) with a wide age and BMI range (15-81 y, BMI 18-43 kg/m^2) parameters of iron metabolism and cardiometabolic risk factors were investigated. Total, visceral and subcutaneous adipose tissue (AT, VAT, SAT) distribution was measured by whole body magnetic resonance imaging (MRI) and liver fat by Dixon-MRI. As a measure of adipocyte size, lipid storage of AT was assessed by the ratio of total fat mass (FM, determined by air-displacement plethysmography) to total AT volume (MRI).
Results: In males and females, serum ferritin correlated with liver fat ($r = 0.63$ and $r = 0.30$, both $p<0.05$), lipid storage of AT ($r = 0.31$ and $r = 0.25$, both $p<0.05$) and VAT ($r = 0.35$, $p<0.01$ in males only) as well as with total cholesterol ($r = 0.49$ and $r = 0.38$, both $p<0.01$) and LDL-cholesterol ($r = 0.47$ and $r = 0.35$, both $p<0.01$) but not with SAT, FMI, triglycerides, HDL, CRP or HOMA-IR. Total and LDL-cholesterol correlated with lipid storage of AT (both $r = 0.56$ in males and $r = 0.25$ in females, all $p<0.05$) and liver fat ($r = 0.39$ and $r = 0.41$ in females, both $p<0.01$), whereas in both sexes liver fat content was not related to lipid storage.
In conclusion, the relationships between ferritin and liver fat or lipid content in adipose tissue support the hypothesis that excessive iron storage in the liver and adipose tissue may increase cholesterol synthesis and ectopic fat in the liver or cholesterol efflux from hypertrophic adipocytes.

Conflict of Interest: None Disclosed.

Funding: No funding.

PO2.009

Myo-inositol supplementation during lactation in rats protects against the development of insulin resistance caused by a mild gestational calorie restriction

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Introduction: Maternal calorie restriction during gestation has detrimental health effects in the offspring, programming greater susceptibility to metabolic syndrome-related alterations in adulthood, such as insulin resistance. Breast milk has bioactive compounds with potential programming effects that may also be determinant of future metabolic health, potentially reversing malprogrammed processes caused by adverse gestational conditions. Among them, myo-inositol may be of interest since supplementation with this compound in adult rats has been reported to improve insulin sensitivity and glucose uptake. Therefore, the aim of the present study was to assess the effects of the supplementation with physiological doses of myo-inositol during lactation in rats on metabolic parameters, as well as its potential to revers metabolic alterations associated with a mild gestational calorie restriction.
Methods: Male and female offspring of control and 25% calorie-restricted (CR) rats were supplemented with physiological doses of myo-inositol or the corresponding vehicle throughout lactation. After weaning, pups were fed with a standard diet until 5 months of age, and then were moved to a high fat and high sucrose (western) diet until 7 months of age. Plasma levels of triacylglycerides, insulin, glucose, and leptin were

measured, and insulin resistance index (HOMA-IR) was calculated at 7 months of age.
Results: Male offspring subjected to maternal calorie restriction during gestation and exposed to western diet in adulthood showed higher HOMA-IR than controls. However, rats of both control and CR groups treated with myo-inositol during lactation displayed lower HOMA-IR values and reduced levels of fasting insulin and triacylglycerides than their respective controls. No significant differences between groups were found regarding leptin levels, but animals supplemented with myo-inositol showed a non-significant trend to lower leptin levels than controls. No differences between groups were found in females.
Conclusion: Myo-inositol supplementation at physiological doses during lactation in male rats may prevent the programmed trend to insulin resistance in adulthood acquired by inadequate fetal nutrition and exacerbated by a diabetogenic diet in adulthood.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Spanish Government: AGL2015-67019-P (MINECO/FEDER, EU).

PO2.010

Investigation of the central and peripheral serotonergic system in the obese phenotype of the adult mice offspring exposed early to maternal high-fat diet

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Introduction: Central and peripheral serotonin (5-hydroxytryptamine [5-HT]) is involved in energy homeostasis, food intake, body weight control and pathophysiology of obesity. Thus, the present study investigated a possible association between the serotonergic system in the hypothalamus and adipose tissue with the obese phenotype in adult mice offspring exposed early to the maternal high-fat diet (HFD).
Methods: Female Swiss mice were fed a control diet (CD – 14.7% fat) or HFD (45.0% fat) throughout pre-mating until suckling. After weaning the offspring received standard chow until 70 postnatal days of age. Body weight and adiposity of mothers and offspring were measured and blood was collected for biochemical analysis. Expression of the 5-HT synthesis enzyme, tryptophan hydroxylase 2 (TPH2), serotonin transporter (SERT) and 5-HT1A receptor were evaluated in the hypothalamus (mothers and offspring) and white adipose tissue (offspring only).
Results: The findings show that HFD dams (before mating, $P<0.0001$ and during pregnancy, $P = 0.0008$) and adult offspring ($P = 0.0005$) exhibit increased body weight gain and adipose tissue ($P = 0.0106$ and $P = 0.0025$, gonadal and retroperitoneal respectively for dams; $P = 0.0009$ and $P <0.0001$, gonadal and retroperitoneal respectively for offspring). The HFD offspring also showed increase LDL-cholesterol ($P = 0.0228$) producing an obese phenotype. However, the maternal hypothalamic serotonergic system did not change. On the other hand, HFD offspring presented significant increase in the protein expression of the 5-HT1A receptor in the hypothalamus ($P = 0.0005$) and also tendencies to increase of the protein expression of the hypothalamic TPH2 enzyme ($P = 0.0599$) and reduction in the expression of SERT in white adipose tissue ($P = 0.0542$).
Conclusion: These findings suggest that serotonergic systems in the hypothalamus and white adipose tissue appear to be involved in the obese phenotype of adult offspring mice exposed to maternal HFD during pregnancy and suckling. So, the central and peripheral serotonin play role important in molecular and cellular processes related to energy homeostasis.

PO2.011

Effect of oxidized-LDL on adipocyte metabolism

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Introduction: Oxidized LDL (oxLDL) correlates with most of the proatherogenic risk factors including obesity and type 2 diabetes. OxLDL can be captured by the adipocyte and modify its metabolism. However, there aren't many researches in human on the regulation that oxLDL might have on the adipose tissue metabolism. The aim of this study was to analyze in vitro the effect of oxLDL on different scavenger receptors (SR) and inflammation markers in adipocytes.
Methods: mRNA gene expression of scavenger receptors LOX-1, MSR1, CL-P1 and CXCL16, as well as IL6 and TNF-α were studied in differenced adipocytes (DA) of visceral adipose tissue (VAT) from 10 non-obese and morbility obese (MO) patients incubated with different concentrations of oxLDL.
Results: Incubations of adipocytes with different concentrations of oxLDL produced a significant increase in esterified cholesterol levels, with a dose-response expression. OxLDL produced a significant increase dose-response in TNF-α and IL6 mRNA gene expression in non-obese and MO patients. OxLDL also showed a significant increase in LOX-1, MSR1, CL-P1 and CXCL16 mRNA gene expression both in non-obese and MO patients.
Conclusion: We demonstrate that oxLDL has an effect on adipocyte metabolism, producing and increase dose-response in TNF-α and IL6, as well as SR LOX-1, MSR1, CL-P1 and CXCL16 mRNA gene expression.

Conflict of Interest: None Disclosed.

Funding: This work was supported in part by a grant from the Instituto de Salud Carlos III (CP13/00188) and has been co-funded by FEDER funds.

PO2.012

The hyperloop way to metabolic syndrome

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Childhood obesity has long-term health consequences, including strong tracking of obesity and related facilitator into adulthood associated with short- and long-term health consequences. This underscores the relevance for evaluation of the food systems and environment, opportunities to exercise, as well as continued efforts on Body mass index (BMI) surveillance, early detection and effective interventions of obesity and related health problems. A greater understanding of the relative importance of environmental and biological factors in the development and persistence of childhood obesity will help us in effectively minimise this epidemic problem. Obesity can lead to a variety of diseases such as hypertension, hypertriglyceridemia, hypercholesterolemia and high glucose level. These diseases are called metabolic syndrome.

Metabolic syndrome is characterized by a group of metabolic risk factors which include abdominal obesity, atherogenic dyslipidemia, elevated blood pressure, and insulin resistance or glucose intolerance. The aim of this study was to examine the prevalence of metabolic syndrome among female school children and adolescents. A cross-sectional study was conducted among 1356 female school children and adolescents between the age of 6 to 18 years. Body mass index, waist circumference, blood glucose level, lipid profile, and arterial blood pressure were determined. Criteria of ATP III were used to diagnose metabolic syndrome among participants. Among 1356 female school children and adolescents aged 6-18 years, 15.2% were overweight and 15.3% were obese. The prevalence of metabolic syndrome was 17.11% overall, 62.02% in obese and 50% in overweight participants. An enormous population of Saudi children and adolescents particularly females are potential to develop metabolic syndrome. We recommend a national obesity prevention program at community level to be implemented to promote leaner and consequently healthier community; Weight reduction program, lifestyle modification, and screening for risk factors of metabolic syndrome should be given rather special consideration.

PO2.013

Mitochondrial dysfunction and oxidative stress induced by palmitate in human muscle cell

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Skeletal muscles are known for their support and movement roles, but they also mainly contribute to heat production, body metabolism and energy production. The muscle energy majority results from the mitochondrial oxidative phosphorylation. Obesity and associated complications such as diabetes or cardiovascular diseases affect negatively skeletal muscles with structure disorganization and metabolic dysfunctions. Oxidative stress has been considered as a trigger of muscle dysfunction, insulin resistance and muscle atrophy. It is well established that reactive oxygen species (ROS) are mainly produced by mitochondria. Therefore, our study investigated the effects of palmitate (PA) on mitochondrial morphology and function in human skeletal muscle cells during proliferation and differentiation. The effect of 24h PA (0.3 mM) treatment on cell viability, mitochondria activity, morphology and ultrastructure was investigated. We also investigated the balance between ROS production and antioxidant response. PA incubation caused a significant increase of mitochondrial superoxide both in myoblast.st and differentiated myotubes. This was concomitant to mitochondrial swelling and disorganization, disrupting the inner mitochondrial membrane. Interestingly, nuclear translocation of NRF2 was observed along with the increase of some specific antioxidative targets, such as catalase, SOD, GSR or NqO1. In conclusion, PA treatment on human skeletal muscle cells at a dose of 0.3 mM induces a lipotoxic response showing severe damages such as disorganization/disruption of mitochondria and increase of superoxide production. However, human muscle cells may try to compensate by promoting the NRF2-induced anti-oxidant response. Further studies will answer whether this compensatory response is sufficient to restore a normal muscle function.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by F.R.S.-FNRS (Belgium).

PO2.014

Intranasal administration of GALP reduces body weight and hepatic lipids accumulation

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Introduction: Galanin-like peptide (GALP), a 60-amino acid neuropeptide that was originally isolated from porcine hypothalamic extracts and is well known as a neuropeptide regulating feeding behavior and energy metabolism. It has been reported that the uptake of GALP by the brain is higher after intranasal administration than with intravenous injection. In this study therefore aimed to clarify the effect of intranasal administration of GALP on the obese mice.
Methods: Mice were fed a high fat diet to induce obesity and were intranasal administrated of GALP (4nmol) for 2 week. Then, we studied plasma lipids and hepatic lipid metabolism related gene expression by use of real-time quantitatively PCR analysis.
Results: Body weight gain was decreased by the GALP treatment compared to the control group. Lipid droplet levels in hepatocytes and hepatic triglyceride levels were decreased in the GALP group compared with the vehicle group, whereas hepatic fatty acid β-oxidation-related gene mRNA levels were increased in the GALP group.
Conclusion: The present study indicates that intranasal administration of GALP has an inhibitory effect on lipid accumulation in the liver.

PO2.015

Anthropometric predictors of distal neuropathy in diabetic adults

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Introduction
Background: Peripheral neuropathy is the most frequent microvascular outcome of diabetes. Among the underlying factors, obesity has been shown to be an independent predictor of the early diabetic neuropathy. It is also a known risk factor for nociceptive and neuropathic pain.
Objective: To investigate the differential contribution of various anthropometric indices to monofilament insensitivity affecting the distal lower extremity.
Methods: This study used the data of 383 diabetic adults from the NHANES 2002-2003. Peripheral neuropathy was defined as one or more areas per foot insensitive to the Semmes-Weinstein 10-g monofilament. Anthropometric variables were BMI, waist circumference (WC), arm circumference(AC), Calf Circumference (CC), Thigh Circumference (TC), waist to height ratio(WHtR), and waist to calf ratio(W/C). The study population was divided into those with and without peripheral neuropathy. Mann-Whitney U test was performed to compare the anthropometric measurements between the two groups. A negative binomial regression was used to examine the contribution of the adiposity measures to the incidence rate ratio of the insensitive sites at the lower leg.
Results: In total, BMI, WC, WHtR, and W/C were significantly higher in the individuals with peripheral neuropathy($p<0.01$). Diabetics with peripheral neuropathy had significantly higher WC (110 vs 104 cm, $p = 0.002$) and CC (38.6 vs 37.5 cm, $p = 0.039$) than those with peripherally sensitive nerves. In contrast, W/C was the only measure which differed significantly between neuropathic and non-neuropathic individuals with prediabetes (3.0 vs 2.7, $p = 0.002$). Generalized linear model adjusted for

age, gender, diabetes duration, and haemoglobin A1C demonstrated an independently significant association between adiposity and peripheral neuropathy. In diabetic individuals, the number of insensate areas per foot rose by 5 and 8% per unit increase in WC and CC while there was about 11% fall in the incidence rate of insensitive sites. In contrast, WC was the only significant anthropometric predictor of peripheral neuropathy in prediabetics (incidence rate ratio(IRR) = 1.11, p<0.05). No significant relationship was found between adiposity and distal neuropathy in non-diabetic individuals.
Conclusion: Excessive body fat may be an independent risk factor for the development and progression of distal neuropathy in patients with hyperglycaemia.

PO2.016

Cold water ingestion was able to favorably affect body composition of Sprague-Dawley rats

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Introduction: Human bodies are known to adapt to external variations in temperature by various ways including alterations in energy intake and expenditure, as well as body fat storage for insulation (1-2). However, it is not clear whether changes in internal temperature will induce similar changes. Thus, a study was conducted to investigate the effect of cold water ingestion on body composition and energy intake of male Sprague-Dawley rats.
Methods: Eighteen six-week old male Sprague Dawley rats were individually housed (22±1°C, inverse light cycle 12:12h dark/light cycle, light off at 10:00 a.m.), adapted to the diet and environment for one week, and then randomly divided into two equal experimental groups. They had free access to food and drinking water for 8 weeks, in which one group received room temperature water (NW) while the other received cold water (CW; ~5°C). Food and water intake, as well as body weight and composition (NMR minispec LF110 BCA analyzer, Brucker, MA, USA) were monitored twice per week. Average weekly data were presented, analyzed for the effect of time, water temperature or combination using two-way analysis of variance. The study was approved by the Institutional Animal Care and Use Committee (IACUC) of the American University of Beirut (AUB).
Results: Body weight, lean body mass and fat mass increased with time. The increase in body weight was similar between the groups (Figure 1A), while the increase in lean body mass was significantly higher in the cold water groups (p<0.001) as compared to the NW group (Figure 1B), in contrast the increase in fat mass was significantly lower in the cold water group(p<0.001) (Figure 1C). Moreover, no significant changes were detected in average energy intake (NW 89.97±7.63 kcal/d vs. CW 93.29±6.26 kcal/d, p = 0.329), while calculated total energy expenditure was found to be significantly (p = 0.003) higher in the cold water group (NW: 66.73±4.49 kcal/d vs CW: 73.75±3.92 kcal/d).
Figure 1. Body weight (g)(A), lean body mass (g)(B) and fat mass (g)(C) changes over the 8 weeks experimental period.
Conclusion: Maintaining rats on cold drinking water was associated with a decrease in body fat and increase in lean body mass with no alteration in total body weight. The changes in the cold water group were associated with an increase in energy expenditure, that seems to favor fat oxidation, and such increase may have been the cost of warming the water to body temperature.

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Conflict of Interest: None Disclosed.

Funding: No funding.

PO2.017

Seed and peel lychee flours did not protect the oxidative and contractile damage in obese diabetic

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Introduction: Overweight and obesity are important risk factors for the development of type 2 diabetes. Excess weight associated to type 2 diabetes mellitus promotes high risk for the development of cardiovascular diseases. Although the literature suggests that oxidative stress is related to diabetic cardiomyopathy, the mechanism of generation of reactive oxygen species is still not well understood. Thus, studies have shown that both the extract and flour of lychee peel and seed are rich in phenolic antioxidant compounds.
Objective: To evaluate the flour consumption of seed and peel lychee on oxidative stress, metabolic and cardiomyocyte contractile function in diabetic obese rats.
Methodology: Male Wistar rats were submitted to obesity condition by high-fat diet, and subsequently induced to type 2 Diabetes Mellitus. Then, the animals were randomized into groups: Obese (Ob, n = 10), Diabetic obese (ObD, n = 8), Diabetic obese treated with lychee peel flour (ObDPF, n = 10) and Diabetic obese treated with lychee seed flour (ObDSF, n = 10). Nutritional and glycemic profiles, water content of lung and liver, pancreas weight, and serum oxidative stress parameters were performed. Furthermore, the total weight of the heart and its relation to tibia length were analyzed. Cardiomyocytes contractile function was assayed. The level of significance was 5%.
Results: ObD presented lower body weight, fat pads and pancreas weight in relation to Ob, on the other hand, there was enhanced of protein carbonylation and superoxide dismutase levels. In addition, ObD presented higher systolic Ca2+ with percentage elevation of shortening; in contrast, there was greater time to peak 50% shortening. Although ObD rats presented higher maximal velocity of relaxation, there was elevation of diastolic Ca2+ levels and greater time to peak 50% recapture. The treatments with flour of seed and peel lychee did not able to change body and morphologic parameters, and biomarkers of oxidative stress in ObD. The ObDPF triggered elevation time to peak 50% shortening compared to ObD rats, without modifications in relaxation contractile parameters. However, the ObDSF presented reduction of percentual and maximal velocity of shortening with consequently increased in time to peak 50% shortening in relation to ObD. In addition, the results showed that ObDSF presented lower maximal velocity of relaxation in relation to ObDPF with concomitant to higher time to peak 50% recapture.
Conclusion: The flour of seed and peel lychee did not revert the oxidative damage and the contractile injury in cardiomyocytes of obese rats induced to diabetes. In addition, the flour of seed lychee accentuated the contractile dysfunction without changes in intracellular Ca2+ handling.

PO2.018

fT3 levels are positively associated with liver fat and inversely with lipid content of adipose tissue

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Introduction: Free triiodothyronine (fT3) levels were found to be positively associated with non-alcoholic fatty liver disease (NAFLD) in euthyroid middle-aged subjects. Enhanced thyroid hormone-mediated increase of epinephrine-induced lipolysis in subcutaneous adipose tissue might explain this relationship by increasing the lipid load for the liver.

Methods: In a cross-sectional study in 311 healthy euthyroid adults (168 women, 143 men, age 18-78 y, BMI 17-45 kg/m^2) thyroid hormones were measured. Total, visceral and subcutaneous adipose tissues (AT, VAT, SAT) were assessed by whole body magnetic resonance imaging (MRI) and liver fat was measured in a subgroup of women by Dixon-MRI. As a measure of adipocyte size, lipid content of AT was assessed by the ratio of total fat mass (FM, determined by air-displacement plethysmography) to total AT volume (MRI).
Results: fT3 levels inversely correlated with lipid content of AT (r = -0.53 in men and r = -0.34 in women, both p<0.001) as well as with SAT at the legs and the trunk (r = -0.35 and -0.28 in men and r = -0.17 and -0.18 in women). These correlations persisted after adjusting for age and fat mass index. No correlations were found between fT3 and FMI or VAT. In a subgroup of 50 women liver fat was measured and was positively associated with fT3 levels (r = 0.38, p<0.01).
In conclusion, the association between higher fT3 levels and lower lipid content of adipose tissue supports the hypothesis that the correlation between fT3 levels and liver fat may be caused by increased thyroid hormone-induced lipolysis.

Conflict of Interest: None Disclosed.

Funding: No funding.

PO2.019

Features of postnatal growth from birth to age 1 year in infants born to obese mothers

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Introduction: Children born to obese mothers are more likely to have increased rates of physical development. Children born to obese mothers are more likely to have increased rates of physical development.
Methods: The prospective study includes 18 infants, whose mothers were obese before and during pregnancy (group 1) and 18 children from mothers with normal BMI during pregnancy (group 2). Height, weight, the IGF-1 and GH in blood were measured at birth, 3, 6 and 12 months of age.
Results: The birth growth (47.78 ± 4.43 cm and 49.44 ± 3.25 cm) and weight (2677.22 ± 580.56 g. and 2923.06 ± 458.98 g), and also at 3 and 6 months did not had significant differences in both groups. At the age of 1 year, in group 1, weight (10435.77 ± 250.13 g. and 9730.06 ± 232.43 g, p <0.05) and height (76.28 ± 2.46 cm and 72.48 ± 2.31 cm, p <0.05) were greater than the group 2. IGF-1 indicators (128.71 ± 21.33 and 74.29 ± 15.21 units, p <0.05) and STG (4.3 ± 1.5 and 1.84 ± 0.36 units, p <0.05) were also higher in children of 1 group at the age of 1 year.
Conclusion: We suppose, that these changes of "GH - IGF-1" axis in 12 months in infants born to obese mothers are the mechanisms, which promote the postnatal growth.

PO2.020

The ingestion of green tea extract associated with high-fat diet: dose response on glucose metabolism in Swiss mice adult

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Introduction: The aim of this study was to analyze whether the consumption of different concentrations of green tea extract was able to induce a protective role on glucose metabolism in mice adults treated with high-fat diet.
Methods: Swiss mice were divided in five groups, and received the following diets for 10 weeks: control diet (C group), control diet with 1% green tea extract (CE-1 group), high-fat diet (H group), high-fat diet with 1% green tea extract (HE-1 group) or high-fat diet associated with 3% green tea extract (HE-3 group). The animals received free access to water and diet. Statistical analysis was performed by two-way ANOVA and p<0.05 was considered for significant difference.
Results: The high-fat diet promoted increased in body weight at the fourth week of treatment. Basal glucose, oral glucose tolerance test (OGTT) at 15 and 30 minutes and AUC were also increased when compared to C group. In contrast, the HE-3 group decreased body weight at 1 th,2 th,3 th,4 th,9 th and 10th weeks of treatment. Basal glucose, OGTT at 15 and 30 minutes and AUC were also decreased when compared to H group. HE-1 group decreased body weight in the first week and glucose levels compared to H group. The CE-1 group did not show significant differences when compared to C group.
Conclusion: The consumption of high-fat diet promoted alteration in glucose metabolism, reversed by green tea extract. Nevertheless, the effect of the green tea extract on glucose metabolism is dependent of the type of diet and concentration of green tea, as our results have shown that the consumption of 1% green tea extract associated with control or high-fat diet was not able to promote any alterations. However, the consumption of 3% green tea extract was able to promote this protective role and reverse a possible insulin resistance.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by FAPESP nº:2017/13108-5 and CAPES.

PO2.021

Changes in DNA oxidation and telomere integrity after pistachio consumption: a crossover randomized clinical trial

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Background: Telomere attrition may play an important role in the pathogenesis and severity of type 2 diabetes (T2D) increasing the probability of beta-cell senescence, leading to reduced cell mass, and decreased insulin secretion. Nutrition and lifestyle are known factors modulating the aging process and the insulin resistance/secretion, determining and increasing the risk of T2D.
Objective: To evaluate the effects of pistachio intake on telomere length and other cellular aging-related parameters related to glucose and insulin metabolism.
Methods: Forty-nine pre-diabetic subjects were included in a randomized crossover clinical trial. Subjects consumed a pistachio-supplemented diet (PD, 50 % carbohydrates, 33 % fat, including 57 g/day of pistachios) and an isocaloric control diet (CD, 55 % carbohydrates and 30 % fat) for 4 months each, separated by a 2-week washout period. DNA oxidation was evaluated by DNA damage (8-OH-dG). Leucocyte telomere length (LTL) and gene expression related to either oxidation, telomere maintenance or glucose and insulin metabolism, were analyzed by quantitative RT-PCR after the dietary intervention.
Results: Pistachio intake reduces oxidative damage to DNA, showing a significant lower effect after the PD period compared to CD period. Compared to the CD, gene expression of several telomere related genes (TERT, WRAP53) was significant higher after the PD [(P<0.043 and P<0.001) respectively]. Interestingly, changes in TERT expression were positively correlated with changes in fasting plasma glucose levels, and homeostatic model assessment of insulin resistance (HOMA-IR).
Conclusion: Chronic pistachio consumption reduces oxidative damage to DNA and increases the gene expression of several telomere-associated genes. Improving oxidative damage to DNA and telomerase expression by

diet, may represent an intriguing way to promote health-span in humans, reversing certain metabolic deleterious consequences of pre-diabetes.

Conflict of Interest: JS-S is a non-paid member of the Scientific Committee of the International Nut and Dried Fruit Foundation. He has received grants/research support from the American Pistachio Growers and International Nut and Dried Fruit Foundation through his Institution. He has received honoraria from Nuts for Life.

Funding: Western Pistachio Association (USA) and Paramount. The study was funded by the Spanish Ministry of Science, Innovation and Universities, (RYC-2013-12598), the Navarra Government (PI 54/2009), PIUNA and CIBERobn (project CIBER, CB06/03).

PO2.022

The effect of high-fat diet and retinoic acid application on oxidative stress, inflammation and insulin resistance in Lewis rats

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Introduction: Long term high-fat diet (HFD) results in gain of body weight, adiposity, and inflammation in the organism. As the main causes of obesity, along with the genetic predisposition of individuals, there is also an overdose of food intake and insufficient energy consumption. Obesity is manifested in increased body mass, elevated levels of free fatty acids (FFS) in the blood, chronic systemic inflammation in the body and excessive production of free radicals, most important of which are the superoxide anion (O2-), hydrogen peroxide (H2O2) and reactive nitrogen species (RNS), often accompanied with insulin resistance which can lead to the development of numerous metabolic and cardiovascular diseases. Adipose tissue is not only a tissue that storages lipid acids and triacylglycerol, but also tissue that secretes biologically active supstances and hormons that interfere inflammatory response in the organism. Obesity is accompanied with increased production of proinflammatory cytokines, reduced serum level of antidiabetic and anti inflammatory adiponectin and increased level of leptin, increased macrofage infiltration in adipose tissue, especially M1 subpopulation that induces insulin resistance by secreting proinflammatory cytokines, such as TNFα. Retinoic acid has inhibitorry effect on adipogenesis.
Methods: Analysis includeded 80 Wistar rats from Department of Animal Physiology Zagreb breeding. Half of the animals were fed high fat diet (HFD, 45% saturated fatty acid) and half standard laboratory diet (STD) during 30 days. 13 – cis retinoic acid (13cRA) was applied orally to 12 – 16 animals from each group in the concentration of 7.5 mg/kg and 15 mg/kg on a daily basis during 30 days, to the control animals destilated water was applied. After sacrifice, serum for haematological, biochemical analyses, inflammatory cytokines, leptin and adiponectin concentration were taken. Also, liver and kidney were stored for oxidative stress analysis (glutathione, lipid peroxidation and catalase activity).
Results: HFD feeding caused hyperlipidemia and insulin resistance, and worsened liver and kidney functions. HFD feeding also potentiated inflammation and oxidative stress while 13 cRA has a protective effect. HFD feeding and 13cRA affected biochemical parameters in serum of Lewis rats.
Conclusion: According to the the present results, we surmised that 13cRA can prevent HFD-induced inflammation and oxidative stress, and may be useful in the prevention of hyperlipidemia-associated inflammation and oxidative stress.

PO2.023

Probiotic *Bifidobacterium animalis* ssp. *lactis* 420 for metabolic health

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Introduction: Obesity is a top global health concern, and the gut microbiota and energy balance are interlinked. *Bifidobacterium animalis* ssp. *lactis* 420 (B420) consumed with or without fiber polydextrose (PDX) offers a promising candidate to be utilized in the combat against obesity epidemic.
Methods: The efficacy of B420 on metabolic health has been studied for a decade in preclinical studies *in vitro*, in obesogenic mice, as well as in a clinical trial studying the efficacy of B420 (10^{10} cfu/day) with or without PDX (12 g) on the body composition and metabolic health outcomes in healthy overweight and obese adults (n = 225) following their habitual lifestyle in a 6 months intervention (registered in Clinicaltrials.gov: NCT01978691).
Results: In mice, B420 with or without PDX has shown benefits in weight management and metabolic health by reducing weight gain, reducing glucose levels and improving insulin sensitivity[1] [2]. In a clinical trial, body fat mass was controlled (compared to placebo), mostly in the abdominal region. Body fat mass results were associated with serum zonulin levels[3], supporting the earlier in vitro findings on B420 enhancing the epithelial integrity[4]. Further, B420 alone and with PDX modified gut microbiota increasing the abundance of bacteria associated with a lean phenotype such as *Akkermansia* spp., *Christensenellaceae* spp compared to baseline[5].
Conclusion: Both preclinical and clinical data suggests that B420 is a potential candidate in metabolic health and especially in weight management through its capability to reduce intestinal permeability and to modulate gut microbiota composition leading possibly to subsequential slow down of detrimental processes associated to endotoxemia and low-grade inflammation.

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PO2.024

Benefits of dietary weight loss intervention on unfolded protein response, inflammatory pathways and mitochondrial dysfunction in leukocytes of obese patients

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Introduction: Obesity is a chronic metabolic disease characterized by nutrient overload leading to intracellular stress responses such us endoplasmic reticulum (ER) stress and mitochondrial dysfunction. Subsequently, chronic activation of the unfolded protein response (UPR) by the ER and increased production of mitochondrial reactive oxygen species (mROS) disrupt cell homeostasis and are considered key mechanisms underlying metabolic disturbances in obesity, including systemic inflammation, insulin resistance and dyslipidemia. Whether weight loss would modulate these mechanisms in human leukocytes is a question yet to be answered.
Methods: Sixty four obese subjects underwent a dietary program during 6 months consisting of 6 weeks of a very-low-calorie diet (VLCD) followed by 18 weeks of hypocaloric diet. Blood samples were drawn and anthropometrical measurements were evaluated at baseline and after 6 months. Changes in biochemical and inflammatory parameters were evaluated in serum. Leukocytes fraction was isolated to asses differential expression of UPR and inflammatory markers, and antioxidant glutathione peroxidase 1 (GPX1) by WB or RT-PCR. Fluorescence microscopy was used for

mROS, mitochondrial membrane potential and cytosolic Ca2+ determinations.
Results: Moderate weight loss ~8.85% was accompanied by a reduction in fasting glucose, A1c, insulin, HOMA-IR, triglycerides and increased HDLc levels. Chronic inflammation was reduced, since serum hsCRP and TNFα levels decline in parallel with activated JNK in leukocytes, whereas up-regulation of antiinflammatory Sirtuin 1 was detected. Furthermore, drop in proapoptotic ATF6-CHOP expression, decrease in cytosolic Ca2+ content and rise in chaperone GRP78 levels suggested an amelioration of chronic UPR pathways and enhanced ER protein folding capacity. Likewise, weight loss reduced mitochondrial membrane potential and mROS production and induced GPX1 expression, which may be positively balancing redox status.
Conclusion: Improvements in cardiometabolic outcomes after dietary intervention were mirrored by enhanced ER and mitochondrial function, as suggested by the reduction in apoptotic response and oxidative stress. Moreover, moderate weight loss seemed to be favouring antiinflammatory and antioxidant responses and restoring Ca2+ distribution within the cell, thus improving overall intracellular homeostasis. These results provide vital new insights into the *in vivo* modulation of organelle function in obesity, pointing to novel therapeutic targets for managing obesity-related metabolic alterations.

Conflict of Interest: The authors declare no conflict of interest.

Funding: ISCIII (FI14/00350, FI17/00144, FI17/00126, FI14/00125, PI16/00301, PI16/01083), ERDF "A way to build Europe".

PO2.025

LPL-HindIII polymorphism effect on visceral obesity associated metabolic syndrome in combination with PPARG2-P12A, sedentary lifestyle and stress

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Introduction: Lipoprotein lipase (LPL), crucial for lipid homeostasis and energy balance playing an essential role in the clearance of plasma triglyceride (TG), has been associated with the metabolic syndrome (MS). It is expressed primarily in tissues responsible for TG storage like the adipose tissue, or requiring large amounts of fatty acid (FA) as fuel like the muscles. Since TG-rich lipoprotein production and plasma TG-derived FA-uptake fluctuate intensely, LPL expression and activity must be extensively regulated, in a tissue-specific manner. While during adipo- and myogenesis transcriptional control is primary, in response to physiological stimuli post-translational regulation dominates. We proposed to study the common HindIII polymorphism alone and in association with genetic and external factors affecting LPL activity, such as PPARG2-P12A - genetic variant of a transcription factor it forms a positive feedback loop with, and physical exercise or stress involving interacting protein and hormonal regulatory mechanisms.
Methods: 315 middle-aged persons from a central Romanian region were investigated in a case-control study. Metabolic syndrome was diagnosed according to the IDF criteria with mandatory visceral obesity, lifestyle characteristics were assessed by PhenX-based questionnaires, and genotyping was done by PCR-RFLP.
Results: HindIII+ carrier status characterized 69.15 vs. 62.82% of patients and controls. No significant differences in metabolic parameters, age at onset of disturbances or cardiovascular complications in patients according to the genotype were noted. While MS development risk associated with HindIII+ carrier status alone reached not the level of statistical significance (OR = 1.59, p = 0.1, 95%CI = 0.93-2.71), when the combination of LPL and PPARG2 predisposing alleles was considered, disease development risk became markedly increased as compared to protective genotypes (OR = 11.74, p = 0.0004, 95%CI = 2.82-49.95). HindIII+ carrier status further increased sedentary lifestyle-associated risk (OR = 3.11. vs 41.03, p<0.0001), and though chronic social stress associated no significantly increased disease risk individually, in combination with predisposing LPL genotype as opposed to the absence of both predisposing factors demonstrated an increased MS development risk (OR = 7.91, p<0.0001, 95%CI = 3.48-17.93).
Conclusion: LPL-HindIII polymorphism effect on MS development risk may be dependent on the simultaneous presence of genetic and non-genetic factors involved in the same pathway such as the nuclear receptor PPARG2-P12A genotype, or unhealthy lifestyle components like physical inactivity and stress, suggesting a multifactorial background and the importance of genetic predisposition-tailored individualized intervention plans.

PO2.026

Effects of different metabolic states and surgical models on glucose metabolism and secretion of ileal L-cell peptides: results from the HIPER-1 Study

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Objective: To compare the impact of 4 surgical procedures (mini gastric bypass [MGB], sleeve gastrectomy [SG], ileal transposition [IT], and transit bipartition [TB]) versus medical management on gut peptide secretion, beta cell function, and resolution of hyperglycemia in patients with type 2 diabetes.
Research Design And Methods: A mixed-meal tolerance test (MMTT) was administered 6-24 months after each surgical procedure (mini gastric bypass [MGB], sleeve gastrectomy [SG], ileal transposition [IT], and transit bipartition [TB], n = 30 in each group) and the result was compared to matched lean (n = 30) and obese (n = 30) T2DM patients undergoing medical management
Results: MGB and IT patients had a greater increase in plasma glucose concentration following MMTT than SG and TB patients. MGB patients exhibited the greatest increase in the incremental area under the curve of plasma glucose concentration above baseline (ΔG0-120) (p<0.0001). Insulin sensitivity was comparable across surgical groups, and statistically greater in surgical patients than in obese nonsurgical patients (p<0.0001). Beta cell responsiveness to glucose was greater in SG and TB than in MGB and IT patients (p<0.001) despite a smaller increase in ΔGLP-10-120 relative to IT. Postoperative beta cell function was the strongest predictor of hyperglycemia resolution.
Conclusion: The present study demonstrated that the level of beta cell function after bariatric surgery is the strongest predictor of hyperglycemia resolution.The study also demonstrates a disconnection between postprandial GLP-1 levels and beta cell function among the studied surgical procedures.

Conflict Of Interest: None.

Funding: None.

PO2.027

Time to glycemic control -- an observational study of 3 different operations

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Background: Medical treatment fails to provide adequate control for many obese patients with type 2 diabetes mellitus (T2DM). A comparative observational study of bariatric procedures was performed to investigate the time at which patients achieve glycemic control within the first 30 postoperative days following sleeve gastrectomy (SG), mini-gastric bypass (MGB), and diverted sleeve gastrectomy with ileal transposition (DSIT).
Methods: Included patients had a body mass index (BMI) ≥30 kg/m^2; T2DM for ≥3 years, HbA1C >7% for ≥3 months, and no significant weight change (>3%) within the prior 3 months. Surgical procedures performed were SG (n = 49), MGB (n = 93), and DSIT (n = 109). The primary endpoint was the day within the first postoperative month on which mean fasting capillary glucose levels reached <126 mg/dL. Multivariate logistic regression analysis was used to identify predictors of glycemic control.
Results: The cohort included 251 patients with a mean BMI of 36.04±5.76 kg/m^2; age, 52.84±8.52 years; T2DM duration, 13.09±7.54 years; HbA1C, 8.82±1.58%. On the morning of surgery, mean fasting plasma glucose was 177.63±51.3 mg/dL; on day 30, 131.35±28.7 mg/dL ($p<0.05$). Mean fasting plasma glucose of <126 mg/dL was reached in the DSIT group (124.36±20.21 mg/dL) on day 29, and in the MGB group (123.61±22.51 mg/dL), on day 30. The SG group did not achieve the target mean capillary glucose level within postoperative 30 days.
Conclusion: During the first postoperative month, glycemic control (<126 mg/dL) was achieved following DSIT and MGB, but not SG. Preoperative BMI and postprandial C-peptide levels were independent predictors of early glycemic control following DSIT.

Conflict Of Interest: None.

Funding: None.

PO2.028

Antidiabetic FGF21 action depended on sex and exerted only in male mice with diet induced obesity

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Introduction: Fibroblast growth factor-21 (FGF21) is a circulating hepatokine that beneficially affects carbohydrate and lipid metabolism: enhances free fatty acid (FFA) oxidation, insulin sensitivity and glucose uptake in obese male mice and humans. Recently we showed that obesity-induced increase in the blood FGF21 level, its gene expression in the liver and brown adipose (BAT) was less pronounced in female than in male mice. The aim of this study was to investigate whether beneficial FGF21 action on body weight and carbohydrate–lipid metabolism also occurs in obese female mice.
Methods: Male and female C57Bl mice consumed for 10 weeks mixed diet: standard laboratory chow and sweet cookies, sunflower seeds, and lard – imitation of a diet that causes human obesity. Mice with diet induced obesity (DIO mice) were treated for 7 days with vehicle or FGF21 (1 mg/kg of body weight). Blood parameters and the expression of genes involved in lipid and glucose metabolism and thermogenesis were analyzed in the liver, white- and brown adipose tissues (WAT, BAT).
Results: FGF21 induced weight loss in DIO mice of both sexes but reduced blood FFA levels and increased glucose tolerance only in DIO males. In DIO mice received vehicle, the expressions of genes involved in FFA oxidation, lipolysis, and glucose metabolism, both in the liver and BAT, were higher in females than in males. BAT expressions of thermogenic genes (*Ucp1, Dio2*) also were higher in females than in males. The transcriptional responses of liver and BAT to the FGF21 administration were sex-depended. "The FGF21 administration increased the expression of hepatic genes involved in glucose and FFA oxidation (*Gck, Pgc1*), insulin sensitivity (*InsR*), FFA synthesis (*Fas*), triglyceride lipolysis (*Atgl*), and BAT genes involved in thermogenesis (*Pparg*) and FFA oxidation (*Pgc1*), only in DIO males." The transcriptional profile of all studied genes was independent on sex and FGF21 treatment in WAT.
Conclusion: Thus, antiobesity FGF21 action was not sex dependent, while antidiabetic FGF21 action depended on sex and exerted only in DIO male mice. In DIO males, FGF21-caused reduction of body weight was associated with upregulation of thermogenic genes in BAT, and FGF21-caused increase in glucose tolerance – with upregulation of hepatic genes involved in glucose and FFA oxidation. There was impact of sex both in basal gene expressions and in transcriptional responses to FGF21 in the liver and BAT of DIO mice. Sex differences in the responses to FGF21 administration could have translational implications for novel therapeutic outcomes.

Funding: Research relating to this abstract was funded by the Russian Science Foundation, grant No. 17-15-01036.

PO2.029

Impact of (poly)phenols supplementation on HbA1c: a meta-analysis of randomized controlled studies in adults with and without type 2 diabetes and meta-regression of determinants for glycation

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Introduction: (Poly)phenol supplementation has been associated with a small reduction in HbA1c (1), yet factors other than glycaemia may influence their effect (2). This meta-analysis and meta-regression updates current knowledge on the effect of polyphenol supplementation on HbA1c reduction in adults with and without type 2 diabetes (T2DM) (1).
Methods: A systematic review of polyphenols clinical trials on HbA1c in the context of T2DM and pre-diabetes was performed according to the Preferred Reporting Items for Systematic Review and Meta-Analysis. Characteristics associated with polyphenol intervention such as health status, BMI, age, region, dose, duration were used to stratify the analysis.
Results: Forty-four controlled randomized trials with HbA1c values were included. (Poly)phenols (extracts or food) were supplemented (0.028 to 1.54 g/d) for 10-540d. Combining all subjects (n = 2431, mean baseline HbA1c = 52.8 ± 12.0 mmol/mol, 56.2 ± 6.3 y old and BMI 29.2 ± 3.0 kg/m^2), (poly)phenol supplementation lowered HbA1c by -5.8±1.2 mmol/mol ($p<0.001$), with a marginally larger effect size in trials recruiting participants with T2DM (d = 0.15) compared to the overall group (d = 0.1). Heterogeneity was very high for trials recruiting participants who were healthy or with pre-diabetes ($p<0.001$, I^2 = 98% & 97.7%, N = 7 & 6, respectively); unlike trials recruiting participants with T2DM ($p = 0.05$; I^2 = 29.1%, N = 33). Meta-regression showed that younger (<50y mean age) participants and those from Asia benefited most from polyphenols supplementation (10% and 27% further HbA1c reduction, respectively). There was not enough evidence supporting an impact of other factors (participants' mean BMI, (poly)phenols' dose and duration of the intervention) on the efficacy of (poly)phenols on HbA1c reduction.
Conclusion: Variables "age" and "BMI" are reported trial mean values of participants, without individual participant data. Confounding at either trial level or at the individual level cannot be addressed, which weakens this analysis. Trial duration was often <84days (n = 19) which is not suitable for HbA1c as an outcome measure. There is scope for further well-designed trials investigating the long-term impact of plant food bioactives on HbA1c in individuals at risk or T2DM.

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Conflict of Interest: None Disclosed.

Funding: S.P.-D. received a CONACyT doctoral scholarship.

PO2.030

Gut microbiota adaptation after weight loss by Roux-en-Y gastric bypass or sleeve gastrectomy bariatric surgeries

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Background: Gut microbiota could be involved in the metabolic improvement after surgery. The main aim of this study was to evaluate the evolution of the gut microbiome with the weight loss through bariatric surgery (BS) in morbidly obese patients and if these changes depend on the surgical procedure.
Methods: We studied 28 severely obese patients: 14 underwent a Roux-en-Y gastric bypass and 14 underwent laparoscopic sleeve gastrectomy (SG). All patients were examined before and after 3 months of the correspondent BS. Gut microbiome profile was assessed by the sequencing of amplicons from the 16sDNA gene by Ion S5 sequencing platform (Thermofisher Scientific). Bioinformatic analyses were performed through the longitudinal plugin of QIIME2 tool.
Results: BS procedures differently affected gut microbiota. SL increased the diversity of the microbial ecosystem. However, RYGB was shown as the maximum change inductor. RYGB provoked an increase in Proteobacteria and Fusobacteria and a decrease in Actinobacteria, while SG produced an increase in Verrucomicrobia. The biomarker discovery analysis (LEFSe) revealed the genus Blautia as characteristic of SG, while Veillonella was of RYGB. Interestingly, the functional analysis revealed that RYGB highly increased the potentially pathogenic bacteria as well as the stress tolerant pathways, possibly through the enrichment of facultatively anaerobic bacteria as well as Gram-Negative bacteria from the Proteobacteria phyla. On the other hand, SG increased the number of aerobic bacteria.
Conclusion: Our study shows a shift of the gut microbiome after BS in a procedure manner. Gut microbiome changes are related to the adaptation to the changing gut environment. RYGB is the procedure that produces greater physiological changes in the host and concordantly produces greater variations in the gut microbiota profile, with Proteobacteria as the key phyla. SG is more conservative, but seems to improve the biodiversity of the gut microbiome and the levels of Akkermansia (Verrucomicrobia), a bacteria related to weight loss and metabolic improvement. These results guarantee further research in the role of gut microbiota in weight loss strategies.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by grant from the Instituto de Salud Carlos III co-founded by Fondo Europeo de Desarrollo Regional - FEDER, CP16/00163, Madrid, Spain.

PO2.031

Causal implication of the gut microbiota in the modulation of body weight and glucose metabolism after bariatric surgery in mice

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Objectives: Bariatric surgery (BS), and especially Roux-en-Y gastric bypass, can induce an important and prolonged weight loss as well as a remission of type 2 diabetes in most patients, although the benefits can greatly vary. The beneficial effects of BS on glucose metabolism do not only depend on caloric restriction and weight loss, suggesting that other mechanisms are involved. Several have been proposed, such as a modulation of the gut microbiota (GM) composition. However, the causal role of the GM in the remission of type 2 diabetes remains to be elucidated. The objective of our mouse study are to demonstrate that the GM is involved in the post-BS metabolic improvements.
Methods: Conventional C57Bl/6 mice were put on high fat diet and later underwent either a type of BS called entero-gastro-anastomosis (EGA), or a laparotomy (Sham). One month after the surgery, the EGA mice were separated in two groups (EGA-rep+ and EGA-rep-), according to their metabolic improvements estimated by the increase in oral glucose tolerance. Stool samples from these there two groups, as well as the Sham group, were used to perform microbiota transplants in conventional C57Bl/6 mice by gavage. We also gavaged a group of mice with its own feces as Controls. All the recipient mice were put on HFD at the time of transplantation. The body weight, body composition and food intake of recipient mice was measured every week during the 15 weeks follow-up period. Glucose and insulin tolerance tests were performed 2.5 months after GM transplantation.
Results: As compared to the Control group, the GM transplantation induced a striking fat gain in mice which received the EGA-rep- GM (t-EGA-rep-) or the Sham GM (t-Sham). On the opposite, the group transplanted with the EGA-rep+ GM (t-EGA-rep+) was similar to the Control group.
The GM transplantation induced an improvement of glucose tolerance in the t-EGA-rep+ group, a decrease in fasting blood glucose levels (162 vs 193 mg/dL, $p<0,05$), as well as an increase in insulin sensitivity. On the other hand, an significant deterioration of glucose tolerance was observed in the t-EGA-rep- and t-Sham groups, as compared to the Control group.
Conclusion: These preliminary results suggest that the GM from the EGA-rep- group induced an altered metabolic phenotype, while the GM from the EGA-rep+ seem to be protective. This suggests that the GM may be involved in the modulation of glucose metabolism post BS, and potentially the variability of patient's metabolic improvements. We are currently performing (i) GM sequencings using the MinION technology, in order to link the observed phenotype to GM species, as well as (ii) an evaluation of the insulino-secretion capabilities of both the donor and recipient mice.

PO2.032

Anti obesity *and* lipid lowering effect of lactobacillus spp. on obese rats

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The effects of Lactobacillus acidophilus, Lactobacillus plantarum, Lactobacillus casi and Lactobacillus rhomunas on the body weight and lipid metabolism on obese rats were evaluated.
Methods:
Probiotic strains
Four probiotic strains were used this study (L.acidophilus, L. Casei, L. Rhamnosus, L. Plantarum), were produced by Vitane Pharma-GmbH_ Germany.To re identification of strains, biochemical tests were used

Study Design: The study was designed as a permuted blocked randomized trial. There were three parallel groups and the study was conducted for 4 weeks. Each group of rats containing 7 rats age between 9 month to 12 month,weight for first group between 460 and 400 g and second group from 380 to 300 g and control group weight from 250 to 200 g. The first group consumedprobiotics with three bacterial strains(L.acidophilus, L. Casei, L. Rhamnosus),the second group consumed probiotic strains with two strains of bacteria(L.acidophilus, L. Plantarum) twice daily for 4 week, Animals were kept under suitable environmental conditions such as room temperature (24-26 C˚) exposed to light 14 hr/day and were fed the basal diet.
Results: In the body weight, the results showed significant deference between rat groups, the group that consumed 3 probiotic strains showed reduction in the body weight with ratio 16.63% while the group consumed 2 probiotic strains showed decreasing with ratio 17.62% compared with control group which increased in the body weight.In the effeci of probiotics on lipid metabolisim the results showed significant deference between rat groups, the group that consumed 3 probiotic strains showed decreasing in the cholesterol with ratio 50.7%, triglyceride with ratio 48.8 %, LDL with ratio 51% and elevated of HDL level with ratio 45%, while the group consumed the 2 probiotic strains showed decreasing in the cholesterol with ratio 48.3%, triglyceride with ratio 43.3 %, LDL with ratio 27.4% and elevated HDL level with ratio 26%.
Conclusion: The study suggests that LAB supplementation has hypocholesterolemic and anti obesity effects in rats. These strains might be able to improve the intestinal microbial balance and potentially improve intestinal transit time.

PO2.033

A novel fiber mixture to promote microbial fermentation in the distal colon differentially affects substrate metabolism in lean versus pre-diabetic, obese men

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Introduction: The gut microbial product acetate can affect host body weight control and insulin sensitivity as shown in rodents. We demonstrated that acetate infusions in the distal colon promoted fat oxidation and improved metabolic parameters in overweight men, whilst proximal colonic acetate infusions had no effect. Here, we hypothesized that combining rapidly fermentable (to satisfy the proximal colonic microbiota) with slowly fermentable, acetogenic fibers enhance microbial acetate production in the distal colon, thereby improving human substrate metabolism.
Methods: To test the hypothesis, we performed experiments in an *in vitro* model of the human colon (TIM-2) and based on the outcomes we designed and executed a human intervention study.
In vitro: The TIM-2 model was inoculated with feces from lean and prediabetic obese donors. We administered a rapidly fermentable resistant starch in combination with several slowly fermentable fibers and assessed acetate production in a 24-hour experiment with the last 14 hours mimicking distal colonic acetate production.
In vivo: In a randomized crossover study, 12 lean (BMI ≤24.9 kg/m²) and 11 prediabetic overweight/obese (BMI ≥25 kg/m² and ≤34.9 kg/m²) men received either 7.5 g resistant starch with 12 g long-chain inulin (RS+INU), 12g inulin alone (INU) or a placebo (maltodextrin, PLA) a day prior to a clinical investigation day (CID). During each CID, feces was sampled, blood was taken, hydrogen breath and indirect calorimetry data were assessed during fasting and after a high-fat mixed meal (postprandial). A linear-mixed model was used to assess differences between interventions during fasting and postprandial (AUC) conditions.
Results: In our *in vitro* model we identified RS+INU as a putative nutritional tool to enhance distal colonic acetate production for the lean phenotype, whereas for obese no increase compared to INU was identified. In accordance, *in vivo*, RS+INU increased hydrogen breath during fasting (P = 0.019) and postprandial (P = 0.006) conditions compared to PLA in lean but not in obese individuals. Interestingly, RS+INU increased postprandial energy expenditure compared to PLA (P = 0.02) and carbohydrate oxidation compared to PLA and INU (P<0.05) in the lean phenotype. In contrast, in the obese group there were no significant effects on energy expenditure and substrate metabolism after INU+RS versus PLA and INU (P>0.05).
Conclusion: A novel fiber mixture promoted microbial fermentation and markedly altered substrate handling in lean but not in obese individuals. The assessment of the gut microbiota composition, microbial products in feces and blood, as well as circulating hormones and metabolites (available during the ECO 2019) will shed more light into these interesting findings.

PO2.034

Obesity alters faecal SCFA concentrations in human adults

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Introduction: Growing evidence points to gut microbiota contributing to homeostasis not only in the gut, but also in multiple organs.In addition, observational studies show difference in faecal microbiome between the obese and normal weight individuals. However, there is much less information about the functional consequences of the altered microbiome. Short Chain Fatty Acids (SCFA) are major end-products of anaerobic microbial fermentation and there is conflicting evidence about patterns of SCFA concentrations in obese and lean humans.We present data from the largest observational study to date investigating relationships between markers of obesity (namely BMI) and stool SCFA in adults.
Methods: 219 participants(94 females; mean age 56.5 years) were recruited from an outpatients' clinic at Wansbeck Hospital,Northumberland. Of these,103 were healthy(no colorectal abnormality on endoscopy) and 116 had polyps.Stool samples were collected and stored(-80°C) until SCFA concentrations were determined by gas chromatography.Mean weight was 82.9 ± 21.3 kg (range 39.5-164) and BMI 28.6 ± 6.1 kg/m² (range 16.8-53.1).Applying WHO classification,participants were divided into normal(n = 53),overweight(n = 92) and obese(n = 74). Differences in SCFA concentrations and molar proportions between the three BMI groups were investigated using the General Linear Model (GLM),adjusting for age, gender, health status and smoking as covariates.
Results: Faecal concentrations of propionate(p = .003), but y rate (p = 0.021), valerate (p = 0.009) & total SCFA concentrations (p = 0.035) were significantly greater in obese compared with normal weight individuals. Molar proportion of acetate was significantly lower in the obese(Least Square Mean (LSM 55.8%) compared with the normal (LSM 59%) weight individuals (p = 0.048) whereas the molar proportion of propionate was significantly higher(p = 0.011) in obese individuals(LSM 19.6%) compared with those with a normal BMI(LSM 17.1%).
Discussion: In this study of older adults, we observed greater total SCFA concentrations in obese individuals compared with those with a normal BMI and that the pattern of SCFA was altered in those with greater adiposity.These data suggest that, in addition to altered microbial population of the large bowel, obesity results in significant functional changes of those micro-organisms.Since SCFAs affect the metabolism and health of multiple body systems, these findings may indicate potential mechanisms through which obesity enhances disease risk.We are currently investigating effects of weight loss on faecal SCFAs, possible dietary and lifestyle factors, associated with obesity, that contribute to microbial dysbiosis in the large bowel.

Conflict of Interest: None.

Funding: The BORICC Study was funded by Food Standards Agency.

PO2.035

Change in diet after vertical sleeve gastrectomy ımproves diversity and composition of the ıntestinal microbiota in DIO rats

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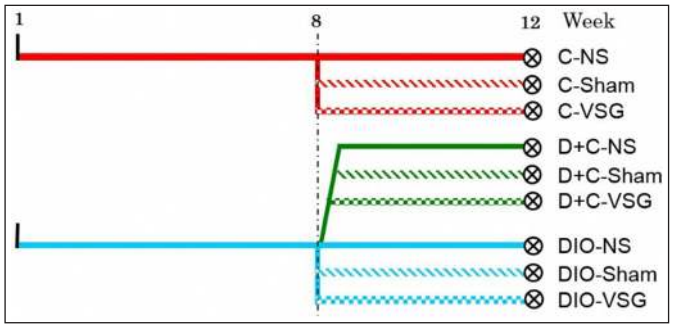
Introduction: The question of obesity and its related comorbidities is still a growing worldwide problem that originates from diverse factors, the solution to this pandemic is still unknown. However, new factors, such as gut microbiota, are arising as key players in fighting the pandemia. Gut microbiota is deeply affected by environmental factors such as diet or bariatric surgery, but the mechanism, as well as the benefits, are still not clear.
Methods: Using next-generation sequencing of ribosomal RNA amplicons, we compared the composition of gut microbiota of Sprague-Dawley rats subjected to vertical sleeve gastrectomy with control groups representing non-operated, sham operated, control-fed, high-fat diet fed and post-operative diet-switched animals.
Results: The high-fat diet was the strongest driver of altered taxonomy and microbial abundance and diversity in the cecum. Rats under high-fat diet had a lower diversity and different taxonomical abundances. Those effects were partially reversed in the diet-switched cohort. Sleeve gastrectomy contributed significantly and additively to major improvement when combined with diet.
Conclusion: The dysbiotic state caused by high-fat diet can be alleviated by vertical sleeve gastrectomy and dietary modification, leading to a restored complexity and composition. These results highlight the importance of a dietary intervention following bariatric surgery for improved outcome. We identify microbes whose frequency correlates with sustained weight loss following surgery and may prove to be instrumental to the development of novel probiotic therapy for microbiome modulation in efforts to tackle obesity.

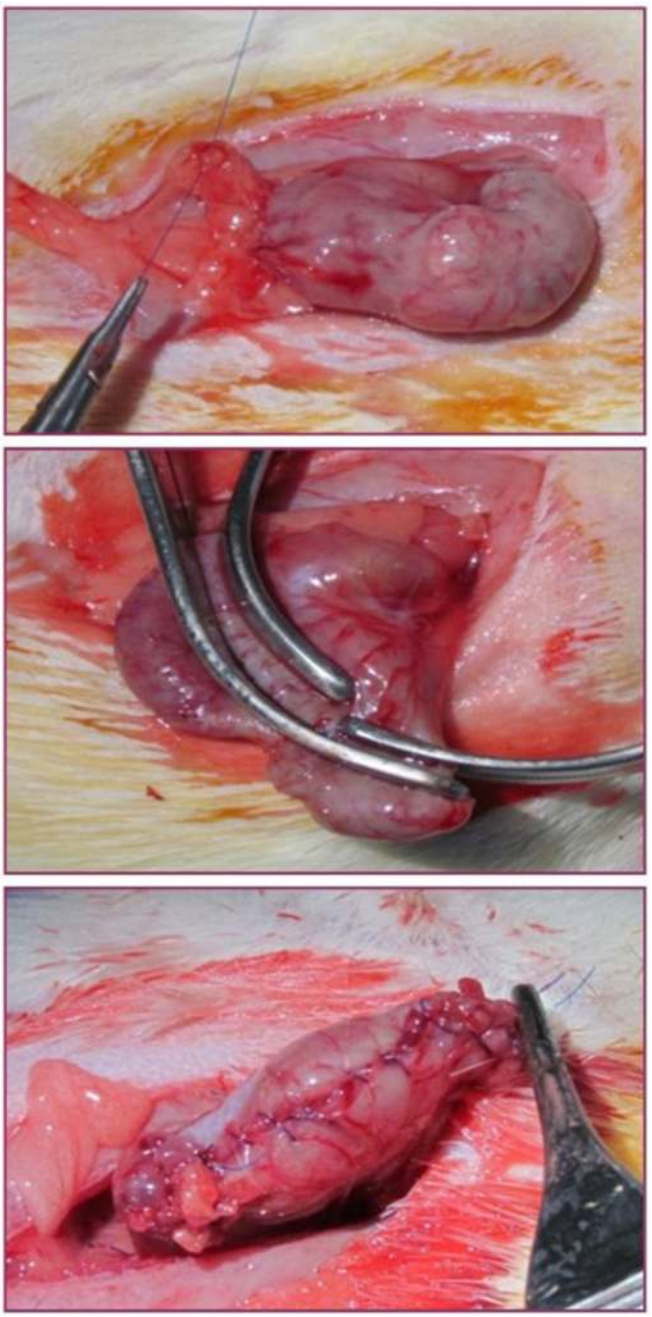
Conflict of Interest: None Disclosed.

Funding: This work was supported by Ministerio de Sanidad y Consumo, Instituto de Salud Carlos III (ISCIII) (PI11/01159, PI15/00190 and PI15/00332 to JAB-F and JP-O), were co-financed by European Union Funds, Fondo Europeo de Desarrollo Regional (FEDER) "Una manera de hacer Europa". Additional funding by the Stockholm Health Authority grant # SLL 20160933 awarded to KIU.



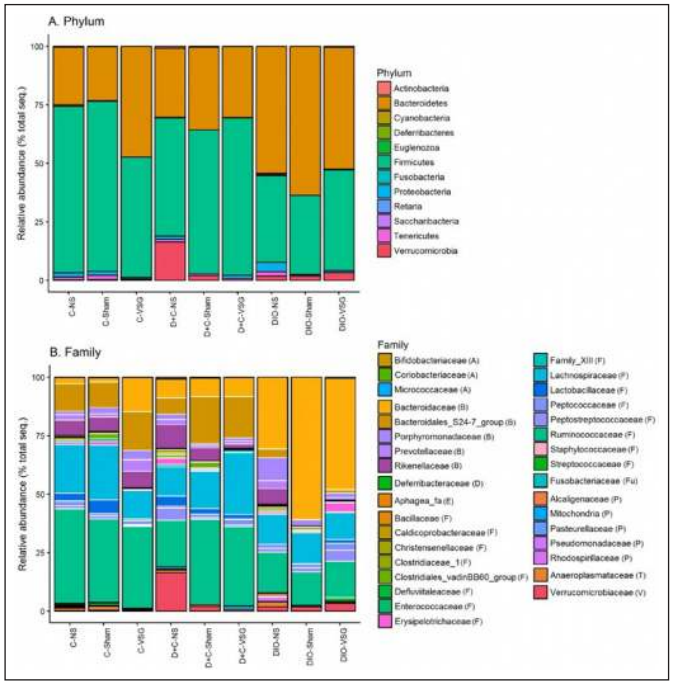
Experiment design and group distribution. Rats were fed on either SCD (red line) or HFD (blue line) during eight weeks. At w.8, half of the HFD-fed rats switched to SCD (green line). Each diet group was divided in three parts and subjected to one of the three surgical situations: No Surgery (solid line), Sham surgery or VSG. Rats were maintained on the corresponding diet until w.12.

Fig. 1.



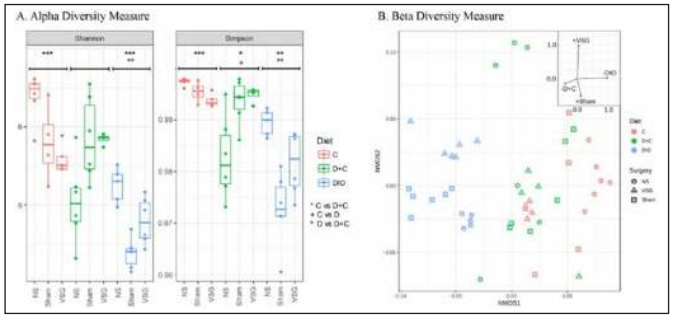
Vertical Sleeve Gastrectomy in rats. Liberation of gastrsplenic adherences, ligation and section of blood vessels in antrum and fundus. Delimitation and resection of the new gastric tube. First suture from fundus to antrum, second suture with invaginating stitches from antrum to fundus.

Fig. 2.



Relative abundances of bacterial composition, (A) at the phylum level, dominated by the Bacteroidetes and the Firmicutes phyla. Relative abundances of bacterial composition (B) at the family level, with phyla separations marked with black lines and family separations marked with white lines.

Fig. 3.



Diversity measures. (A) The Shannon and Simpson indices showing samples alpha diversity. Bottom and top of the boxplot indicate first and third quartile, while line inside the box show the median. Diversity was reduced by both sham surgery and VSG in all groups. DIO samples had the lowest diversity except for D+C-NS in the NS situation. (B) Beta diversity. The NMDS plot for the bacterial communities in our samples, based on Bray-Curtis dissimilarities. DIO groups, C-NS and C-VSG formed distinct clusters. PERMANOVA analysis: Surgery (P<0.001), Diet (P<0.001). D+C samples formed less defined clusters, but were very distinct from DIO samples and were overlapping the C-VSG and C-Sham groups.

Fig. 4.

PO2.036

Proatherogenic composition of intestinal microbiota in overweight and obese children

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Introduction: Disruption of signaling interactions between the macroorganism and the microbiota may lead to the disregulation of metabolic processes and initiate disturbances in the energy balance in the body.
Objectives: The purpose of our study was to assess the composition of the intestinal microbiota in overweight and obese children using the method of gas chromatography - mass spectrometry (GC-MS) and reveal the characteristic changes.
Methods: We examined 120 children aged 12 to 15 years: 60 overweight children (body mass index – BMI -24.2 ± 1.12 kg/m^2) 1st group, 60 children with obesity – 2nd group (BMI - 31.6 ± 4.3 kg/m^2). The comparison group (3rd group) consisted of 30 healthy children with a BMI - 17.9 ± 1.1 kg/m^2.
To assess the composition of intestinal microbiota we use the GC-MS method to detect species-specific fatty acids as genetically determined structural components of the bacterial cell wall.
Results: Changes in the composition of the intestinal microbiota were detected in 100% of cases in children of 1st and 2nd groups in comparison with the children of 3rd group due to the GC-MS method. These changes were characterized by a decrease in the level of representatives of normal parietal microbiota (Bifidobacteria, Lactobacilli, Propionobacteria) and an increase in the level of opportunistic microflora (Str. Mutans, Actinobacteria, Clostridia, Staphylococci, Rhodococci) and fungi. The most pronounced changes were found in children of the 2nd group. According to the interrelation between lipid metabolism disturbances and changes in the intestinal microbiocenosis we isolate microorganisms possessing of proatherogenic activity (Str. mutans, Actinobacteria, Clostridia) and microorganisms with protective properties (Bifidobacteria and Propionobacteria).
Conclusion Changes in the composition of intestinal microbiota revealed in all children with an impaired energy metabolism (excess body weight and obesity). These changes aggravated with an increase in the degree of obesity and characterized by a decrease in the level of representatives of normal parietal microflora and an increase in the level of opportunistic microflora and fungi. The use of the method of gas chromatography mass-spectroscopy has allowed us to expand our understanding of the spectrum of microorganisms belonging the biofilm of the intestinal mucosa in children with excess body weight and obesity and to identify the bacteria most closely associated with impaired carbohydrate and lipid metabolism (proatherogenic bacteria) - Str. mutans, Actinobacteria, Clostrudium ramosum.

PO2.037

Gut microbiota is differentially affected by distinct weight loss strategies

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Introduction: Gut microbiota plays a role in obesity and metabolic disease, although the mechanisms have not been fully understood. Alterations of gut microbiota can affect host homeostasis and the ability to gain and lose weight. Weight loss induces important changes in the composition of the gut microbiota. The aim of this study is to study the repercusion of different interventions for weight loss in patients with obesity in gut microbiota: Bariatric Surgery (BS), ketogenic diet (KD) and Mediterranean diet (MD).
Methods: The study was conducted in patients with BMI>30km/m^2 divided into three groups with different weight loss strategies: 22 with BS, 18 with KD and 21 with MD. Ketone bodies and permeability and inflammation markers were measured in blood by ELISA. Fecal bacterial DNA was extracted and analyzed by 16S rRNA sequencing using an IonS5 platform and followed by a bioinformatic analysis by QIIME2.
Results: Significant differences were obtained between the anthropometric and biochemical variables such as weight loss, glucose or LDL-cholesterol changes in blood. KD highly increases ketone bodies, as well as gut permeabilty with respect to the other treatments. But inflammation was not significantly affected by any one. Microbiota profiles were changed by the KD and MD treatments. MD gut microbiota changes differed from the BS and KD. Richness and diversity are increased with MD as well as the evenness with the KD, however no difference was observed between treatments. Firmicutes level was significantly increased by MD, resulting in a significant difference with BS. Bacteroidetes levels differed between MD and KD. About Proteobacteria levels, there was a tendency to higher values in BS with respect to the other weight loss strategies. However, all the treatments resulted in an increase of Verrucomicrobia levels. Potentially pathogenic bacteria and stress tolerant bacteria tended to decrease in the patients under MD.
Conclusion: MD provokes profound changes in gut microbiota, increasing richness and diversity. Firmicutes is the taxa more abundant. Also, MD seems to decrease stress in the environment. KD is able to change the gut microbiota profile. However, KD produces an increase of the intestinal permeability. Although BS triggers in the highest weight loss, BS seems to be the technique that provokes the least changes in gut microbiota. Weight loss is not the main driver for gut microbiota changes, being dietary interventions the techniques with the highest impact on gut microbiota. Therefore, the combination of strategies could serve to improve treatment.

Conflict of Interest: None Disclosed.

Funding: This work was supported by a grant from the Instituto de Salud Carlos III co-founded by Fondo Europeo de Desarrollo Regional, Madrid-Spain.

PO2.038

Lifestyle intervention modulates gut microbiota richness and diversity

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Introduction: There is a growing evidence that shows how dietary factors can dramatically alter gut microbiome in such a way that it contributes to progression of obesity and related diseases. Mediterranean diet and physical activity promotion have been associated to beneficial effects on human health. However, we still miss information about the simultaneous relationship with gut microbiota changes. In order to have a better understanding of this connection, we have analyzed bacterial diversity and richness in two nodes of Predimed plus, the multicenter, primary prevention field trial of cardiovascular disease in Spain.
Methods: 200 subjects (100 in the control group and 100 in the intensive intervention group) have been randomly selected to participate in this study. Fecal samples of patients at baseline and 1 year intervention have been processed in order to obtain bacterial DNA for 16S rRNA analysis. Microbial diversity and bacterial genus abundances in both groups have been evaluated and statistically analyzed.
Results: Microbial richness and diversity in intervention group resulted to be, respectively, significantly ($p = 0.014$) or almost significantly different ($p = 0.067$) in one year treatment. Different patterns in bacterial genus profiles have been also identified in control versus intervention group. A study of functionality based on these data has been proposed, in order to find out the potential association between microbial composition and its specific role in Predimed plus study.
Conclusion: A metabolic pathway associated with microbial diversity after intervention period is then suggested in this study in order to better clarify a specific bacterial role.

PO2.039

Palmitoylated PrRP as potential anti-obesity agents: the role of leptin signaling

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Introduction: Anorexigenic neuropeptides are able to decrease food intake and ameliorate obesity but are ineffective after peripheral application, because they are not able to cross the blood-brain barrier. We have designed and tested lipidized analogs of neuropeptide prolactin-releasing peptide (PrRP) able to act centrally after peripheral administration. The aim of this study was to characterize the effect of two palmitoylated PrRP analog in rat models of diet-induced obesity and prediabetes, diet-induced obese (DIO) Sprague-Dawley and Wistar Kyoto rats, and in rat models with impaired leptin signaling, Zucker diabetic (ZDF) rats and spontaneously hypertensive obese rats (SHROB).
Methods: The rats were treated intraperitoneally for two or three weeks with palmitoylated analogs of PrRP. Body weight (BW) and food intake (FI) were monitored during the treatment and oral glucose tolerance test was performed at the end of experiment, as were blood samples collected for determination of metabolic parameters and fat and liver for mRNA analyses.
Results: In the DIO Sprague-Dawley and Wistar Kyoto rats, the treatment lowered significantly FI and BW, improved tolerance to glucose and decreased leptin levels and adipose tissue masses in a dose-dependent manner. In contrast, in ZDF rats, the same treatment lowered FI but did not significantly affect BW or tolerance to glucose, probably in consequence of severe leptin resistance due to a non-functional leptin receptor.
Finally, the three-week treatment significantly lowered FI and BW in control spontaneously hypertensive rats (SHR), but not in SHROB model, again probably due to the impaired leptin receptor signaling. Surprisingly, the treatment improved tolerance to glucose and tended to decrease leptin levels in both SHR and SHROB.
Conclusion: Our data showed anti-obesity and antidiabetic properties of palmitoylated PrRP in rat models of obesity and diabetes dependent on functional leptin signaling. Thus, the strong anorexigenic, body weight-reducing and blood glucose-improving effects make palmitoylated PrRP an attractive candidate for anti-obesity and glucose-lowering treatment.
This study was supported by GACR 18-10591S, RVO:61388963 and RVO:67985823.

PO2.040

Radiation therapy in patients with pituitary somatotropinomas

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Purpose: To assess the effect of radiation therapy (RT) in patients with acromegaly, depending on the age of the patients and the activity of the formation.

Materials and Methods: The object of the study was 50 patients (36women and 14men) with acromegaly who received gamma-therapy in a total dose of 45-60Gr.

The age of patients ranged from 29 to 77 years. By age, the patients were divided into 3 groups: 1st age group-29-44 years old-23patients (46%), 2nd group-45-59 years old-16 patients (32%), 3rd group-60-79 years old-11patients (22%).

All patients underwent hormonal (GH, IGF-I) studies in the dynamics of treatment.

Results: The hormone levels of GH and IGF-1 remain high in group I in 22% of patients, and in group III in 9%. Remissions reached 64% in the IIIgroup.

The highest levels of GH were in the age range from 45 to 59years old and amounted to 77.5±9.68 mMe/l, and from 26 to 44 years old was 68.1±6.84 mMe/l. After RT, this indicator in both age groups was almost equally depressed, but not to the norm. At the same time, in the Igroup, a decrease in the level of GH is observed in 10patients, and in the II age group in 9 patients it was 9.99±6.2 mMe/l.

As the results of the study showed, the use of RT leads to a significant decrease in the level of GH and IGF-1 in all age periods and a particularly significant decrease was observed in age group III.

Conclusion: Thus, the analysis of the results of studying the relationship between the age of patients and the activity of the process at different periods of observation after RT showed that in all age periods, RT is a fairly effective method of treatment and gives positive results in most cases.

PO2.041

A high carbohydrate diet increased adiposity and compromised vasodilation in rats

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Introduction: Obesity and its associated co-morbidities are a global pathological phenomenon. The disease, despite its genetic predisposition, is mainly due to lifestyle factors, such as poor diet and inactivity. Rodent models of dietary obesity are important, as they allow the study of the underlying mechanisms linking obesity to its associated pathologies. Therefore, the objective of this study was to set up a diet-induced obesity model in rats, using a diet truly analogous to that of humans, especially those from the Middle East.

Methods: Male Sprague Dawley (SD) were grouped into three categories: NC group were fed with Normal chow (NC) and had access to regular water ad libitum, CAF group were fed with a combination of cafeteria style diet (CAF) and normal chow with 5% sugary water ad libitum for 15 weeks to induce weight gain. After 15 weeks a group of CAF were switched to 'reversibility' group (REV) and fed with NC for four weeks to induce weight loss. Vascular reactivity, systemic levels of cardiovascular risk factors, measures of tissue distribution of fat and histological examination of fatty liver were determined.

Results: Results showed that the CAF diet significantly increased body weight, compared to NC (P<0.001). This was accompanied by abnormal changes in their systemic metabolic risk factors, and increased hepatic fat deposition. The CAF diet, while not altering noradrenaline mediated vasocontractile responses, did, however, lead to significantly compromised Ach mediated vasorelaxation (P<0.001), suggesting endothelial dysfunction. In the weight reversal group, rats showed a slight, but statistically insignificant, weight loss. This trend in weight loss was enough to produce reduction in levels of systemic metabolic risk factors. However, changes in vascular responses were not reversed by the trend in weight loss.

Conclusion: In conclusion, this study reported a dietary model of obesity similar of that which induces human obesity, and also its associated metabolic and vascular abnormalities. However, while even modest weight loss improved metabolic risk, it did not improve endothelial dysfunction. Thus, measures that prevent obesity need further investigation.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Qatar University internal grant (QUUG-CAS-BES-13/14).

PO2.042

iNOS gene deletion improves liver inflammation and fibrosis in leptin-deficient *ob/ob* mice

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Introduction: The hepatic extracellular matrix (ECM) remodelling during fibrosis in non-alcoholic fatty liver disease (NAFLD) is complex and dynamic, and involves the synthesis, secretion and degradation of different matrix components, including tenascin C (TNC). The objective of the present study was to analyze the influence of inducible nitric oxide synthase (*iNOS*) gene ablation on inflammation and ECM remodelling in the liver of *ob/ob* mice since a functional relationship between leptin and iNOS has been described.

Methods: The expression of molecules involved in liver inflammation and ECM remodelling were analyzed in double knockout (DBKO) mice simultaneously lacking the *ob* and the *iNOS* genes. Moreover, the efffect of leptin replacement was analyzed in control, leptin-treated (1 mg kg−1 day−1) and pair-fed *ob/ob* mice, and compared to wild types (n = 50 mice in total).

Results: The absence of the ob gene increased (P<0.01) liver inflammation and fibrosis. As expected, leptin treatment corrected the obese phenotype of *ob/ob* mice, whereas the simultaneous absence of both iNOS and leptin improved insulin sensitivity, liver inflammation and fibrogenesis, as evidenced by lower macrophage infiltration and collagen deposition, as well as the downregulation of important proinflammatory and profibrogenic genes including *Tnf* (P<0.05), *Emr1* (P<0.01), *Hif1a* (P<0.01), *Col1a1* (P<0.01), *Col6a1* (P<0.01), *Col6a3* (P<0.01), *Spp1* (P<0.01), *Cd44* (P<0.01) and *Tnc* (P<0.05). Circulating TNC levels were also decreased (P<0.05). Interestingly, leptin upregulated (P<0.05) TNC expression and release via NO-dependent mechanisms in AML12 hepatic cells.

Conclusion: Ablation of iNOS in leptin-deficient mice improved liver inflammation and ECM remodelling-related genes, decreasing fibrosis and metabolic dysfunction. The activation of *iNOS* by leptin is necessary for the synthesis and secretion of TNC in hepatocytes, suggesting an important role of this alarmin in the development of NAFLD.

Conflict of Interest: There is no conflict of interest.

Funding: This work was supported by the Instituto de Salud Carlos III and fondos FEDER (PI16/00221, PI16/01217, PI17/02183 and PI17/02188) and by the Department of Health of Gobierno de Navarra (61/2014). CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN) is an initiative of the Instituto de Salud Carlos III, Spain.

PO2.043

Levels of adipocytokines in women with endometrial cancer and obesity

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Introduction: The association between endometrial cancer and obesity is well documented [1]: women of normal weight have a 3% lifetime risk of endometrial cancer compared to a 9-10% lifetime risk in obese women [2]. However, the relationship between obesity and endometrial cancer is complex and likely to involve multiple biological pathways.
In obese individuals, excess adipose tissue has been associated to increased cancer risk and to a state of chronic inflammation. Nevertheless, the exact role of intracellular signalling factors within adipose tissue, in the development of endometrial cancer, is still unclear. In this inflammatory state, adipocytes and macrophages secrete several molecules, which may promote tumour development. Several studies have demonstrated an association between the risk of endometrial cancer and single circulating adipocytokines, however no study has been carried out to assess such association for several adipocytokines in the same patient population. This study aimed, therefore, to examine blood concentration levels of adiponectin, leptin, tumour necrosis alpha (TNFα), interleukin 6 (IL-6), insulin growth factor 1 and 2 (IGF-1, IGF-2) in women with endometrial cancer.
Methods: Fasting blood samples were collected from 16 obese, 5 overweight and 4 normal weight women with endometrial cancer and from healthy volunteers. Adipocytokines blood levels were determined using enzyme-linked immunosorbent assay (Biotechne, UK).
Results: Adiponectin levels were10% lower in obese women compared to overweight and normal weight women with endometrial cancer, whereas leptin levels were 60% higher. No changes in leptin levels were observed between healthy obese and normal weight women. Results for IL-6 and TNFα levels were border line detection.
Conclusion: These preliminary results suggest that differences in adipocytokines blood concentration levels between obese, overweight and normal weight women may play a role in the development of endometrial cancer, although further studies are required to elucidate potential molecular pathways involved.

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Conflict of Interest: None Disclosed.

PO2.044

BMI heritability in the United Arab Emirates (UAE): a study of 201 twin pairs

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Introduction: Body mass is a highly heritable trait; this is supported by twin studies in various populations showing a weighted mean correlation of 0.74 for monozygotic (MZ), and 0.32 for dizygotic (DZ) twins. Obesity and overweight are highly prevalent in the UAE. We have explored the relative contribution of genetic and environmental factors to body mass in population in twin pairs attending a large out-patient facility in the UAE.
Methods: Twin sets were identified from the Imperial College London Diabetes Centre patient database. Opposite gender twin sets were defined as Dizygotic. The height difference between co-twins was used in order to define same gender twin sets as MZ or DZ; height difference ≥5 cm were defined as DZ. The MZ intra-pair correlation coefficient (rMZ) and the DZ intra-pair correlation coefficient (rDZ) were determined by plotting the BMI of co-twins and determining the slope of the trend-line. The intra-pair correlation coefficients were then used to calculate broad sense heritability (percent additive genetic influence), percentage shared environmental influence and percentage non-shared environmental influence. Data regarding diabetes diagnosis of the twin pairs was also considered.
Results: A total of 71 MZ twin pairs (age 27.9 ± 20.7 years, BMI 24.1 ± 7.8 kg/m^2) and 130 DZ twin pairs (age 29.8 ± 21.9 years, BMI 24.2 ± 7.8 kg/m^2) were identified from the database. Co-twins were set as twin 1 or twin 2 where twin 1 is the leaner twin and twin 2 is the heavier twin. rMZ was found to be 0.7534 and rDZ was found to be 0.5541 (figure 1). Accordingly, the broad sense heritability (h2) was calculated as 39.9%. Furthermore, the percentage of shared environmental influence was calculated as 35.5% and that of non-shared environmental influence was calculated as 24.7%. Additionally, 28 of the twin sets were found to be concordant for type 2 diabetes, 34 were discordant and 139 did not have type 2 diabetes.
Conclusion: Our results of BMI correlation in MZ twins are similar to weighted mean reported from other cohorts. However, our data suggest a relatively high contribution of environmental factors to obesity and overweight in the UAE. Further studies seeking to confirm zygosity through genetics are under way.

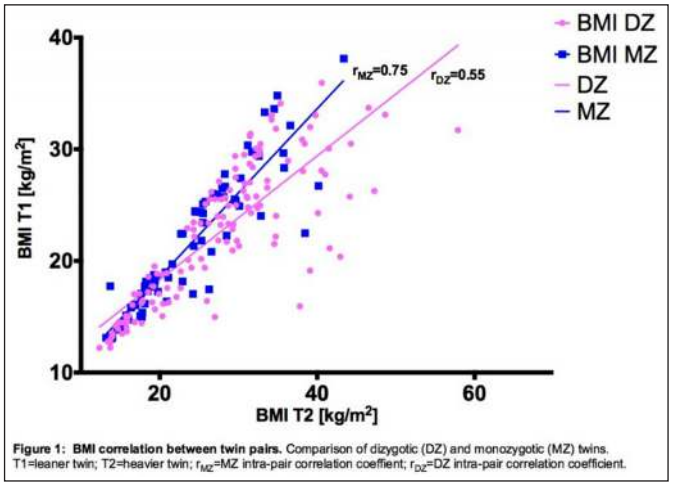

Fig. 1. BMI correlation between twin pairs.

PO2.045

Does low and heavy load resistance training affect musculoskeletal pain in overweight and obese women? Secondary analysis of a randomized controlled trial

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Introduction: Overweight and obesity are associated with musculoskeletal pain. As regular resistance training may prevent or treat these complaints, the aim of the present study was to investigate the effect of three different resistance-training modalities available in health- and fitness clubs, on musculoskeletal pain in overweight and obese women.
Methods: This is secondary analysis from a single-blinded randomized controlled trial, including previously inactive, but healthy women, with a BMI (kg/m^2) ≥25. The participants were allocated to 12 weeks (3 times/weekly) of either BodyPump (high-repetition low-load group session) (n = 24), heavy load resistance training with a personal trainer (n = 28), non-supervised heavy load resistance training (n = 19) or non-exercising controls (n = 21). Primary outcome was self-reported musculoskeletal pain in ten different body parts, measured with the Standardized Nordic Pain Questionnaire, at baseline and post-test. In addition, the study included sub-analyses of the participants when they were divided into high (≥28 of 36 sessions, n = 38) and low (≤27 of 36 sessions, n = 22) exercise adherence.
Results: The analysis revealed no between group differences in musculoskeletal pain in any of the ten body parts. The results did not change when the participants were divided into high versus low adherence.

Conclusion: Twelve weeks of BodyPump, heavy load resistance training with a personal trainer and non-supervised heavy load resistance training did not show any effect on self-reported musculoskeletal pain in overweight and obese women.

PO2.046

Relationship between handgrip strength and both anthropometic and bioimpedance variables in adult obese females

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Introduction: Hand Grip strength (HGS) is widely used in the clinical practice to assess the impact of a variety of disorders on hand function. However, the relationship between HGS and both anthropometric and bioimpedance variables has not been studied in obese patients. The aim of this study is to evaluate the association between anthropometric and bioimpednace variables with mean HGS in adult females with overweight and obesity (BMI >25 kg/m ^{2})

Methods: One hundred and six adult females (age range 18-65 y) participated in the study (age 37.3±13.4 yrs, weight 95.9±20.7 kg, height 160.8±5.6 cm, BMI 37.1±7.2 kg/m^2)

Grip strength for the right and left arms was measured with a handgrip dynamometer and bioimpedance analysis was performed at 50 kHz (DS Medica) in all subjects.

The mean HGS was the average value of three handgrip measurements of the dominant hand.

The following variables were considered for the association with mean HGS:

1) general characteristics: age, height, weight, BMI;

2) BIA measures: bioimpedance index (height^2 /resistance = BI index) and PhA (total body, arm and leg).

Statistical analysis was performed using linear correlation and multiple regression analysis (SPSS vers. 18.0).

Results: Mean HGS was 23.3±4.65 kg, total phase angle was 6.12±0.76 degrees, arm phase angle 4.41±0.73 and leg phase angle was 7.50±1.1 degrees.

According to ESPEN definition on sarcopenia, we found that 24 females (22.6 %) had mean HGS lower than 20 kg.

HGS was significantly correlated (linear correlation) with height (r = .404, p = 0.000), age (r = -.311, p = 0.001), weight (r = .228, p = 0.019) and among the general characteristic, and BI index (r = 0.240, p = 0.013) and arm phase angle (r = 0.199,p = 0.040) among Bia measures.

When we performed the multiple regression analysis for general characteristics, height and age (r = 0.454, SE = 4.18 kg) were the most correlated parameters; if we consider BIA measures, only IB was included (r = 0.240, SE = 4.53 kg)

If we consider both general characteristic and BIA measures in the multiple regression analysis, we found that height and arm phase angle were the most correlated parameters (r = .468, SE = 4.14 kg).

Conclusion: Our preliminary findings shows that height and arm phase angle seems the most correlated parameter with HGS in adult obese females.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.047

A simple tool to identifying the need for specialist respiratory referral among severely obese individuals - "NQT - 2 of 3 Test"

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Introduction: Obesity hypoventilation syndrome (OHS) (Pickwickian syndrome) is a condition that effects people with a body mass index (BMI) >30kg/m^2 and results in low levels of blood oxygen and high carbon dioxide (CO2)(Hypercapnia). OHS is a serious weight related comorbidity and has been linked to increased mortality.

The objective of this study was to identify associated criteria that had predictive validity and may assist in identifying signs of OHS based on simple, non-laboratory tests that could be repeated in a primary care setting and so enable early identification and treatment for this serious respiratory condition.

Methods: One hundred and nine patients (70% female, 44±12 years, BMI 52±10 kg/m^2) who attended our weight management service underwent venous blood gases (VBGs) in addition to a comprehensive multidisciplinary assessment including anthropometrics, physical function measures and a patient rated quality of life question (QoL) in the form of a simple rating from 0 to 10, 0 being poorest QoL, 10 being the highest QoL. During post hoc analysis 3 markers were found to have predictive associations with hypercapnia and thereby warranted tertiary screening for OHS. These criteria were; neck circumference (men ≥43.2cm; women ≥ 40.6cm), QoL (<7 numerical rating score) and a timed up and go test (TUG)(≤10secs). If at least 2 of the markers were outside the reference range we categorised them as NQT (Neck, QoL, TUG) positive.

Results: In addition to the differences in the criterion variables (Neck circumference, QoL & TUG), the NQT negative group (n = 44) were significantly different from the NQT positive group under other measured headings; these included gender (male:49% vs. 75%*), body weight (135.1±20 kg vs. 162.3±40 kg*), $PaCO_2$ (4.8±1 kPa Vs 5.9±1 kPa*) and HCO_3 (23.6±2 mEq/L vs 25.1±2 mEq/L*)(* p≤0.01).

Conclusion: Hypercapnia in addition to a BMI of >30 kg/m^2 are key criteria for the diagnosis of OHS. We found associations for these diagnostic criteria with 3 easily performed tests (neck circumference, timed up & go and verbal rating of QoL (0-10)). Our post hoc analysis found that if 2 out of the 3 tests were positive, there is a significantly higher chance of an individual requiring tertiary screening for OHS. These simple tests may help guide health care providers in primary care who are considering making onward referral to specialist respiratory services without blood laboratory tests.

Tab. 1. Results - NQT Screening.

Anthropometric and Self Report Measures	Total (n=109)	NQT Screen Negative (n=44)	NQT Screen Positive (n=65)	*p*-value (<0.05)
Gender Male % (*n*)	37% (*40*)	25% (*10*)	75% (*30*)	<0.01
Female % (*n*)	64% (*69*)	49% (*34*)	51% (*35*)	
Age (years)	44.3±12.2	41.9±11.8	45.9±12.3	0.09
Weight (kgs)	151±36.1	135.1±20	162.3±40	<0.001
Height (m)	1.7±0.1	1.7±0.1	1.7±0.1	0.2
BMI (kg/m^2)	52.2±10	47.5±5.7	55.4±11	<0.001
Neck circumference (cm)	45±5	41.6±4	47.3±5	<0.001
Self-Report Measures				
PAL mins per week (mins)	110±140	165±172	73±100	<0.001
Self Reported Sleep (hours)	6.4±1.6	6.3±1.5	6.4±1.7	0.81
Nocturia mean (x/night)	1.5±1.9	1.1±1.3	1.8±2.2	0.07
Quality of life (0 to 10)	5±2.5	6.7±2.2	3.9±2.1	<0.001
Functional Measures	**Total (n=109)**	**Screening tool -ve (n=44)**	**Screening tool +ve (n=65)**	***p*-value (<0.05)**
Timed Up & Go (Sec.)	8.7±4.6	7.1±1.6	9.9±5.6	<0.001
TOSCA, VBG and Blood sampling				
pH	7.4±0.01	7.4±0.01	7.4±0.1	0.97
PCO2	6.2±1	5.9±0.9	6.4±0.9	0.01
PO2	6±3	6.4±3.9	5.7±2.1	0.31
Base Excess	0.8±3	0.1±2.9	1.4±2.9	0.01
HCO3	24.5±2.4	23.6±2.2	25.1±2.3	<0.001
Vitamin D	27.3±14.4	35.7±16.8	23.5±11.7	0.02

Significant differences between the groups - NQT positive and negative.

PO2.048

Experimental models of obesity or sucrose excess not promote cardiac remodeling and heart failure

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Introduction: Several diseases are associated with excess of adipose tissue, and obesity is considered an independent risk factor for the development of cardiac remodeling and heart failure.
Objective: The purpose was the development and characterization of an obesity experimental model from hypercaloric diets, a high sucrose (HS), high fat (HF) and high fat and sucrose (HFS), which resulted in cardiac remodeling and predisposition to heart failure.
Material and Methods: Thirty-day-old male Wistar rats (n = 60) were randomized into four groups: control (C), high sucrose (HS), high-fat (HF) and high-fat and sucrose (HFS) for 20 weeks. General characteristics, comorbidities, weights of the heart, left (LV) and right ventricles, atrium, and relationships with the tibia length were evaluated. The LV mycoyte cross sectional area and fraction of interstitial collagen were assayed. Cardiac function was determined by hemodynamic analysis and the contractility by cardiomyocyte contractile function. Heart failure was analyzed by pulmonary congestion, right ventricular hypertrophy, and hemodynamic parameters. Data were expressed by mean and standard error of the mean, being submitted to one-way ANOVA. The level of significance was 5%.
Results: HF and HFS models led to obesity by increase in adipose tissue deposition and adiposity index (C = 8.3 ± 0.2% versus HF = 10.9 ± 0.5%, HFS = 10.2 ± 0.3%, p <0.05). There was no change in the morphological parameters and heart failure signals. The HS model presented cardiomyocyte contractile dysfunction visualized by lower shortening (C: 8.34 ± 0.32% vs. HS: 6.91 ± 0.28, p <0.05), and the maximal velocity of shortening (C: 2.58 ± 0.10 μm/s vs. HS: 2.21 ± 0.08, p <0.05).
Conclusion: Experimental models proposed in this study not promote cardiac remodeling and predisposition to heart failure under conditions of obesity, but cardiomyocyte contractile dysfunction in high-sucrose diet was observed.

Funding: CNPq (grant number 402090/2016-0) and CAPES (grant number: 88881.196771/2018-01).

PO2.049

Risk assessment in obese patients

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There is a close relationship between lipid profile changes and aging. The prevalence of obesity in older people is increased, being one of the major risk factor of age-related diseases. Atherogenic index (AI) could be good predictor for metabolic disturbances. Our study aimed to investigate the link between AI and obesity incidence at older patients (over 65 years old). Patients (n = 358) were divided into 2 groups: obese patients group (n = 224); normal weight patients (n = 134) as control group. AI values are significantly higher (0.21±0.30 vs. 0.44±0.29; p <0.001) in obese compared to normal weight patients. In obese patients, 76.33% are at high risk and respectively at normal weight patients 42.53%, are at high risk (hence atherogenic risk increases 1.79 times). From the point of view of gender, obese women have significantly lower AI values than men (p <0.001), so even at menopause, women have a lower atherogenic risk. The prevalence of dyslipidemia rises from 31.94% in low risk AI to 75% in those at high risk. Multivariate regression analysis showed that patients with high AI had 4.35-fold risk for obesity [OR 4.35, 95% CI: 2.74-6.90, p <0.0001]. In conclusion, AI is associated with lipid changes; high risk AI leads to an increase in the prevalence of obesity, therefore AI could be a helpful marker in risk assessment of obese patients.

PO2.050

Differences in circulating microRNA signature in Prader–Willi syndrome and non-syndromic obesity

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Prader–Willi syndrome (PWS) represents the most common genetic-derived obesity disorder caused by the loss of expression of genes located on the paternal chromosome 15q11.2-q13. The PWS phenotype shows peculiar physical, endocrine and metabolic characteristics compared to those observed in non-syndromic essential obesity. Since miRNAs have now a well-established role in many molecular pathways, including regulatory networks related to obesity, this pilot study was aimed to characterize the expression of circulating miRNAs in PWS compared to essential obesity. The circulating miRNome of 10 PWS and 10 obese subjects, adequately matched for age, BMI and sex, was profiled throughout Genechip miRNA 4.0 microarray analysis. We identified 362 out of 2578 mature miRNAs to be expressed in serum of the studied population. The circulating miRNA signature significantly characterising the two populations include 34 differently expressed RNAs. Among them, miR-24-3p, miR-122 and miR-23a-3p highly differ between the two groups with a FC >10 in obese compared to PWS. In the obese subjects, miR-7107-5p, miR-6880-3p, miR-6793-3p and miR-4258 were associated to the presence of steatosis. A different signature of miRNAs significantly distinguished PWS with steatosis from PWS without steatosis, involving miR-619-5p, miR-4507, miR-4656, miR-7847-3p and miR-6782-5p. The miRNA target GO enrichment analysis showed the different pathway involved in these

two different forms of obesity. Although the rarity of PWS actually represents a limitation to the availability of large series, the present study provides novel hints on the molecular pathogenesis of syndromic and non-syndromic obesity.

PO2.051

Effect of spirulina on liver, kidney and pancreatic lesions induced by a fructose enriched diet in a rat model of non-alcoholic fatty liver disease

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Introduction: Spirulina, a blue-green alga, has recently received full attention for its role in the treatment of non-alcoholic fatty liver disease (NAFLD). Spirulina supplementation has been shown to correlate with an improvement of this disease. The main objectives of this work were to determine the effect of consuming a fructose-enriched diet for 16 weeks on the development of hepato-pancreatic-renal lesions and to study the effect of administration of spirulina in the improvement of these lesions in male Wistar rats.
Methods: Forty Wistar healthy male rats, weighing on average 150-200g, were randomly divided into four groups of 10 rats. They received diets of equal quantities (20g / day), but with different compositions for 16 weeks. The first group received a standardized diet, the second group received a 40% fructose enriched diet, the third and the fourth groups were assigned the same diet composition as the second group but enriched with 5% and 10% spirulina (of the total weight) respectively.
Results: At week 16, the 40% fructose-enriched group had the highest liver weight and percentage of steatosis (34%) ($P < 0.05$). This group showed significantly higher levels of plasma triglycerides between groups (week 16) and a significant decrease in adiponectin within group (week 1-week 16). In the fourth group, the administration of spirulina at a dose of 10% attenuated steatosis (13.8%) and high fructose-induced triglyceride levels ($P < 0.05$). The energy intake/rat/day was also significantly reduced as compared to other groups. In addition, in this group, levels of TNF-α and urea were significantly reduced within group (week1-week16). Nevertheless, the 10% enriched spirulina diet slightly attenuated liver, pancreas and kidney fibrosis induced by the 40% fructose enriched diet.
Conclusion: Spirulina, at 10% concentration, could be considered as an alternative to increase satiety, reduce steatosis and ameliorate blood and inflammatory parameters, but not to reduce organ fibrosis.

PO2.052

Atherosclerotic plaque in morbidly obese patients determines the improvement in oxidative profile and the remission of comorbidities one year after bariatric surgery

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Background & Aims: Obesity is considered an oxidative stress (OS) state, defined as the unbalance between the production of pro-oxidant substances and antioxidant defenses. Excessive reactive oxygen species (ROS) play an important role in the pathogenesis of many cardiovascular diseases, including atherosclerosis. Some of the beneficial effects of bariatric surgery on cardiovascular risk associated with obesity might be achieved by preventing the progression of the initial stages of atheromatosis.
The aim of this study is to evaluate if there are differences in biomarkers of oxidative stress between morbidly obese patients with and without atheromatous plaque, before and after bariatric surgery.
Methods: Sixty-six morbidly obese (BMI ≥40 kg/m^2) patients who underwent bariatric surgery were divided in two groups: patients with and without atheromatous plaque. We evaluated anthropometric and biochemical parameters in plasma before surgery and after a 6 and 12 months follow-up period.
Results: In the group obese with plaque there were more patients with comorbidities. Morbid obese had more OS in basal situation than 12 months after surgery: high levels of ox-LDL and MDA were found before bariatric surgery. In all periods, the amount of OS markers was higher in plaque group. One year after surgery oxLDL decreased 52.4% in patients without plaque and 37.7% in the plaque group. MDA decreased similarly in patients without and with plaque (78.2% and 72.0% respectively).
Antioxidant parameters were altered in morbid obese but along the twelve-month follow-up period the antioxidant defences improved. SOD2 levels significantly decreased after surgery (52.4% in patients without plaque and 37.3% in plaque group). PON1 increment was higher in patients without plaque (113.0%) than in patients with plaque (15.8%); $p<0.0001$. One year after surgery, catalase activity increased 107.4% in patients without plaque and 34.1% in patients with plaque. At 6 and 12 months periods, catalase activity was significantly higher in patients without plaque; $p<0.05$ and $p<0.0001$ respectively. We found a negative correlation between PON1 and ox-LDL in patients without plaque.
Although in the plaque group we also found differences between periods, the improvement was greater and faster in the group without plaque.
Conclusion: Bariatric surgery attenuated oxidative stress markers 6 months and 1 year after surgery. Twelve months after surgery, antioxidant defenses improved and OS decreased. Although bariatric surgery allows remission of comorbidities and decreased risk factors in both groups, the prognosis is always better for patients without atherosclerotic plaque.

PO2.053

Association between myeloperoxidase and obesity in older patients

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Introduction: Obesity is a complex metabolic disorder, and is associated with anthropometric, biochemical and physiological abnormalities, that lead to inflammation, insulin resistance (IR) and cardiovascular disease (CVD).

Myeloperoxidase (MPO), a heme protein secreted by activated neutrophils and macrophages, plays an important role in the initiation and progression of acute and chronic inflammatory diseases. Many studies have suggested that MPO may be involved in the development of obesity and IR.

Methods: This study aimed to evaluate the levels of MPO in two groups of older patients (71.38 ± 8.51 years): a group of control patients and a group of patients with obesity. MPO levels were determined in serum by immunoenzymatic assay and spectrophotometric detection at 450 nm.

Results: Our results showed the serum MPO level was significantly increased in the group of patients with obesity compared with a control group (821.52 ± 304.17 vs 498.31 ± 172.12 ng/ml serum).

Conclusion: In conclusion, serum MPO levels are elevated in patients with obesity, wich demonstrates their role in degradation of fibrous plaque and is considered a marker for the inflammatory and oxidative status in obese patients. Thus, the higher concentrations of MPO suggesting a positive correlation between activation of MPO and metabolic disorders.

PO2.054

Linking obesity and the Sustainable Development Goals: A new model for projecting BMI-related premature mortality from noncommunicable diseases

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Introduction: Obesity is a major contributor to premature mortality from the four major noncommunicable diseases (NCDs), namely cardiovascular disease, cancer, chronic respiratory disease, and diabetes. Globally, NCDs account for 41 million deaths annually and 15 million of these are premature (between 30-70 years). Furthermore, according to data from the Global Burden of Disease study, high BMI directly accounted for 4 million deaths in 2015 (1). In addition, NCDs pose a substantial economic burden to society. The achievement of the 'Sustainable Development Goal (SDG) Target 3.4' of reducing premature mortality from NCDs by one third by 2030 requires intensified reduction in rates of obesity. The aim of this study was to illustrate the projected impact of BMI on NCD-related premature mortality in 2030 in five high-income and upper-middle-income countries.

Methods: A BMI Mortality Model was developed based on population projection data on BMI, age and gender distribution in 200 countries (2) and applied associations between BMI and premature mortality from NCDs (3). The model was validated by independent experts within the field of obesity and health economics. The model compares three future scenarios for 2030: linear growth scenario (current BMI levels extrapolated linearly), status quo scenario (current BMI levels remain unchanged), and no excess weight scenario (assuming no one will have BMI above 25).

Results: When compared to the linear growth scenario, application of the status quo scenario resulted in the following decrease in premature NCD-related deaths by 2030: 5% decrease in Brazil, Denmark, and Mexico, 6% in Canada, and 7% in United Kingdom. In contrast, if there is no overweight or obesity by 2030 (no excess weight scenario) premature mortality will decrease by 25% in Brazil, 26% in Denmark, 28% in Mexico, 30% in Canada, and 31% in United Kingdom (Table 1).

Conclusion: This study provides important evidence on the extent to which excess BMI impacts the premature mortality from NCDs in selected countries. Addressing the growing burden of obesity is critical to achievement of the SDG 3.4 and requires timely and evidence-based measures to halt the growing rates among the population and treatment of those living with obesity.

Tab. 1. Total number and relative reduction of NCD-related premature mortality (between 30-70 years) in five countries by 2030 according to three scenarios.

	Linear growth scenario	Status quo scenario	Status quo scenario	No excess weight scenario	No excess weight scenario
Country	Total number	Total number	Reduction compared to linear growth scenario (%)	Total number	Reduction compared to linear growth scenario (%)
Brazil	347,316	329,267	5	261,294	25
Canada	67,760	63,617	6	47,214	30
Denmark	11,220	10,609	5	8,259	26
Mexico	205,256	194,100	5	198,735	28
United Kingdom	127,645	118,234	7	87,552	31

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PO2.055

The effect of nutrient-extraction blender preparation of fruit on postprandial glucose response in overweight and obese adults

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Introduction: Increased fruit consumption is associated with a lower risk of several chronic diseases [1]. Unlike traditional juicers that remove the pulp leaving only the juice, 'nutrient-extractor' blenders homogenize the whole fruit without removing fiber. It is particularly important to understand the effect of fruit consumed in this way on the glycaemic response in overweight or obese, who are susceptible to glucose intolerance. Recent findings in healthy weight group demonstrated that consumption of nutrient-extracted mixed fruit resulted in a significant lowering of the glycaemic index GI compared with whole mixed fruit [2]. The mechanism responsible for this effect is unclear and it is unknown whether a similar response would be elicited in an overweight group.

Methods: Twelve OB/OW subjects (BMI: 33.1 kg/m^2; mean age: 40.8 y) and 12 HW subjects (BMI: 22.2 kg/m^2; mean age: 22.3 y) participated. After an overnight fast, participants consumed one of 3 meals containing 25g sugar/serving in a random order: kiwi/mango whole fruit, nutrient-extracted kiwi / mango and glucose control, with a minimum 3-day washout period between tests. Glucose levels were obtained via finger prick blood sample at baseline and at 15 minute intervals for 2 hrs post-prandial. GI was calculated from the incremental area under the 2-h glucose response curve.

Results: Blood glucose responses to the whole fruit, nutrient extracted fruit and glucose control did not differ between the OW/OB and the HW groups at any point. There were also no differences in the GI between the whole fruit and nutrient extracted fruit in the OW/OB group (GI whole 42.43 vs NE 42.69) or HW group (GI whole 59.18 vs NE 51.94).

Conclusion: This work confirms that the use of a nutrient extraction blender does not increase the GI of fruit in comparison to consumption of whole fruit in overweight and obese individuals who are otherwise healthy. Fruit prepared in this way did not adversely affect the change in post-prandial blood glucose in this sample. Further work is needed to explore the response to different fruits in a larger sample of obese people.

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Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Farid M. Jamjoom specialised company Ltd, but the funders have had no input into the research at any stage.

PO2.056

Platelets mitochondrial DNA methylation as a predictor of future CVD in adults with obesity

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Background: The reason why some adults with obesity develop cardiovascular diseases (CVD) and others do not is poorly understood. Platelet dysfunction contributes to the aetiology of CVD and, since platelets are anuclear, their prothrombotic function is both regulated, and supported by, the energy produced by the mitochondria. DNA methylation is altered in CVD cases and in those with higher CVD risk factors. Here, we investigated whether mitochondrial DNA (mtDNA) methylation is associated with future CVD outcome in adult with obesity.
Methods: Platelet mtDNA was isolated from plasma from 200 individuals with obesity (male 39%, mean age 62.5±10, mean BMI 35.5±5.1). Of these, 84 individuals developed CVD within 5 years and 116 individuals remained CVD-free. MtDNA methylation was quantified in mitochondrially-encoded Cytochrome C Oxidase I (MT-CO1, 2CpGs), MT-CO2 (2 CpGs), MT-CO3 (2 CpGs), tRNA Leucine 1 (MT-TL1, 2CpG1) and phenylalanine (MT-TF, 1CpG), D-Loop (1 CpG), and Light-strand-Origin-of-Replication (MT-OLR, 3 CpGs) by bisulfite-pyrosequencing.
Results: MtDNA methylation was higher in MT-CO1 CpG2 ($p = 0.014$), MT-CO3 CpG1 ($p = 0.042$), and MT-TL1 CpG2 ($p = 0.008$) in the future CVD group compared with the obese control group. For each of these three CpG positions, using ROC curves we established a threshold (12.0% for MT-CO1 CpG2, 1.5% for MT-CO3 CpG1, and 3.0% for MT-TL1 CpG2) above which risk of future CVD is higher. A model was generated using the three thresholds (Score 0 = none CpG position, 1 = any CpG position, and 2 = 2 or 3 CpG position above the threshold). Risk of CVD was significantly greater with all three markers combined ($p = 0.003$) and the CVD hazard ratios increased progressively from Score 0 (HR 1.44) to Score 2 (HR 2.59). Methylation at all three mtDNA sites was independent of conventional CVD risk factors, including systemic inflammation, fasting blood glucose concentration, and blood pressure.
Conclusion: Individually, methylation at MT-CO1, MT-CO3, and MT-TL1 is a strong predictor of future CVD and all three methylation markers combined provides even stronger prediction of future CVD risk. Methylation of these genes was independent of conventional CVD risk factors and so may represent an intrinsic predictor of future CVD in adults with obesity.

Conflict of Interest: None.

Funding: Santander travel grant.

PO2.057

Experimental obesity diet-induced: effects of time on glycaemia, central adiposity and l percentage of body fat

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Introduction: Experimental models of obesity diet-induced have been widely used to understand the development of obesity and metabolic syndrome (MS). In this sense, visceral fat plays a central role in the development of MS, being related to insulin resistance, hypertension and dyslipidemia. However, due to the great variability of diets, it is still unclear the relationship between the consumption time of fat-rich diets and their effects on different variables.
Objective: Thus, the aim of this study was to analyze the effect of high-fat diet on body mass, visceral fat deposition and fat percentage in different periods.
Material and Methods: Male Wistar rats were kept in a coletive cage with food and water ad libitum, on a 12:12-h light–dark cycle at 23±1°C. The animals were assigned in five groups (n = 9) according with diet: Chow Diet (C) and High-fat Diet (HF) and the time of course of diet (0, 28 and 56 days). The Institutional Animal Ethics Committee approved all animal procedures. Experimental groups received chow diet (C) provided by Agromix (Jaboticabal, Brazil) or high-fat diet (HF) previously standardized by our research group. The HF diet has 4.66cal/g and 20% of fat and C diet has 3.85cal/g and 4.80% of fat (IKA-5000; MA-061). The percentage of body fat (%BF) was determined by dual-energy X-ray absormetry (DEXA) one week before the euthanasia. In the 0, 28 and 56 days the euthanasia were performed. The glycaemia was measured in fasting state and the visceral adipose tissue was removed and weighed. Results are expressed as mean ± sd. Data analysis was done using SPSS 22. Statistical comparisons were carried out by ANOVA one-way and post hoc analysis (Tukey-Kramer multiple comparisons).
Results: Animals fed with chow diet did not present statistical differences between the times of evaluations in the analyzed variables. On the other hand, 28 days of consumption of the high-fat diet was sufficient to promote significant changes in all analyzed variables. These differences were maintained up to 56 days (see Table I).
Conclusion: The results suggest that the high-fat diet studied in the present research is a valid experimental model for induction of obesity. However, the excess of adipose tissue per se is still not enough to prove the efficiency of HF in the development of metabolic syndrome. In this way, new research must be carried out to determine the time required for the development of diseases related to obesity.

Tab. 1. Effects of time on glycaemia central adiposity and percentage of body fat.

Variables / Groups	Glycaemia (mg/dl)	Relative mass of Visceral fat pad (g/100g BM)	Percentage of body Fat (%BF)
C0	101±11.81	0.74±0.14	12.93±2.01
C28	102.2±8.0	0.93±0.24	13.34±2.44
C56	101.94±8.53	0.74±0.25	12.06±3.36
HF28	116.66±9.83 a,b	1.54±0.64 a,b	19.40±5.52 a,b
HF56	114.33±9.83 a,c	1.36±0.52 a,c	19.17±1.19 a,c

a versus C0; b versus C28; c versus C56; BM: body mass; HF: High-fat diet; C: Chow diet.

PO2.058

Best cross-sectional computed tomogram plane to measure the visceral adipose tissue area predicting metabolic syndrome

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Background: Visceral fat area measured by computed tomography is widely used to evaluate the risk of obesity and metabolic syndrome. However, the best cross-sectional imaging level of visceral fat area to predict metabolic syndrome is still unclear.
Methods: Computed tomography examination was performed to measure the visceral adipose tissue at the four different cross-sectional CT planes (L1-2, L2-3, L3-4 and L4-5 level) in healthy volunteers (151 men, 99 women). Metabolic syndrome was defined as the presence of two or more of: raised blood pressure, high triglyceride level, low HDL cholesterol, or high glucose. To determine the best imaging level of visceral fat

area to predict metabolic syndrome, stepwise multiple logistic regression model was constructed. Receiver-operating characteristic (ROC) curve analysis was performed to analyze the optimal cut-off point to predict metabolic syndrome.
Results: In a stepwise logistic regression model including age, visceral fat areas at 4 different levels as independent variables, visceral fat area measured at L1-2 level was identified as single best predictor for metabolic syndrome in both sex group. The optimal cut-off point of visceral fat area measured at L1-2 level to predict metabolic syndrome was 109.0 cm^2 (men: 109.0 cm^2, women: 66.6 cm^2) in this study subjects.
Conclusion: Findings in this study suggest that visceral fat area measured at L1-2 level may be superior to predict metabolic syndrome than L4-5 level which is most frequently used in clinical setting.
Keyword: visceral adipose tissue, computed tomogram, metabolic syndrome

PO2.059

IL10 induction by adipose stem cells in the programming of diabetes by obesity

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In obesity adipose tissue (AT) dysfunctions initiate insulin resistance (IR). Adipose stem cells are both adipocytes progenitors and immunosuppressors. Obesity alter their differentiation potential. We postulate that their immunosuppressive defect may also contribute to AT inflammation. We have addressed the consequence of overfeeding on IL10 production induced by ASC on immune cells. IL10 is the main immunosuppressive cytokine in AT. To assess ASC dysfunctions before AT inflammation, we developed a protocol of IR programming by overfeeding of mothers during lactation.
ASC isolated from subcutaneous AT (S-ASC) were amplified by culture. IL10 was measured by ELISA in the supernatant of ASC co-cultivated for 48h with splenocytes with LPS. IL10 producing cells were identified by flow-cytometry. For the programming, C57/Bl6 mice mothers were fed with a chow or with a high fat high sucrose (HFHS) diet during lactation. ASC were analysed from the 10 weeks (w) old male offspring fed with a chow or with a HFHS diet after weaning. Glucose metabolism was analysed by glucose and by insulin tolerance tests. The inflammatory status of adipose tissue was assessed by the expression of cytokines (IL10, TNFα, IL6, MCP-1) by RT-qPCR.
ASC from chow diet mice increased the expression of IL10 by splenocytes by inducing the expansion of B regulatory cells (Breg). Intolerance to glucose (IG) was observed after 6 w of HFHS post weaning and IR after 14 w. Mice breastfed with overfed mothers only during the 3 w of lactation were IG at the age of 10 w confirming the programming of metabolic problems, but additional 6 w HFHS after weaning did not lead to IR pointing that these mice were still in the early phase of obesity. Accordingly, in subcutaneous AT, no inflammation marker was detected after 6 w of post-weaning HFHS even in programmed animals. S-ASC collected from programmed mice, showed a decreased of proliferation and expression of adipogenic genes (PPARγ and CEBPα) identical to the decreased observed with exposure to HFHS after weaning only. However neither programming, nor 14 w exposure to HFHS diet altered the ability of ASC to induce IL10 production by splenocytes in co-cultures.
ASC were prone to stimulate IL10 production by Breg and this property was not altered by HFHS, even in ASC isolated from inflammatory adipose tissue after 14 w HFHS diet. Programming by HFHS only during lactation, alter the expression of adipogenic genes in ASC identical to overfeeding after weaning. This occurred before changes in AT genes expression, indicating that S-ASC were early and durably affected by overfeeding during lactation but their potential involvement into the initiation of inflammation did not involve a failure in their intrinsic ability to support IL10 production.

PO2.060

miRNA expression profile in HUVECs and exosomes secreted by HUVECs cells according to the composition of the type of oil (extra virgin olive oil vs. sunflower oil)

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Introduction: The endothelial cells are very exposed to the effects of the intestinal triglyceride-rich lipoproteins (TRL). In addition, endothelial cells also secrete exosomes with certain content in miRNA. However, the effect that these TRL can have on the expression of the miRNAs of endothelial cells and the exosomes is not known. We wanted to see how intercellular communication can be modified depending on the type of oil consumed: the type of oil (extra virgin olive oil (EVOO) and sunflower oil (SO)), can exert certain effects on the miRNA of the endothelial cells, and in the secretion of exosomes.
Methods: This study was carried out on 10 non-obese subjects who had taken 2 different breakfasts which consisted of 50gr of bread + 25ml of oil, of two different groups: EVOO and SO. The intestinal TRL of the blood sample obtained at 3 hours of the meal will be obtained and the HUVECs were incubated with the TLRs from the two different types of oil. Exosomes of the supernatants were isolated and purified from the supernatants of HUVECs cultures. We employed next-generation sequencing (NGS) to analyze miRNA profiles of the HUVECs and exosomes secreted by HUVECs cells.
Results: We have found a total of 126 miRNAs with differential expression (DE) in HUVECs cells incubated with the TRL from EVOO and SO. On the other hand, in the exosomes secreted by HUVECs cells incubated with the different TRL, we have found a total of 60 miRNAs with DE. We observed that 26 miRNAs were common expressed in the HUVECs cells and the exosomes secreted for these cells. This miRNAs common participate in different biological functions such as cell cycle, cellular growth and proliferation and in different diseases such as immunological disease, cardiovascular disease, inflammatory disease.
Conclusion: In this study have obtained a DE of the miRNA according on the type of oil both in the HUVECs cells and in the exosomes secreted from these cells.

Conflict of Interest: None Disclosed.

Funding: This work was supported in part by a grant from the Instituto de Salud Carlos III (PI14/01306) and has been co-funded by FEDER funds.

PO2.061

Effects of bariatric surgery on DNA methylation in adults: a systematic review

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Introduction: DNA methylation is an epigenetic mechanism through which environmental factors including obesity influence health. Obesity is a major modifiable risk factor for many common diseases including cardiovascular diseases and cancer. Obesity-induced inflammation resulting from aberrantly-methylated inflammatory genes may drive disease risk.

This systematic review reports the effects of weight loss induced by bariatric surgery (BS) on DNA methylation in adults with obesity focusing on inflammation-related genes.
Methods: A systematic review was performed using Medline, EMBASE and Scopus, to identify studies in adult humans that reported DNA methylation following BS.
Results: Out of screened 10640 titles, 14 intervention studies were identified all of which reported significantly lower BMI post-surgery. Normal BMI was achieved in those studies where follow up was ≥12 months.
DNA methylation was assessed in five different tissues (blood = 6, adipose tissues = 4, skeletal muscle = 2, liver and sperm). Most studies (n = 13) assessed DNA methylation at specific genes or genome wide using bisulphite-based pyrosequencing. Eleven studies reported significant changes in DNA methylation after BS. BS increased methylation of PDK-4 loci in skeletal muscle and blood in two intervention studies while effects of BS on IL6 methylation in blood differed between studies (increased in one study and decreased in another).
Conclusion: To date, relatively few studies have investigated the effects of BS on DNA methylation in humans. Whilst methylation changes at a number of genomic loci have been reported (11 out of 14 studies), the effects on methylation of inflammatory genes is limited and inconsistent. In addition, measurements have been made in different tissues which hinders combining or comparing data across studies.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.062

Effect of bariatric surgery on LEP gene methylation in recal mucosal samples: an intervention study

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Introduction: Colorectal cancer (CRC) is the fourth most common cancer in UK. Obesity is a major modifiable risk factor for CRC. LEP gene encodes for leptin hormone which is involved in regulation in body weight. LEP is overexpressed in colorectal mucosa in patients with CRC which have been postulated to contribute to development and progression of CRC. This study aims to investigate the effects of weight loss induced by bariatric surgery (BS) on LEP gene methylation in rectal mucosal samples.
Methods: Rectal mucosal samples were collected from participants in Biomarkers of Colorectal cancer After Bariatric Surgery (BOCABS) study before and 6 months after bariatric surgical intervention and from healthy non-obese control group at 10 cm from anal verge using sigmoidoscopy. Methylation levels of LEP gene in rectal mucosal biopsies were assessed using pyrosequencing technique (Qiagen Pyromark Q96 ID).
Results: Methylation levels were studied in rectal mucosal samples of 19 participants (46.7 years old, 4 males) and 9 controls (48.5 years old, 4 males).
There was a significant decrease of BMI in participants after BS (42.95 vs 33.1,p <0.001), while mean BMI in control was 25.3.
There was a significant difference between methylation levels of LEP of mean of all CpG sites in controls and in participants before (45.5% vs 53.9%, p = 0.001) and after (48.5% vs 53.9%) BS.
There is a significant increase of LEP methylation levels of the mean of all CpG sites after surgery (45.3% vs 48.55, p = 0.005) as well as 1st (61.6% vs 65.1%,p = 0.003), 3rd (38.2% vs 41.9%, p = 0.005), and 4th (55% vs 58.7%, p = 0.001) CpG sites.
Conclusion: Our results suggest that weight loss following BS appear to normalise methylation levels of LEP gene. This finding might contribute to better understanding of the protective effect of weight loss on lowering risk of CRC. However, further evidence is needed to support such finding.

Conflict of Interest: None Disclosed.

Funding: No Funding.

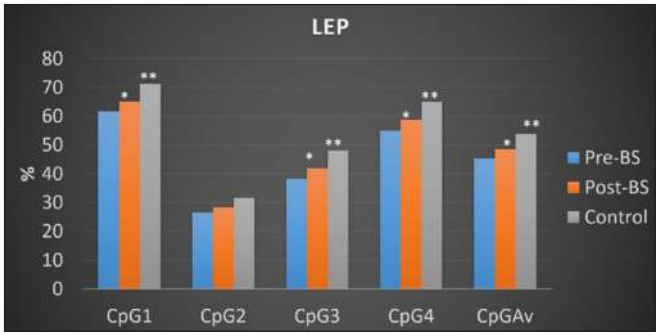

Fig. 1. compares meal levels of LEP methylation between controls, pre-BS and post-BS groups (* p<005 using paired student T-test between pre-BS and post-BS, ** p<0.05 using independent student t-test to compare between post-BS and controls).

PO2.063

Genomics of the obese patient before and after bariatric surgery

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Rare and frequent coding variants may be associated to obesity - related traits
Introduction: Obesity is today a worldwide clinical and public health burden. And it is associated with an increased risk of type 2 diabetes, cardiovascular disease, cancer, metabolic syndrome, nonalcoholic steatohepatitis, and mortality (1). The pathogenesis of obesity is clearly complex, involving multiple interactions among behavioral, environmental, and genetic factors (2). The identification of multiple genetic defects responsible for monogenic syndromic and non-syndromic, oligogenic and polygenic forms of obesity over the last 20 years confirm an inherited component (3). A partial genetic overlap has been demonstrated between BMI variation in general populations and extreme forms of obesity (4) However, little is known on the genetic determinants of BMI variation among obese people.
Methods: It is a longitudinal study with 448 morbidly obese patients. Clinical data were extracted from the CHRU Lorraine's patient database. And blood was collected during the surgery for DNA extraction using GE healthcare kit. Genotyping was performed using 240k SNPs Illumina Human Exome-12v1.2 BeadChip Array. A Quality control was performed using GenomeStudio 2.0, Plink considering a callrate > 99%, and callFreq >95%.
Results: By linear and logistic regression analyses, our results have shown that 169(48%) of patients are carriers of at least 1 of these mutations predisposing to obesity, and 182 are non-carriers, which explains that carriers for these mutations present 1.3 unit of BMI more than in the general population before the surgery. The variants do not have effect on weight loss in response to the modifications due to lifestyle and the surgery after 2, 7, and 12 months.
Conclusion: The results suggest that rare and low frequency genetic variants associated with BMI in a general population have six times more effect on BMI in the morbidly obese cohort, and different genetic variants control the response to obesity lifestyle modification and surgery.

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Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the French PIA Project << Lorraine Universite d Excellence>>.

PO2.064

Obesity and colorectal cancer: impact of the gut microbiota

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Introduction: Obesity is considered an important factor in the increased risk of CRC (up to 70%), but the role that the gut microbial population plays in this link is not well established. The aim of this study was to determine the gut microbiota composition in fecal samples from CRC patients with and without obesity compared to the microbiota present in normal-weight healthy controls, in order to unravel the possible association between gut microbiota, the inflammatory level and the gut permeability in the context of obesity-associated CRC.
Methods: The study was conducted over 50 CRC patients (25 patients with BMI <30 km/m² and 25 patients with BMI >30 km/m²) who were age and sex paired to 30 normal-weight healthy controls. Fecal bacterial DNA was extracted and analyzed by 16S rRNA sequencing using an IonS5 platform and followed by a bioinformatic analysis by QIIME2.
Results: Patients with CRC had lower bacterial diversity and richness than normal-weight controls, being even lower in CRC subjects with obesity (BMI>30kg/m²). The microbiota of CRC patients was characterized by a reduction in butyrate and lactate producing bacteria (*F.prausnitzii, Roseburia, Butyricimonas and Bifidobacterium*) and an increase in opportunistic pathogens (*Streptoccocus, F.nucleatum and E.coli*). Moreover, the relative abundance of these opportunistic pathogens was significatively higher in obese CRC patients compared to normal-weight CRC patients and healthy controls. The serum levels of IL1B (proinflammatory cytokine) and the gut permeability (determined by zonulin levels) were significatively increased in obese CRC patients than in normal-weight CRC patients and healthy controls. Additionally, zonulin levels were significantly correlated with the relative abundance of several microbial groups, being in a positive way with *Prevotella* in normal-weight CRC patients and with *E.coli* in obese CRC patients, while negative associations were found with the relative abundance of *Ruminococcus and F.prausnitzii* in normal-weight controls.
Conclusion: The presence of obesity in CCR patients is related to lower diversity of microbiota, higher gut permeability, higher presence of opportunistic pathogens such as *F.nucleatum*, which in turn could be responsible, at least in part, of the higher levels of inflammation found in these patients. These data point out the importance that gut microbiota could have in the appearance and develpment of CRC-associated to obesity and could give new clues for the development of new diagnostic tools for CRC prevention.

Conflict of Interest: None Disclosed.

Funding: This work was supported by a grant from the Instituto de Salud Carlos III co-founded by Fondo Europeo de Desarrollo Regional-PI15/00256, Madrid-Spain.

PO2.065

The FXR rs11110415 (T) allele is associated with increased prevalence of breast cancer in the Swedish Obese Subjects study

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Introduction: Obesity is a known risk factor for breast cancer, and the suggested mechanisms underlying the higher risk of breast cancer with obesity are complex. The bile-acid-activated Farnesoid X receptor (FXR) is a promising drug target for obesity, but is also suggested to play a role in breast cancer development. In addition, activation of FXR inhibits leptin signaling in breast malignancy fibroblasts, thereby counteracting tumor-promoting activities. Thus, it is possible that genetic variants involved in bile acid signaling affect the risk of breast cancer in patients with obesity. To test this hypothesis, we have analyzed the association between the FXR rs11110415 and breast cancer prevalence in the Swedish Obese Subjects (SOS) study.
Methods: The rs11110415 SNP was genotyped in women from the SOS study using the QuantStudio 12K Flex system with pre-spotted custom OpenArray plates from Life Technologies. Information on cancer events was obtained from the Swedish National Cancer Registry. Median follow-up time was 18.1 years (interquartile range 14.8–20.9 years, maximum 26 years). This study is registered with ClinicalTrials.gov, NCT01479452.
Results: We found that carriers of the minor T allele had a higher prevalence of breast cancer (16%) than individuals homozygote for the major allele (11%), and this association was statistically significant ($p<0.0001$).
Conclusion: Our results show that FXR rs11110415 (T) allele is specifically associated with higher prevalence of breast cancer in the SOS cohort.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Swedish Research Council and by grants from the Swedish state under the agreement between the Swedish government and the county councils (ALF-agreements).

PO2.066

Serum magnesium levels are associated with glycemic and insulin resistance parameters in a population of obese individuals

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Introduction: Magnesium, the second most abundant intracellular cation in the body, with a widespread role in the body, is an essential cofactor of many enzymes including those used in glycolysis, synthesis of carbohydrates and response to certain hormones, for example, it plays an important role in the secretion and mediation of insulin action, playing a key role in glycemic profile.
Objective: To determine the relationship between serum magnesium levels, fasting glucose, insulin, A1c, and HOMA-IR, in obese patients.
Methods: We performed a retrospective observational study including all morbidly obese patients submitted to bariatric surgery – Roux-en-Y gastric bypass (RYGB), laparoscopic adjustable gastric band (LAGB), and sleeve gastrectomy (LSG)- between January 2010 and June 2017, to evaluate the relationship between the plasmatic levels of magnesium and glucose parameters. Patients without magnesium levels records were excluded. We used HOMA-IR as a measure of insulin resistance. We defined hypomagnesemia as serum magnesium levels≤1.5mEq/L. To define DM we used the 2018 ADA guidelines criteria: HbA1c ≥ 6.5%, fasting plas-

ma glucose of 126mg/dL or 2-h post-load plasmatic glucose ≥200mg/dL during an OGTT. We also considered as having diabetes, patients using antidiabetic treatment. The serum magnesium was measured by spectrophotometric determination in serum with xylidyl blue. The association between the levels of A1c, HOMA-IR, fasting glucose and insulin with serum magnesium levels was tested using Spearman correlation coefficient, adjusted for sex, age, BMI and surgical technique using a linear regression.
Results: We included 1551 patients, of which 84.9% were females, with a mean age of 42.0±10.7years, initial BMI 43.0 kg/m^2 (AIQ = 6.8), waist circumference 123.4±13.26cm, hip circumference 132.0cm (AIQ = 15.0) and 20.5% of the patients had DM. Regarding magnesium, the mean initial serum magnesium level was 1.59mg/dL (AIQ = 0.18) with 42.9% of diabetic patients having this disease. We found an association between fasting serum magnesium levels and fasting glycemia (β = -0,219; t = -6.370; p<0.01), A1c (β = -0.217; t = -6.107;p <0.01) and HOMA-IR (β = -0.03; t = -2.425;p <0.05) even when adjusted for age, sex, BMI and presence of DM. The effect of fasting insulin on serum magnesium levels is no longer significant (β = -0.36; t = -1,270; p = 0,204) after this adjustment.
Conclusion: Magnesium levels are associated with fasting glycemia, A1c and HOMA-IR, even after adjusting for sex, age, BMI and presence of DM.

PO2.067

High fat diet affects mitochondrial function in brain cortex and synaptosomes in mice

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Introduction: The consumption of high-fat diet (HFD), widely diffused in industrialized countries, is implicated in several metabolic pathologies, which can be risk factors for the development of neurological and neurodegenerative diseases[1]. Mitochondria specifically located at synapses (synaptosomal mitochondria) play a key role in providing energy to support synaptic functions and plasticity. Thus, the impairment of their functions, following HFD consumption, may contribute to neurodegenerative diseases[2]. The aim of our study is to analyse the dysfunctions and the oxidative stress of brain cortex mitochondria and synaptosomal fraction in a mouse model of diet induced obesity.
Methods: MaleC57Bl/6 mice were divided into two groups fed a standard diet or HFD for 12 weeks. At the end of the treatment, mitochondrial function and efficiency, inflammatory and antioxidant state were determined in brain cortex and synaptosomal fraction.
Results: HFD induces mitochondrial dysfunctions not only in brain cortex, but also in synaptosomal fraction. Moreover, HFD induced an increase in inflammatory parameters and a reduction in antioxidant activity in brain cortex isolated mitochondria and in isolated synaptosomes.
Conclusion: High fat diet, negatively affecting mitochondrial activity at synaptic level, alters the synaptic energy supply, leading to synaptic failures that could be an early event in neurodegenerative diseases.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.068

Impact of dietary fat replacement with rapeseed or sunflower oils on biomarkers of cardiovascular disease in healthy adults with overweight / obesity

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Introduction: The role that vegetable oils play in diets in relation to cardiometabolic health is an ongoing topic of debate. We have shown that the phenolic content of olive oil did not impact on proteomic cardiovascular health markers in a healthy cohort (1). This study aimed to investigate the effects of vegetable oils with different fatty acid compositions on markers of cardiometabolic health, in self-reported healthy adults with overweight/obesity.
Methods: Participants aged 25-75 with a BMI >25 and/or large waist (female >88cm, male >102cm) were randomly allocated to one of three groups, stratified for age and BMI: habitual diet, 20g/d RO or 20g/d SO, over 12-weeks (as a replacement). Urine and bloods were collected at 0, 6 and 12-week. Blood lipids were measured by enzymatic colorimetric method; Capillary Electrophoresis-Mass Spectrometry (CE-MS) was used to measure proteomic biomarkers of coronary artery disease (CAD), Chronic Kidney Disease (CKD), Heart Failure (HF) (2). Change from baseline at 6 and 12-weeks were computed and compared between intervention and control groups.
Results: Participants (n = 84) were aged 44±12 years, with a BMI of 30±5 and a WC of 102±17cm. Attrition at 6-weeks was 10% and 27% at 12-weeks. There was no marked change in weight at 6-week (0.2±2.4kg) or 12-weeks (0.4±2.9kg), with no difference between groups. One-way ANOVA showed no difference in any of the proteomic CE-MS biomarkers between groups at 6 or 12-weeks when treated as continuous variables, or blood lipids.
Conclusion: Dietary fat replacement with RO or SO did not impact on biomarkers of cardiovascular health over 6 or 12-weeks in this group of healthy adults with overweight or obesity. Attrition at 12-week was greater than anticipated, weakening the power of the study to detect an effect. Other confounding factors linked to diet and lifestyle remain to be investigated.

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Conflict of Interest: The rapeseed oil used in this study was provided as a gift by Hillfarm Ltd, without any further input in the study design or data analysis

Funding: This study was partly funded by the BBC, as part of a study featured in a TV programme.

Childhood and Adolescent Obesity

PO2.069

The dietary intake of total polyphenols and risk of metabolic syndrome in European adolescents: the HELENA study

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Introduction: Dietary polyphenols have been studied for their potential health effects like on metabolic health, but the situation during adolescence is little explored. This study aimed to test the association between polyphenol intake and metabolic syndrome risk, including obesity in European adolescents.

Methods: The HELENA cross-sectional population-based survey included 657 participants (54% girls; 14.8% overweight; 12.5-17.5 years), who had a fasting blood sample and data on dietary intake of polyphenols from two-non-consecutive 24 hour recalls matched with the Phenol-Explorer database. Metabolic syndrome was defined via the pediatric American Heart Association definition (central obesity, blood pressure, glucose, triglycerides, high-density cholesterol). Multilevel linear regression examined the associations of total polyphenol quartiles with obesity and metabolic syndrome components, while logistic regression examined the associations with metabolic syndrome risk.
Results: Median polyphenol intake was 326 [Q1:167-Q4:564] mg/d. Polyphenol intake was significantly higher in Non-Mediterranean countries and in those with higher intake of total carbohydrates, mono- and disaccharides, fibre, and vitamin C, and lower consumption of polysaccharides, lipids, monounsaturated fatty acids, and minerals. After adjusting for all of the potential confounders (socio-demographic variables and other nutrients), BMI z-score was significantly lower among individuals in the highest quartile of total polyphenol intake (0.1 as zBMI and 4.5% overweight versus 0.4 and 7% overweight in lowest quartile). No significant associations were found for other metabolic syndrome components or total risk.
Conclusion: Higher intake of total polyphenols was inversely associated with overweight, independent from socio-demographics or other nutrients.

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: The HELENA Study was carried out with the financial support of the European Community Sixth RTD Framework Programme (Contract FOODCT-2005-007034). The writing group takes sole responsibility for the content of this article. The European Community is not liable for any use that may be made of the information contained therein. The first author was sponsored as PhD student by Indonesia Endowment Fund for Education (LPDP, Indonesia).

PO2.070

Lifestyle study in Hungary among 11-18 years old young including factors influencing obesity

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Introduction: The lifestyle, attitudes and knowledge levels of children have a significant impact on the prevention of lifestyle-related non-communicable disease in later stages of life. The aim of this survey was to familiarize the lifestyle of young people between the ages of 11- 18, with special regard to their eating habits, knowledge and daily intakes. Another objectives were to find out attitudes, knowledge of the healthy lifestyle including parameters influencing obesity and assess physical activity.
Methods: As an initiative by TÉT Platform, the study used n = 800, 11-18 years old participants living in four regions of Hungary. Anthropometric measures, "three-day" dietary diary, and a lifestyle-related attitudes-knowledge-level questionnaire were used in the survey.
Results: 70% of the examined population think their own lifestyle healthy and only very few (3%) consider it unhealthy. They think the healthier way of life would be more achievable more sports and more persistence. Distribution of young people by BMI categories: 7.3% thin, 69.1 % normal, 18.4 overweighed, 5.1% obese. The average of the daily energy consumption met the recommendation in both sexes and in the group of 11-14 years old young people (2103 and 2392 kcal). Excess energy intake was observed in the group of the 17-18 years old boy participants (21.8%). Energy intake from fat (en%) was 35-36, higher than the recommended maximum (30 en%) in both sexes and all age group. The ratio of n-3 and n-6 fatty acids was 1:27 in average, more than the recommended 1:5 ratio. Energy intake from carbohydrates was lower (49 en%) than the recommendation (57 en%), but the energy intake from added sugar was higher (11.7 en%) than the recommended 8, maximum 10 en%.
In terms of food consumption, the total amount of vegetables and fruit was fairly below the recommended amount (about 400-450 g/day) in all age group and both sexes. The consumption of whole grain cereals and (brown) bread were low. Total consumption of milk and dairy products was 309 g/day, which is significantly less than the recommended 500 g/day.
Conclusion: In the lifestyle of young people between the ages of 11 and 18, traces of mistakes those are typical of adult population's attitudes, knowledge and in the consumption of certain food groups, can already be discovered. Obesity means a serious medical, public health and economic problem, and it requires higher public awareness and political support.

PO2.071

Nutritional selectivity and obesity in children with autism

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Introduction: Autism spectrum disorder (ASD) is a neuro-developmental disorder that negatively affects social skills and communication, which usually occur in the first three years of life. The prevalence of ASD among 11 Autism and Developmental Disability Monitoring (ADDM) areas for 2014 is 16.8 in 1,000 people (1 in 59 children). Individuals with autism have their own unique and unusual eating behavior. When compared with healthy children, swallowing, chewing and swallowing movements of these individuals were found to be different. Food rejection, pica, ruminating, vomiting, one-way nutrition, continuous consumption of a single food or over-eating can be given as examples of these problems. Children with ASD tends to coincide with preferences for a narrow range of low-nutrition, energy-dense foods and rejection of fruits, vegetables, and whole grains and this situation causes obesity. Obesity is a common disease in individuals with autism. This study was planned and conducted in order to evaluate the nutritional selectivity and obesity status of children with autism.
Methods: This study was conducted on 70 children diagnosed with Autism Spectrum Disorder who were educated in four Special Education and Rehabilitation Centers of Ministry of National Education between June 2016 and February 2017. The data were collected by means of face-to-face interviews with parents with children with autism. Body weight of the children was measured with the Tanita SC 330 brand body analyzer and their length was measured by stadiometer.
Results: Seventy percent of the children who are subject to the research are boys and 30,0% are girls. The mean age of children is 11.4 ± 3.0 years. According to age, 40% of children are obes according to percentile value (≥97.persentile). The proportion of those with normal weight is 31.4% (15.-85.p), followed by overweight (85.-97.p) (15.7%). Thirty eight point six percent of the children do not consume vegetables, 11.4% olives, 11.4% of them are cheese, the rest of them do not consume eggs, milk and fish.
Conclusion: As a result of the study, it was observed that children did not consume the nutrients that were beneficial for them and the BMI percentile values were quite high according to age. Therefore, in the following years, the risk of diseases such as cancer, cardiovascular diseases, diabetes, respiratory problems increases. Therefore, families should be given necessary nutrition training for their children and children should be tried to eliminate their selectivity.

PO2.072

Compliance monitoring using web-based technology for a better outcome in obesity patients

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Obesity is now the most prevalent form of malnutrition in the industrialized countries and is rapidly becoming highly prevalent in developing countries too. Obesity is considered now as a major contributor to the global burden of disease and disability. Management of obesity as a chronic disease begins with identifying individuals who may benefit from

treatment. Intensive lifestyle intervention is considered appropriate for all individuals with obesity. Ultimately, weight loss targets and approaches should be determined collaboratively by the patient and clinician and should be based on an overarching goal of improved health. The recommended minimum initial goal for weight loss to improve health is 5%-10%, although greater weight loss yields greater benefits and may be necessary to ameliorate certain weight-related complications. The goal of compliance-monitoring is to increase self-awareness of target behaviors and outcomes, thus it can serve as an early warning system if problems are arising and can help track success. One can use the Food Diaries, Exercise Logs, Metabolic Devices and Regular Weighing for compliance monitoring. Dr. Shikha's Nutrihealth has launched a smart scale which is connected to their mobile health application YuWoW, through which patients can get a personalized diet plan depending on their requirement.

PO2.073

Meal intake and overweight in schoolchildren aged 7 to 12 years old in a city in southern brazil

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Introduction: The risk of chronic non-communicable diseases (NCDs) and excess weight during childhood is associated with factors such as the omission of breakfast consumption, the lower daily frequency of meals and the larger meal sizes. The aim of this study was to describe the prevalence of overweight in schoolchildren aged 7 to 12 years old and to evaluate the association between six meals intake and overweight.
Methods: a cross-sectional study was conducted with a sample of 1074 schoolchildren aged 7 to 12 years enrolled in public schools in Florianópolis, state of Santa Catarina, Brazil. Children reported their food consumption by using the Food Intake and Physical Activity of School Children (CAAFE), an Internet-based software for the qualitative measurement of food consumption based on a single day recall. Measurements of weight and height were performed and Body Mass Index (BMI) was calculated as weight (in kg) divided by the square of height (in m). Children's BMI data was converted into z-scores (according to age and sex), based on the World Health Organization Growth References. Weight status were then categorized as non-overweight (BMI-for-age < +1.0 SD) or overweight including obesity (BMI-for-age ≥ +1.0 SD). Logistic regression was used to evaluate the association between meal intake and overweight.
Results: a higher proportion of children performed three or more meals a day (97.6%). The lunch was the most consumed meal (96.1%), followed by dinner (86.6%), breakfast (85.5%) and afternoon snack (82.1%). The prevalence of overweight found was 36.7% (95% CI 33.8%-39.7%). In the adjusted analysis, it was observed that children who ate breakfast and evening snack were less likely to be overweight when compared to non-overweight children (OR = 0.68, 95% CI = 0.47-0.99, OR = 0.7, 95% CI = 0.55-0.96, respectively).
Conclusion: There were significant associations between meal intake and overweight in schoolchildren aged 7 to 12 years old. Breakfast and evening snack consumption were associated with reduced risk of overweight.

PO2.074

Family predictors of dietary inflammatory index in children and associations with weight status at age 5 and 9: results from the Lifeways Cross-Generation Cohort Study in Ireland

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Introduction: A familial and social environment can influence offspring and the dietary inflammatory index (DII®) is associated with childhood obesity. These associations however have not been examined in three generations. We assessed intergenerational relationships between the energy-adjusted DII (E-DII) scores, its predictive factors in children and associations with weight status at age 5 and 9.
Methods: The study comprises 551 children and index-child´s mothers, fathers and grandparents who completed the study baseline questionnaire in Lifeways Cohort-Study. E-DII scores were generated at baseline for expectant mothers, fathers, grandparents, and at 5-year follow-up for the children, using a validated food frequency questionnaire. Body mass index (BMI) was determined when the child was 5 and 9 years. Associations were assessed by logistic regression and mediation analysis.
Results: After adjustment for confounders, higher children's E-DII scores were associated with higher risk of childhood obesity at age 5 (OR:1.09; 95%CI:1.00-1.37; P = 0.02) and overweight/obese (OR:1.06; 95%CI:1.01-1.09; P = 0.01 and OR:1.12; 95%CI:1.07-1.18; P = 0.01) at 5 and 9 years, respectively. Regarding predictors of child's E-DII, maternal and paternal smoking (OR:1.98; 95%CI:1.19-3.03; P = 0.001 and OR:1.64; 95%CI:1.12-2.49; P = 0.006, respectively) was associated with increased likelihood of higher E-DII score (median>0.58) in children. Child BMI and TV watching were associated with a more pro-inflammatory diet (P<0.05), whereas breastfeeding and family meals at the table were associated with a more anti-inflammatory diet (P<0.04). Higher child's DII scores were also associated with higher maternal DII scores at pregnancy (P<0.001) and at 5-year follow-up (P = 0.008). In the mediation analysis, significant associations were found in maternal line E-DII scores on child's E-DII scores at age 5.
Conclusion: Both parental and child´s risk factors were associated with higher child's E-DII scores and child pro-inflammatory diet is associated with overweight and obesity at age 5 and 9. In the maternal line, maternal grandmothers E-DII scores appear to influence child's E-DII but indirectly through maternal E-DII scores.

Conflicts of Interest: We wish to disclose that Dr James R Hébert owns controlling interest in Connecting Health Innovations LLC (CHI), a company planning to license the right to his invention of the dietary inflammatory index (DII) from the University of South Carolina. Dr Nitin Shivappa is an employee of CHI. The subject matter of this paper will not have any direct bearing on that work, nor has that activity exerted any influence on this project.

Funding: The Irish Health Research Board (HRC/2007/13).

PO2.075

Diet quality in relation to overweight and obesity in 2- to 6-year-old Finnish children

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Introduction: The incidence of overweight has alarmingly increased among children worldwide over the last decades. Dietary intake in accordance to that recommended has been shown to advance health in many ways, including protection from obesity as well as risk markers for cardiovascular diseases and diabetes. Timely information of dietary choices that advance normal growth and weight development in children is often needed to improve nutrition counselling practices of children and families

in child welfare health clinics. The aim of this study was to investigate the relation of diet quality to overweight and obesity status in preschool aged (two- to six-year-old) children.
Methods: Participating families were recruited through child health clinics nationwide. Parents filled in a previously validated Children's Index of Diet Quality (CIDQ) during health clinic visit. The index consists of 13 questions on consumption of wholegrain products, fruits and berries, vegetables, fat and milk. Based on the index points the diet quality is classified into good, moderate or poor with reference to dietary recommendations. Children's weights and heights were measured in child health clinic visits by nurses and their overweight/obesity status was determined using national growth charts.
Results: A total of 717 study participants with mean age of 4.3 ± 1.4 years were enrolled in this study. Of the participants, 389 were girls and 328 were boys, and 15.5% were overweight and 4.2% were obese. Based on the CIDQ points, the diet quality was good in 13.1%, moderate in 55.3% and poor in 31.6% of the studied children. The diet quality did not differ between girls and boys (p = 0.435). Furthermore, there were no statistically significant differences in the diet quality in overweight and obese children (10.8 ± 2.6 CIDQ points) compared to that of normal weight children (11.1 ± 2.6 CIDQ points, p = 0.344).
Conclusion: The results showed that overall only one out of eight children had good diet quality, indicating a need for enhanced dietary counselling in child health clinics to meet the dietary reference values. Although no difference in dietary quality between normal weight and overweight and obese children were seen in this cross-sectional study, it is possible that poor dietary quality may contribute to weight control.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.076

Overweight, obesity and dietary habits among Bulgarian first-graders

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Introduction: In Bulgaria overweight and obesity in childhood is a serious public health problem with increasing burden. The present study aims to identify the current state of the problem and to explore some of the associated risk factors among a nationally representative sample of first graders aged 7 years.
Methods: A cross-sectional study among 7-year-old schoolchildren in first grade was carried out on nationally representative effective sample of 3378 Bulgarian first graders in 2016. Height and weight were measured with standardized anthropometric equipment. Overweight and obesity were assessed by BMI-for-age using the WHO Growth Reference 2007 definitions. Descriptive analysis was performed with SPSS software on collected data through validated in previous national surveys questionnaire, filled in by the parents of the included children.
Results: Among the studied representative sample of first graders the prevalence of overweight (including obesity) was 29.2% and the one for obesity - 13.4%. Every sixth child (17.4%) skips some of the main meals for the day, one third (32.3%) of the children do not consume a daily hot meal at lunch and one quarter (24.9%) at dinner. Nearly one tenth (13.1%) of the families use frying as the preferred method for culinary food processing, and over one fifth (22.8%) of first graders often snack on foods and drinks with high fat, sugar and salt content after dinner. Most of the children (89.8%) want their parents to buy them foods and drinks advertised on TV, with only 13.1% of the parents refusing the claims. Only half (52.7%) of pupils do not add salt to their food. Large proportion of children (60%) suffer from chronic illnesses.
Conclusion: Collecting reliable information on the nutritional status and dietary habits of first-graders in Bulgaria is the basis for raising awareness and developing effective programs to improve the nutritional and health status of children.

PO2.077

A systematic review with meta-analysis of changes in dietary intake and impact on child and adolescent obesity

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Introduction: Assessing dietary intake is an important antecedent to understanding amenability to dietary change. The aim of this systematic review was to synthesise the best available research evidence on the impact on dietary intake of nutrition components of interventions to treat or manage overweight or obesity in children and adolescents.
Methods: Following a published protocol, a search of eight databases for randomised controlled trials (RCTs) ever published up to April 2018 was conducted. Inclusion criteria were: RCT; intervention with a dietary component for treatment of 2-20 year olds with overweight or obesity; and reported a dietary intake outcome. Data followed guidelines for conducting systematic reviews from the Joanna Briggs Institute (JBI) with quality assessed using JBI Checklist for RCTs, a 13-item quality appraisal tool, and meta-analysis conducted using R software.
Results: Of 299 RCTs identified, only 88 papers had reported dietary outcomes, with 80 reporting at least one statistically significant dietary change. Meta-analysis for change in energy intake in studies using 24-hour recalls or food records found reduced total energy intake, [standardised mean difference, -193.9kcal 6months (-340.1, -47.9); -154.7kcal 12months (-282.2, -27.2); -158.30kcal 24months (-359.8, 43.2), p<0.001] for intervention versus controls(n = 13 studies). A significant reduction in total daily energy intake (X2(1) 6.65,p = 0.036) was found for interventions in which the dietary component was administered by a dietitian. Other changes included increased fruit and vegetable intakes over 3-12 months (n = 18 studies, +0.3 to +0.5 serves/day) and decreased sugar-sweetened beverages (SSBs) (n = 18 studies, -0.25 to -1.5 serves/day) between 4-24 months. Studies that reported a significant reduction in at least one adiposity measure were more likely to have reported a reduction in energy-dense, nutrient-poor food intakes (X2(1) 8.65, p<0.01).
Conclusion: Interventions aimed at reducing children and adolescent adiposity have a modest, but sustained impact on reducing intakes total energy, SSBs, energy-dense, nutrient-poor foods, and increasing fruit and vegetables. Synthesis of dietary assessment methods and outcomes was limited by incomplete and inconsistent reporting of dietary intervention components and dietary outcomes. There is a need for standardised reporting of dietary intervention components and outcomes within future interventions for children and adolescents with overweight and obesity.

Conflicts of Interest: None.

Funding: Financial support from National Health and Medical Research Council Senior Research Fellowship (CC), a Gladys M. Brawn Senior Research Fellowship (CC) and a Gladys M. Brawn Fellowship support package (KD and VS).

PO2.078

The longitudinal effect of cumulative soft drinks intake on the adiposity, weight status and metabolic indicators in Korean children and adolescents

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Introduction: In many studies, it was reported that increased intake of soft drinks in children is associated with a surge in obesity or metabolic disease. However, most of the studies in Korea are cross-sectional in nature and just revealed that the relation with nutrition status and body mass index (BMI). We investigated the effect of cumulative soft drinks intake on the adiposity, weight status and metabolic indicators among Korean children and adolescents.
Methods: The study subjects were children (boys 215, girls 245, mean age 9.89 ± 0.31) who participated in the 4th (2008), 6th (2010), 8th (2012) year of the Korean Child–Adolescent Cohort Study. The frequency of soft drink intake per week was collected by self-report. We calculated cumulative average soft drink intake of 4th and 6th and categorized as consuming low: <1/weeks, middle: 1-2/weeks, high:≥2/weeks. Anthropometric measurements, body composition, and blood sample analysis were performed at baseline and at follow-up 2 and 4 years later. MANOVA (profile analysis) was performed to assess longitudinal differences and patterns of change of the adiposity, weight status and metabolic indicators according to the cumulative intake of soft drink in the 4th to 6th period into three groups.
Results: In boys, BMI was highest in high intake group (19.0 -> 20.3 -> 21.5 kg/m^2), BMI of high intake group in girls tended to be higher from the 4th to the 8th period. There was a significant difference in gender according to BMI change between intake groups during 6th to 8th period ($p<0.01$). Percent body fat increased from 4th to 8th on average in girls but decreased in boys, and changes in percent body fat between the intake groups were more pronounced in boys than in girls. The higher cumulative intake, the higher the waist circumference of each period in boys. The difference between the groups at each time point was evident in the 8th period (63.1-> 68.6-> 74.7cm, $p <0.04$), but not in girls. Fasting glucose and blood pressure were higher in the group with high cumulative soft drinks intake from the 4th to the 8th period, but there was no significant difference between the groups in the trend change over time. The higher cumulative intake level of soft drinks was, the significantly lower both boys and girls had HDL cholesterol level, as time goes by. (boys: 61.0->55.4->51.0 mg/dL (6th $p = 0.04$, 8th $p = 0.03$, girls: 53.0->50.7->46.5 mg/ dL, 6th $p = 0.04$, 8th $p = 0.03$).
Conclusion: These findings provide longitudinal evidence that cumulative intake of soft drinks predicts adiposity, weight status and metabolic abnormality across childhood and adolescence.

Conflict of Interest: None Disclosed.

Funding: This research was supported by a grant from Ministry of Food and Drug Safety in 201(13162소비자105).

PO2.079

Childhood obesity and iron metabolism

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Introduction: Hypoferraemia is the most common nutritional deficiency worldwide and a leading cause of potential developmental disorders in children. Obesity seems to be associated with this condition, but it is still unclear if it is caused either by depleted iron stores, diminished availability, or both. The aim of this study was to analyse the relationships between childhood obesity, iron metabolism and inflammation.
Methods: A six-month cross-sectional study was conducted on a convenience sample of otherwise healthy children and adolescents referred to two tertiary level Paediatric Obesity Clinics. They were compared to a sample of normal body mass index (BMI), age and sex matched individuals, from a routine follow up General Paediatrics clinic. Evaluated variables: BMI; iron intake (7-day diet record); serum iron, transferrin receptor, ferritin and high sensitivity C-reactive protein (hs-Crp). Exclusion criteria: recent bleeding and/or fever episodes, chronic inflammatory conditions, iron supplements, anti-inflammatory drugs and drugs affecting body weight. Data were analysed using covariance and multiple linear regression models with $\alpha = 0.05$.
Results: 272 patients were studied: 51% female, 92% Caucasian, 29% overweight and 21% obese; median age 9.3 (5 to 18) years old. Overweight and obesity were associated to lower non-heme iron and vitamin C intake and to lower serum iron. On the other hand, they were related to higher heme iron intake and to higher serum transferrin receptor (iron deficiency), hs-Crp, and ferritin (iron sequestration). There were no differences in total daily iron ingestion or other dietary factors important to its absorption such excessive dairy consumption. High transferrin receptor and iron sequestration contributed independently as predictors of low serum iron. Contrarily, neither total dietary iron intake or BMI were independent predictive factors.
Conclusion: In paediatric patients, hypoferremia of obesity is caused both by real iron deficiency and by inflammatory-mediated iron sequestration. The inflammation is related to oxidative stress and release of several cytokines and adipokines. These stimulate hepcidin synthesis that decreases iron absorption and inhibit bone marrow iron release conditioning its bioavailability. As iron deficiency (and overload) may have damaging effects, careful screening and treatment are advised.

Conflict of Interest: None Disclosed.

Funding: No funding.

PO2.080

WHO European Childhood Obesity Surveillance Initiative: unhealthy eating habits and overweight-obesity risk in children from 18 countries

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Introduction: Childhood obesity is increasing dramatically, and unhealthy eating habits are one of the main causes of this public health concern. This study aimed to assess parents' education level and anthropometric indicators in children from 18 countries categorized according

to their eating habits, and to evaluate the risk of overweight/obesity (ov/ob) associated with unhealthy intake of 16 food groups.
Methods: Data from the fourth measurement round (2015/2016) of the World Health Organization (WHO) European Childhood Obesity Surveillance Initiative (COSI) were used. This study focused on a cross-sectional sample of 54643 primary school-children (6-9 years) from 18 different countries. Body Mass Index (SDS-BMI) z-scores, Waist-to-Height Ratio (WtHR) and ov/ob prevalence were derived from measured weight, height and waist circumference. Data on children's food frequency consumption (16 food items) and parents' education level were collected with a standardized questionnaire. For each food item, countries were ranked according to daily frequency of food consumption. A healthy eating score was computed, which ranged between 16-288 points. Lower scores denoted healthier food consumption. The sample was classified according to the healthy eating score median (156 points).
Results: Children from countries with a good healthy eating score (n = 29,534; 8.06±0.90 years old; 50% girls) showed lower weight, SDS-BMI, WC and WtHR than children from countries with a poor score (n = 25,109; 7.91±0.84 years old; 50% girls). Ov/ob prevalence was higher in countries with poor healthy eating scores (WHO: +24%, IOTF: +10%). Parents' education level was higher in countries with good healthy eating scores with a +7% of the fathers and +10% of the mothers within the highest level registered in comparison with countries with poor healthy scores. Countries with intakes high in vegetables, low in cake and also low in cheese showed lower ov/ob risk. Countries with low meat and other high dairy products (excl. milk) intake were associated with higher overweight risk. Countries with higher fruit juice intake showed higher obesity risk, according to IOTF cut-off.
Conclusion: Healthy eating habits in childhood play a key role in anthropometric indicators. Countries with healthier eating habits presented higher parental education level and lower anthropometric indicators, specifically countries with high vegetable and meat intake, and low cheese, other dairy products (excl. milk) and cake intake presented lower ov/ob risk.

Conflict of Interest: The authors declare no conflict of interest.

Funding: A.O-R. acknowledges her fellowship from the Navarra's Government. Project funded locally in each country by the relevant health organisations.

PO2.081

Data-driven dietary patterns at 7 year-old and their association with cardiometabolic health at 10 year-old

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Introduction: Diet is usually represented as single foods or dietary patterns not related with a specific outcome, and its cardiometabolic effects at early ages is not clearly understood.
Objective: To assess whether dietary patterns, namely an obesity-related dietary pattern, derived at 7 years of age, have an effect on cardiometabolic health at 10 year-old.
Methods: This study uses data from the Generation XXI cohort (n = 8647 children, Portugal, 2005-2006). Dietary data were collected by a validated food frequency questionnaire at 7 year-old and dietary patterns were previously derived through partial least squares (PLS) (explains variance of food groups and a specific outcome, i.e. BMI z-score), principal component analysis and latent class analysis (both explaining variance of food groups). At 10 year-old, systolic (SBP) and diastolic (DBP) blood pressure were measured, and blood samples were drawn to analyze cardiometabolic parameters [(glucose, triglycerides (TG), HDL-cholesterol (HDL-c), LDL-cholesterol (LDL-c) and HOMA-insulin resistance], standardized based on age and sex. After excluding twins, follow-up losses and participants without information of interest, 3350 children were studied. Linear regression coefficients and 99% confidence intervals [$\hat{\beta}$ (99% CI)] were computed (covariates: child's birth weight, gestational age, physical activity, maternal age and education).
Results: A dietary pattern that takes into account the explanation of BMI z-score at 10 year-old (PLS-1 - characterized by the intake of processed meat, energy-dense foods and a lower intake of vegetable soup) was the only significantly associated with most cardiometabolic parameters: SBP ($\hat{\beta}$ = 0.052, 99% CI: 0.022; 0.082), DBP ($\hat{\beta}$ = 0.043, 99% CI: 0.022; 0.065), TG ($\hat{\beta}$ = 0.065, 99% CI: 0.026; 0.104), HDL-c ($\hat{\beta}$ = -0.059, 99% CI: -0.099; -0.019), LDL-c ($\hat{\beta}$ = 0.040, 99% CI: 0.001; 0.080) and HOMA-IR ($\hat{\beta}$ = 0.110, 99% CI: 0.071; 0.149). After further adjustment for BMI at 10 year-old, the magnitude of the associations was weakened. The other methods to derive dietary patterns did not show a consistent significant association with cardiometabolic health at 10 years of age.
Conclusion: The adherence at 7 years of age to a dietary pattern that is related to obesity, rich in energy-dense foods, processed meat and low in vegetable soup, may increase SBP, DBP, triglycerides, LDL-c and HOMA-IR and reduce HDL-c at 10 year-old. BMI at 10 year-old explained part of these effects.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by EPIUnit-ISPUP (UID-DTP/04750/2013), FEDER through COMPETE and FCT through national projects (POCI-01-0145-FEDER-030334; POCI-01-0145-FEDER-016837; POCI-01-0145-FEDER-016838), and Investigator contracts (IF/01350/2015; IF/01060/2015).

PO2.082

Nutritional assessment of children in a northern school in Bogotá, Colombia

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Introduction: Malnutrition due to micronutrient deficiency continues to be a public health problem in Colombia. Great attention has been paid to the nutritional situation of children due to the serious repercussions that may exist in adult life, therefore in the country's public health. The objective of this work is to determine the nutritional status in a sample of a school population in Bogotá, considering dietary habits, physical activity, micronutrient levels and homocysteine in blood.
Methods: An analytical cross-sectional study was carried out with the aim of identifying nutritional habits in a group of 30 students, between 6 and 12 years old, and correlating said data with the biochemical parameters studied. Exclusion criteria was applied, were no participants who were carriers of a malignant disease and/or who used steroids. Participation was voluntary and an informed consent and assent of the parents was signed.
Conclusion: It was concluded that despite being a population with the necessary economic resources to finance a healthy diet, there is malnutrition due to lack of nutrients or excess of some. In addition, sedentary lifestyle due to lack of physical activity generates alterations in growth and development in children.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.083

Parental misperception of child's nutritional status and how this influence childhood obesity

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Introduction: Obesity in Portugal has become a major public health concern with significant implications for both immediate and long-term health. Latest studies have found that the predicted prevalence of

overweight and obesity in children seems to have stabilized. Despite these promising findings, childhood overweight and obesity remains an important public health issue and the identification of effective preventive strategies is urgently needed. This study aims to investigate the accuracy of father's and mother's perceptions of their child's weight, the factors related with the underestimation, and its association with the prevalence of childhood obesity in central Portugal.
Methods: Data were collected in primary schools (2013/2014) with 834 parents and respective children. Height and weight were objectively measured and child's weight status was classified using the International Obesity Task Force. Parents' perception of child's weight together with child and family demographics were accessed by a questionnaire.
Results: Parental misperception of child's weight was high (21.9% were actual overweight or obese but only 10.2% were perceived as such); and slightly higher among fathers compared to mothers. Parental weight and education, as well as, child's real weight status were
associated with the risk of underestimation both in mothers and fathers. Parents who underestimate their child's weight were almost 15 times more likely of having an obese children.
Conclusion: Many parents do not properly recognize their child's weight status. The strongest predictor of childhood obesity was parental underestimation of their child's weight status. This finding has a valuable and practice implication for future interventions designed to reduce or control child's weight. Parents, with the help of the school, teachers, and health care providers, should be educated on how to recognize an unhealthy weight before being suggested to interventions to reduce childhood obesity and adopt healthy lifestyles.

PO2.084

Physical determinants of weight loss during a residential rehabilitation program for obese adolescents

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Introduction: Comprehensive obesity management programs that emphasize on appropriate nutrition, exercise and behavioral modification generally yield positive results, but with a large variability in outcome. This retrospective cohort study aims to evaluate a possible correlation between physical determinants at baseline and weight loss at completion of a 1 year multidisciplinary residential adolescent rehabilitation program.
Methods: Patient records for 27 boys and 37 girls were selected from available data of adolescents aged 14-18 years that participated in and finished the 1-year weight loss program. Body mass index, body composition and cardiorespiratory fitness (measured as VO2peak in ml/min per kg lean body mass) at baseline and at completion of the 1-year long program were used to investigate a possible correlation with age-, sex- and height-corrected weight loss calculated as change in BMI standard deviation score (BMIz).
Results: We report a significant mean decrease in BMIz of 1,20±0,5 SD ($p<0,001$) for boys and 0,87±0,4 SD for girls ($p<0,001$) after completion of the program, with a similar positive effect on body fat percentage (boys -52,8%; girls -31,5%). Both baseline BMIz (boys R = 0,459; girls R = 0,432) and baseline VO2peak (boys R = -0,418; girls R = -0,579) are significantly correlated with the change in BMIz. When patients are divided into two groups according to baseline BMIz above or below 3SD, the change in BMIz is smaller for those with BMIz > 3SD (boys: 0,29SD with p = 0,116; girls: 0,39SD with p = 0,001). Those patients starting the program with a BMI >3SD are unlikely (odds ratio 33 and 31,7 for boys and girls respectively) to lose sufficient weight to reach 95th percentile (1,65SD) within a year. When patients are divided into two groups according to physical fitness at baseline, the change in BMIz is significantly smaller for those with below average fitness (boys: 0,42SD with p = 0,021; girls: 0,36SD with $p<0,001$).
Conclusion: Less obese and fitter adolescents lose more weight than their heavier and more deconditioned peers during a one-year residential obesity treatment program, advocating early intervention in treating adolescent obesity.

PO2.085

Active lifestyle on childhood abdominal obesity

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Introduction: Childhood obesity is known to be a strong predictor of an increased risk of developing obesity during adulthood; particularly abdominal obesity is a predictor for cardio-metabolic risk. Prevention and treatment of obesity in early life are strongly recommended throughout interventions aiming at enhancing healthy dietary habits (DH) and increasing physical activity (PA).
This ancillary cross-sectional study aimed to investigate DH and PA, in a previously described sample of Italian children/adolescents (88F/90M, 11.8±2.6 years), affected by overweight/obesity.
Methods: We evaluated DH and PA by using our validated questionnaire in 179 children: 49 normal weight (NW), 76 overweight (OW) and 54 with obesity (OB). Waist to height ratio (WHeR) was also calculated, defining abdominal obesity for WHeR>0.5.
Results: Analysis of Variance showed that normal weight subjects did not show different DH when compared to OW and OB but they reported a significantly higher PA score ($p = 0.001$) than both OW and OB. BMI adjusted-regression analysis reported that DH were not related to WHeR, while PA was significantly and inversely related to WHeR ($r = -0.27$; $p = 0.05$). Cluster analysis described 4 clusters of subjects both for the DH and PA. Only for PA, we observed a cluster with WHeR significantly lower within subjects playing sports at least 3-4 hours/week.
Conclusion: PA in children/adolescents is associated with lower abdominal fat deposition and the risk of developing metabolic disorders in the future. There are many components playing a key role in developing childhood obesity, but PA is more crucial than others considering the increased sedentary behaviours and decreased time spent in physical activity.

PO2.086

Change in BMI and overweight from 2002 to 2017 in Norwegian adolescents

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Aim: The aim of the study was to describe the change in Body Mass Index (BMI) z-score distribution and prevalence of overweight and obesity (OWOB) in Norwegian adolescents from 2002 to 2017.
Methods: A cross-sectional study on health, socio-demographic factors and lifestyle was undertaken in 2002 and 2017 in 10th -grade students (aged 15-16 years). Based on weight and length reported by the participants, we calculated body mass index (BMI)-for-age Z-score (BMIz) and overweight and obesity (OWOB) as defined by the International Obesity Task Force. We compared the distribution of the BMIz and prevalence of OWOB in 2002 and 2017 in boys and girls.

Results: The questionnaire was completed by 1675 (2002) and 1580 (2017) adolescents. The prevalence of OWOB increased from 10 to 15 per cent among girls (risk difference [RD] 0.05, 95% CI: 0.02,0.09), and from 18 to 21 per cent among boys (RD: 0.03, 95% CI: -0.01,0.07). The mean BMIz for girls increased from -0.07 in 2002 to 0.22 in 2017 (mean difference 0.29, 95 % CI: 0.18,0.39), and was unchanged at 0.19 among boys (mean difference 0.00, 95% CI: -0.10,0.10). The density plots revealed almost identical shapes of the distributions in 2002 and 2017 for both boys and girls.
Conclusion: The change in BMIz among 15-16 year olds between 2002 and 2017 was observed only in girls; Contrary to previous knowledge, we find that the increase in OWOB is not due to a larger subpopulation in the upper percentiles, but rather a uniform right shift for the entire BMIz distribution.

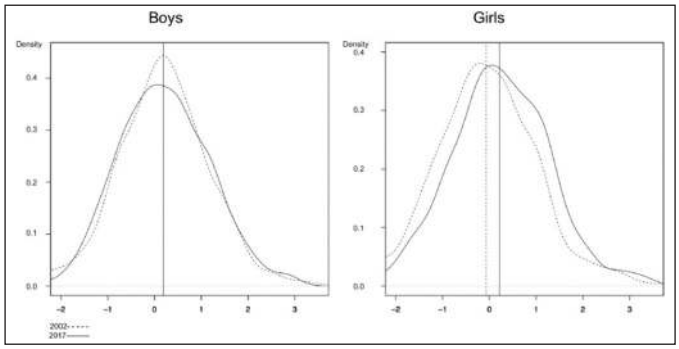

Fig. 1. BMI z-score distribution 2002 and 2017.

PO2.088

Cross-section survey of the relationship between sleep duration, physical activity and childhood obesity

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Introduction: Overweight and obese children are likely to stay obese into adulthood and more likely to develop noncommunicable diseases like diabetes and cardiovascular diseases at a younger age. We investigated the relationships between sleep duration, physical activity and childhood obesity to provide scientific basis for the prevention and intervention of childhood obesity.
Methods: Based on the physical examination of Minhang CDC, we conducted a cross-sectional survey in 5752 children who were in their first grade of primary school. Standardized questionnaire were completed during the face-to-face interviews with their guardians, including demographic characteristics, dietary habit, physical activity, sleep duration and screen entertainment time. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated by unconditional Logistic regression models.
Results: In 5752 children, the rates of over-weight and obesity were 13.9% (14.8% for boys; 12.5% for girl) and 12.0% (15.4% for boys; 8.5% for girls). In unconditional logistic regression models, we found that both enough sleep duration (OR = 0.58, 95%CI: 0.39-0.86) and moderate intensity exercise (OR = 0.59, 95%CI: 0.35-0.98) significantly decreased the risk of childhood obesity.
Conclusion: Our results suggest significantly negative association between sleep duration and childhood obesity, as well as physical activity and childhood obesity.

PO2.090

The size of the childhood obesity problem in Scotland: Results from the 2018 Active Healthy Kids Scotland Report Card

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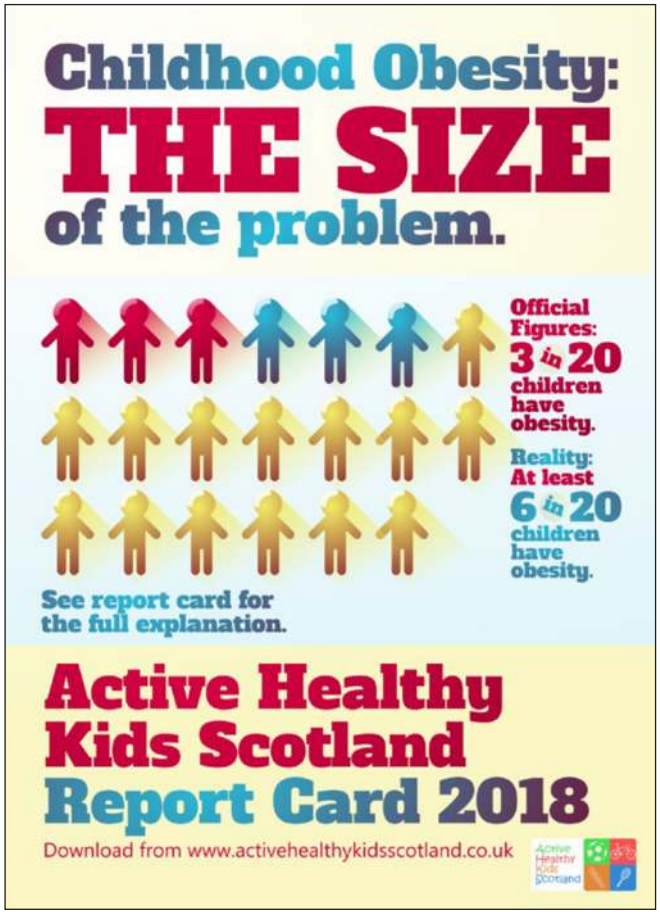
Introduction: The 2018 Report Card provides a 'state of the nation' assessment of the physical activity (PA) and health of children and adolescents in Scotland, focusing on obesity prevalence.
Methods: We graded eleven PA and health indicators based on data which were: recent, derived from nationally representative surveys, affected by minimal bias, and determined by the % of children and adolescents meeting an evidence-based recommendation, ranging from A+ (94%-100%) to F (<20%).
Results: C grades were assigned to Active Transportation to school/nursery (49%) and Government (many policies target PA and obesity, however policy implementation and evaluation is more limited). Organised Sport and PA was graded as B (68%). Community and Environment was graded as B-, access to local play areas was high (92%), but perceived safety was lower. Active Play was graded as D-, 26% of 2-15 year olds participated in ≥2 hours/day on weekdays and 40% at weekends. Family and Peers was graded as D, 77% of 2-15 year olds had fathers who met the adult PA recommendation (71% of mothers), 26% had at least one parent who ate 5+ portions of fruit & veg/day and 74% had at least one overweight or obese parent. Sedentary Behaviour was graded as D-, 68% exceeded the screen time recommendation (≥2hrs/day) on weekdays and 83% at weekends. Diet was graded as D, 13% of 2-15 year olds ate 5+ portions of fruit & veg/day and the average intake of sugar and saturated fat exceeded Scottish Dietary Goals. The F grade for Overall PA was carried forward from the 2016 report card because no recent survey measured this indicator appropriately. Physical fitness could not be graded due to lack of data. National surveys suggest 14% of 2-15 year olds are obese, however these substantially underestimate the true prevalence of obesity, because they do take adequate account of age, and because BMI-for-age has low sensitivity(1), thus Obesity could not be graded. For many of the indicators, prevalence estimates were worse among those from more deprived areas.
Conclusion: Scotland has a favourable physical and policy environment, and good grades for Active Transportation, and Organised Sport and PA. However, levels of PA are low among children and adolescents in Scotland and levels of sedentary behaviour are high. Furthermore, many children and adolescents are not meeting the Scottish Dietary goals and obesity prevalence is much worse than official figures suggest. Thus, greater focus on policy implementation is needed to improve the grades in order to prevent and control the childhood obesity problem in Scotland. Improved surveillance of PA and obesity is also required.
1. www.who.int/bulletin/volumes/96/11/17-205948.pdf?ua = 1 Bull WHO 2018 96:772-781

Conflicts of Interest: None.

Funding: None.



Theme of the 2018 Active Healthy Kids Scotland Report Card

Fig. 1. Cover image from the 2018 Active Healthy Kids Scotland Report Card.

PO2.091

Feasibility of the ToyBox-Scotland obesity prevention intervention in preschools: results of a cluster randomised controlled trial

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Introduction: The ToyBox-Scotland intervention is an 18-week practitioner-led programme that aims to increase physical activity, reduce sedentary behaviour, and promote healthy snacking and water consumption. We adapted the original Toybox intervention (Manios et al. 2012) using a co-production approach for implementation in Scottish preschools. Examining the feasibility and acceptability of effective public health interventions is critical to ensure success can be translated from one context to another. Therefore, this study aimed to evaluate the feasibility and acceptability of implementing the adapted ToyBox intervention in Scottish preschools.
Methods: A feasibility cluster randomised controlled trial was conducted involving six preschools in Glasgow, randomly assigned to the intervention or usual-care control group. Participants were 3-5 year old children and their parents. Of interest for this feasibility study were parameters such as recruitment and retention rates, and SDs of outcome measures to inform a full scale trial (namely physical activity, sleep and sedentary time via accelerometry, body composition via bioelectrical impedance analysis (BIA), and measures of diet and home screen time via parental questionnaire). Process evaluation involved focus groups with practitioners, interviews with participating parents and pre/post practitioner logbooks and parental questionnaires.
Results: The overall trial recruitment rate was 18%. 36 children (16 girls) provided at least one valid measurement at baseline and follow-up (attrition rate = 16.6%). Anthropometric measures were acceptable and feasible. Parental questionnaire response rates were low (20%). 61% and 27% of participants provided valid accelerometer data for baseline only, and for baseline and follow-up respectively. A process evaluation has recently been conducted and results will be presented at the congress.
Conclusion: Overall, the intervention was feasible and acceptable in Scottish preschools. Process evaluation results will help identify ways in which recruitment of preschools, and recruitment and retention of trial participants-particularly regarding accelerometry compliance, can be maximised in Scottish preschools. Such information will be useful for the development of a future full-scale trial.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Cunningham Trust.

PO2.092

Child-centred health dialogue for primary prevention of obesity in child health services – a feasibility study

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Introduction: The rise in child obesity challenges global health as it results in various health and social consequences. Since evidence-based models that can be used in Child Health Services for the promotion of healthy lifestyle and prevention of obesity are lacking, there is a need for a child-centred, multicomponent, interactive intervention that includes the family of the child and can be executed universally within Child Health Services. The aim of this study was to test a Child-Centred Health Dialogue model for primary prevention of obesity for 4-year-old children in Child Health Services, for its feasibility and the responsiveness of its outcomes.
Methods: A feasibility study was set up with a non-randomised quasi-experimental cluster design comparing usual care with a structured multicomponent child-centred health dialogue consisting of two parts: 1) a universal part directed to all 4-year-old children and 2) a targeted part for families where the 4-year-old child was identified with overweight.
Results: Nurses trained in the model were able to execute both the universal health dialogue and the targeted part of the intervention. Tutorship enabled the nurses to reflect on and discuss their experiences, which strengthened their confidence in the model. 203 children participated in the child-centred health dialogue while 582 children in the control group received usual care. One year after the intervention fewer normal-weight 4-year-olds in the intervention group had developed overweight at the age of 5 compared to the control group and none had developed obesity.
Conclusion: This study demonstrates that a child-centred, multicomponent, interactive intervention for the promotion of healthy lifestyles and primary prevention of obesity for all 4-year-old children participating in Child Health Services is feasible on a small scale. As almost all parents make use of Child Health Services in Sweden, the findings should be confirmed in a randomised controlled trial before the intervention can be implemented on a larger scale.

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this abstract

Funding: Research relating to this abstract was funded by The Swedish Research Council for Health, Working Life and Welfare (FORTE), Region Skåne and Föreningen Mjölkdroppen Helsingborg.

PO2.093

Perspectives of teachers and parents towards a preschool intervention in Borneo: ToyBox Malaysia

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Introduction: Although there are many studies on childhood obesity prevention including intervention studies on healthy energy balance-related behaviours in developed nations, such studies are scarce in Borneo. The aim of the present study was to elicit teachers' and parents' perspectives on a childhood intervention study: ToyBox Study Malaysia is aimed at improving healthy energy balance-related behaviours among preschoolers, focusing on healthy snacking, drinking water, reducing sedentary behavior, and increasing physical activity.
Method: The research design for this needs assessment was a descriptive-interpretive qualitative study. The setting involved rural government kindergartens in Sarawak, one of the states of Malaysia, which is located on Borneo Island. Six intervention kindergartens out of a total of seven ToyBox Study Malaysia intervention kindergartens participated in this study. All nine teachers from the six kindergartens were recruited to take part in the study. A total of three parents from each of these six kindergartens also participated. Semi-structured focused group interviews were conducted with teachers and parents in one group per kindergarten. The interviews were voice-recorded and transcribed verbatim. Data analysis was guided using a framework and themes from the interview.
Results: Several themes emerged: (i) knowledge and awareness about ToyBox; (ii) changes in healthy energy balance-related behaviours in drinking, eating and snacking, sedentary behaviours, and physical activities; (iii) roles of school/teachers and family in ensuring the success of the intervention programme; (iv) water bottle and the #SukuSukuSeparuh (#QuarterQuarterHalf) Healthy Eating Plate as mediational tools to foster good drinking and eating habits; (v) advantages of ToyBox; and (vi) expectations of ToyBox as a holistic means to a balanced diet including concerns about underweight children in the study.
Conclusion: This study enabled us to better understand aspects of the ToyBox Study Malaysia intervention programme. The programme has potential to foster positive healthy energy balance-related behaviours among the preschoolers through buy-in from parents and teachers. Transformation and changes in knowledge, behaviour, and motivation of these two parties about obesity and healthy energy balance-related behaviours are important for empowering parents, teachers, and children to adopt this programme in Borneo.

PO2.095

Adolescents' lifestyle and the influence of their food choices

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Introduction: Overweight and obesity reached epidemic levels worldwide. Thus, it is urgent to implement programs to prevent it. Considering it is a multifactorial problem, research teams must be multidisciplinary, and studies should focus on different variables, considering different areas of knowledge. Literature reinforces that adolescent food choices are related to health-promoting lifestyle and healthy behaviours. Therefore, the main aim of this study was to better understand adolescent's food choices and their relationship with adolescents' lifestyles.
Methods: The sample for this study was recruited in a public school in the centre of Portugal. The adolescents comprised in the sample were engaged in a multidisciplinary program aiming to prevent adolescents overweight and obesity. Participants included 61 adolescents aged between 11 to 16 years (M = 12.37; SD = 0.93), with the majority of the sample being female 55.7%. The Portuguese versions of the Adolescent Lifestyle Profile and the Food Choices Questionnaire were used.
Results: The adolescent food choices were mostly influenced by the sensitive qualities (M = 1.05; SD = 0.69) and the humour (M = 0.89; SD = 0.71), and minor influenced by ethics (M = 0.25; SD = 0.83) and convenience (M = 0.31; SD = 0.87). Adolescents presented moderate indices of health-promoting lifestyle (M = 2.77; SD = 0.43). Regarding the correlation between food choices and the adolescent lifestyle profile, it was found that those teenagers who tend to choose more convenient foods also tend to present lower health-promoting indices ($r = -0.26$; $p<0.05$), namely in the nutrition, positive life perspective and interpersonal relations subscales ($p<0.05$).
Conclusion: In order to better tailor intervention and prevention programs, it is of utmost importance to understand adolescents' food choices. The better the reasons for young people's food choices are known, the better intervention and prevention programs may be, helping them to behave in a healthier way. Our study highlights that sensitive qualities and humour may be important in adolescents' food choices. Moreover, adolescents that usually select more convenient foods, also tend to present lower health-promoting indexes, suggesting that there must be a relationship between the two variables. Future studies may try to highlight what may mediate this relationship. This study also reinforces the importance to work in multidisciplinary teams in order to fight overweight and obesity.

Conflict of Interest: No conflict of interest.

Funding: Research relating to this abstract was supported and co-funded by the FEDER (European Regional Development Fund), under the Portugal 2020 Program, through COMPETE 2020 (Competitiveness and Internationalization Operational Program).

PO2.096

Association between anthropometric measures, physical activity and adolescents' lifestyle

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Introduction: Overweight/obesity rates are rising all over the world. Thus, it is of utmost importance to implement programs to prevent the appearance of what was already considered as the epidemic of the 21st century. In order to better tailor those programs, several important variables of the studied population must be checked. Therefore, the main aim of this study was to characterize a sample of adolescents regarding a number of body composition variables, as well as examining some physical activity exercises. Moreover, the relationship between these 3 types of variables was checked.
Methods: For this study, a sample was recruited in a public school in the centre of Portugal. The sample included 41 adolescents aged between 11 to 15 years (M = 12.40; SD = 0.85), with the majority (57.1%) being girls. To assess adolescent's lifestyle, the Adolescent Lifestyle Profile was used. Some anthropometric measures were also assessed: weight, height and abdominal perimeter. Adolescents also performed some physical exercises namely crunches, push-ups and horizontal and vertical jumps. These tests are part of a major test battery called FitEscolas, which is used every year in the majority of portuguese schools.
Results: Adolescents presented moderate indices of health-promoting lifestyle (M = 2.80; SD = 0.38). Regarding their body composition, the mean BMI was 20.99 (SD = 4.92) and the mean abdominal circumference was 78.39 (SD = 11.98). As regards to their muscular fitness, adolescents performed 29.71 (SD = 23.15) crunches and 9.77 (SD = 8.12) push-ups. No significative correlation was found between adolescent lifestyle and body composition. However, health-promoting nutrition was correlated ($p<0.05$) with muscular fitness (namely the number of crunches and the horizontal jump).
Conclusion: Understanding some of the characteristics of the study population is of utmost importance in order to better tailor prevention programs. This study is part of the TeenPower project, an eHealth program aiming to prevent overweight/obesity and promote healthier behaviours.

Understanding the anthropometric characteristics and the physical activity adolescents are able to do is important to better adjust the components of the program. Surprisingly, and although health-promoting nutrition was correlated with the muscular fitness, no significant correlation was found between adolescent lifestyle and body composition. The reduced sample may explain this result. Future studies should focus on this issue.

Conflict of Interest: No conflict of interest.

Funding: Research relating to this abstract was supported and co-funded by the FEDER (European Regional Development Fund), under the Portugal 2020 Program, through COMPETE 2020 (Competitiveness and Internationalization Operational Program).

PO2.097

Adipose tissue distribution in seven year old children evaluated by waist- difference between European countries (COSI study)

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Introduction: Overweight and obesity prevalence significantly differs between Southern European and Central and Northern European countries (Wijnhoven et al. 2013). The aim of this study was to evaluate differences in adipose tissue distribution measured by waist circumference between European countries. The study is part of the WHO Europe Childhood Obesity Surveillance Initiative (COSI).
Methods: Children aged 7.00-7.99 years from 10 countries (BUL, Bulgaria; CZH, Czech Republic; GRE, Greece; IRL, Ireland; LVA, Latvia; LTU, Lithuania; MKD, Macedonia; NOR, Norway; ESP, Spain; SWE, Sweden) in which waist circumference (WC) was measured during rounds 1- 3 of the COSI project (2007/2008, 2009/2010, and 2012/2013) were included. BMI and WC categories were compared by classifying each child into seven categories - using the percentiles 3, 10, 25, 75, 90, and 97 as cut-off points.
Results: Mean levels of waist and SD in individual countries are shown in Table.
A significantly higher prevalence of increased waist circumference (higher than 90th percentile) was found in 7 year old children from Southern European countries (ESP, GRE and MKD) in comparison with the other countries. A small percentage of children was identified with normal BMI and increased waist circumference.
Conclusion: The results suggest that measurement of waist circumference in 7 year children could help to identify children at increased risk of obesity and its complications. These results should be confirmed by future studies.

Reference

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Conflict of Interest: None Disclosed.

Funding: Supported by grants: AZV MZČR 17-31670 A and MZČR – RVO EÚ 00023761.

Tab. 1. Mean waist circumference in COSI countries.

	BUL	CZH	ESP	GRE	IRL	LTU	LVA	MKD	NOR	SWE	Total
WC (cm)											
Boys mean	56.27	58.03	59.7	60.80	57.86	58.87	57.24	60.44	56.63	56.79	58.05
Boys SD	6.95	6.09	6.96	7.36	5.50	5.83	5.67	7.91	5.09	4.78	6.43
Girls mean	55.40	56.38	58.90	60.32	58.04	58.14	55.92	59.00	56.46	56.29	57.16
Girls SD	7.23	6.16	6.77	7.48	6.52	6.17	5.79	8.01	5.53	5.47	6.69

WC waist circumference

PO2.098

Prevalence of overweight and obesity in French children: evolution during the last 10 years between the two French nutrition and health surveys (ENNS 2006-2007 and Esteban 2014-2016)

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Introduction: According to the World Health Organisation, over 340 million children and adolescents aged 5-19 were overweight or obese in 2016(1). Overweight and obesity are major risk factor for noncommunicable diseases but they are largely preventable by limiting damaging dietary and physical activity patterns. Improving the nutritional status of the population constitutes a major challenge for public health policies. In France, it is one of the objectives of the French National Nutrition and Health Programme (PNNS) developed since 2001 by the Ministry of Health. To assess the nutritional status of the population according to the PNNS indicators, national nutrition and health surveys were implemented in 2006-2007 (ENNS) and 2014-2016 (Esteban). This work describes the evolution of the prevalence of overweight and obesity among French children during the last 10 years.
Methods: Data from two cross-sectional population-based surveys, using a multistage sampling design, were used: ENNS 2006-2007 (n = 1314 children aged 6-17) and Esteban 2014-2016 (n = 1099). Anthropometry was measured according to standardized procedures from WHO recommendations. Body mass index was categorized as underweight, normal weight, and overweight/obesity according to IOTF age- and sex-specific cut-offs(2). The samples have been compared by linear regression and Adjusted Wald test (gender-stratified, weighted and standardized data).
Results: In 2014-2016, among 6-17 years old children, the prevalence of overweight (including obesity) was 17%. That of obesity alone was 4%. There was no difference between boys and girls. The prevalence of thinness was 13% and reached 19% in 11-14 years old girls. Between 2006 and 2015, the prevalence of overweight (including obesity) in children remained stable. Nevertheless, the prevalence of thinness has significantly increased from 8% to 13%, the main increase being in 11-14 years old girls.

Conclusion: In 2007, France has been one of the first countries in the world to show a plateauing trend of the evolution of overweight in 7-9 years old children(3). These new results confirm the stability of overweight and obesity in France over ten years among 6-17 French children. However prevalence of these burdens remains important and the increase in thinness must be monitored.

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PO2.099

The effect of weight loss on endothelial function in childhood obesity and the potential association with blood pressure and inflammation

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Introduction: Childhood obesity is an increasing worldwide problem associated with an increased risk for atherosclerosis and cardiovascular morbidity and mortality. A first and reversible aspect of cardiovascular dysfunction in obese children is endothelial dysfunction. Peripheral arterial tonometry (PAT) is used to measure microvascular endothelial function. In this study we investigated whether endothelial dysfunction is indeed reversible after weight loss and if it is related to the effect of weight loss on the systolic and diastolic blood pressure (SBP and DBP) and on the levels of hs-CRP.

Methods: A prospective longitudinal cohort study was performed, including obese children and adolescents aged 8-18 participating in an inpatient weight-loss treatment program. Endothelial dysfunction was measured as time to peak response (TPR) with the EndoPAT-2000 at the start of the treatment and after 10 months follow-up. BMI and fat% was collected at start and follow-up. Plasma hs-CRP was determined. The blood pressure (BP) was measured 3 times at both moments and the average used. BMI and BP were reported with Z-scores.

Results: 54 patients were included (mean age 14 years, 66% female, mean TPR 180 ± 61s). After 10 months, a significant improvement was seen for BMI, fat%, BP, hs-CRP and TPR. At baseline, TPR related to age ($r = -0.331$, $p = 0.014$), fat% ($r = -0.302$, $p = 0.027$), DBP ($r = 0.316$, $p = 0.02$) and hs-CRP ($r = 0.307$, $p = 0.024$). After correction for age, the relation with DBP and hs-CRP remained, but the relation with fat% lost significance. Five patients with diastolic hypertension at baseline had a significant delayed TPR (median 255, range 165-255) compared to the non-hypertensives (median 165, range 45-255). Hs-CRP was raised (>3.0mg/l) in 29 patients. However the difference in TPR between the normal and raised hs-CRP group did not reach significance in this number of patients ($p = 0.056$). In 23 patients hs-CRP normalized during treatment. After the 10 month treatment, the correlation of TPR with hs-CRP became nonsignificant and the association of TPR with DBP weakened ($r = 0.272$, $p = 0.046$). The improvement of TPR only related to the lowering in DBP and hs-CRP and remained significant after correcting for age.

Conclusion: From this initial analysis we conclude that endothelial dysfunction is indeed reversible after significant weight reduction and that endothelial function relates to age. The endothelial function was negatively correlated with diastolic hypertension and an increased hs-CRP. Interestingly, when hs-CRP and DBP normalized after weight loss, the association with the endothelial function was no longer present or weakened.

Conflict of Interest: None Disclosed.

Funding: Research related to this abstract was funded by the FWO-TBM project n°150179.

PO2.100

Serum zinc changes in obese adolelescents during weight loss

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Introduction: Current evidence suggests that obese adolescents may present with lower serum zinc concentrations, which increase during weight loss, but the exact underlying mechanism is not well known. We therefore analysed the changes in body composition, markers of inflammation and insulin resistance and serum zinc during a residential weight loss program.

Methods: 91 (41 male and 50 female) obese adolescents, aged between 10 and 18 years, and 90 (19 male and 71 female) normal-weight controls were studied. Anthropometric measures, body composition (total body fat and body fat percentage (BF%) and fat-free body mass (FFM) by dual-energy X-ray absorptiometry (GE Lunar, GE Healthcare, Madison, USA) and fasting blood samples were obtained before and after 4 months of a residential weight loss program. Laboratory analyses included Zn, hs-CRP, ferritin, glucose and insulin. Serum zinc concentrations were measured with atomic absorption spectrometry using the PerkinElmer Life Sciences analyzer. Hypozincemia was defined as serum zinc concentration below 70 µg/dL.

Results: At baseline, serum Zn was significantly lower in the obese subjects compared to the controls ($p<0.001$) and hypozincemia was more pronounced in females than in males ($p<0.001$). In total, 47 (or 51.6%) obese and 23 (or 25.6%) controls had a serum zinc below 70 µg/dL. Serum Zn was inversely correlated with age and the degree of obesity (BF %). After controlling for age, serum Zn remained inversely correlated with BMI Z-score ($p = 0.031$) and BF% ($p<0.001$). After 4 months of treatment, decreases in all anthropometric measures of adiposity and markers of inflammation and insulin resistance were highly significant in 78 obese adolescents with repeated measurements. Mean serum Zn markedly increased ($p<0.001$) after 4 months, but changes did not correlate with changes in body composition or studied biochemical markers. In 68 of the 78 (87%) obese subjects, an increase in serum zinc was documented in parallel with a decrease in absolute and height-corrected lean mass.

Conclusion: Obese adolescents and especially females, are at risk for hypozincemia, which in the great majority is corrected by weight loss. Increases in serum Zn were found to be independent of changes in serum markers of insulin resistance and systemic inflammation, but to correlate with the loss of lean mass, suggesting a possible involvement of lean mass in the regulation of serum Zn in obesity.

Conflict of Interest: Non Disclosed.

Funding: No Funding.

PO2.101

The relationship between obesity in early childhood and physical morbidity in childhood and adolescence: a systematic review and meta-analysis

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Introduction: Epidemiological research has identified a relationship between childhood weight status and numerous health conditions such as asthma, musculoskeletal disorders and hypertension. However, the nature of the relationship is not definitively understood, and systematic reviews often combine overweight and obesity. This systematic review aimed to evaluate the relationships between early childhood obesity (<10 years) and adverse health outcomes in childhood and/or adolescence.
Methods: A robust search strategy was applied to five databases (MEDLINE, CINAHL, SportDiscuss, AMED, Embase) between 2001-2016, with an additional forward citation search conducted on eligible studies' reference lists up to October 2018. The Newcastle-Ottawa scale was used to assess study quality, and the overall quality of evidence was assessed using GRADE. Observational studies were included if they used a recognised measure of obesity (e.g. body mass index ≥95th percentile) at any point between birth and 9.9 years (exposure measure) along with a non-obese comparison group, and a measure of a physical morbidity at any point from birth to 19 years (outcome measure). Studies were excluded if they did not adequately define obesity, combined obesity and overweight in analysis, or if the exposure was measured ≥10 years. A random-effects meta-analysis will be applied to each eligible outcome. Data analysis is being conducted using IBM SPSS and Meta XL.
Results: 68 studies were included following screening and citation searches which investigated the relationship between childhood obesity and asthma (n = 30), vitamin D levels (n = 14) Musculoskeletal disorders (n = 9), wheeze (n = 7) and allergies (n = 6). A smaller number of studies investigated other conditions (premature adrenarche, inflammation, and anaemia; n = 9). 85% of the included studies reported an adverse association between obesity and physical morbidities. Data analysis is underway and full results will be available in time for the Congress.
Conclusion: This review demonstrates that obesity in childhood is associated with a range of adverse health outcomes. A pooled analyses of health conditions which have recently been identified as comorbidities of childhood obesity will be presented, enhancing the existing knowledge-base regarding how obesity in early childhood impacts physical health.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Cunningham Trust.

PO2.102

Emotional distress of preadolescents with excess weight

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Introduction: Childhood obesity has become a major health problem. An estimated 11.8-16.3 million children in Europe are classified as overweight and obese, of which 2.9-4.4 million children are obese. Psychological problems such as depression, self-esteem, anxiety and impulsivity are related to childhood obesity. The aim of this study was to examine the emotional distress of preadolescents with excess weight in comparison with preadolescents with normal weight.
Methods: This is a cross-sectional study of 1,771 students (47% girls) from 16 primary schools from 8-to 12-year-old (mean = 9.83, SD = 1.11). BMI was established according to the World Health Organization classification (2007). Students completed questionnaires related to depressive symptoms, self-esteem, anxiety symptoms, impulsivity and risk of eating disorders.
Results: Results showed that 61.9% was normal weight, 27.7% overweight, and 10.4% obese. In general, girls showed more anxiety symptoms and boys more impulsivity. Furthermore, younger children had a higher score in anxiety symptoms and risk of eating disorders than older ones. According to BMI, obese preadolescents scored significantly higher in depressive symptomatology and lower in self-esteem that normal weight and overweight preadolescents. Regarding risk of eating attitudes, obese children scored significantly higher than their counterparts.
Conclusion: These results contribute to a better understanding of the emotional situation of preadolescents with excess weight. Thus, they may help to design future intervention strategies to improve their psychosocial well-being.

Funding: Study financed by a Predoctoral Grant from the the Basque Government; and the Research Group in Clinical Psychology (Basque Government, IT945-16).

PO2.103

Secular trends and sociodemographic and parental determinants of overweight among children and adolescents in Malaysia from 2006 to 2015

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Introduction: Malaysia is experiencing a nutrition transition because of positive economic growth and rapid urbanisation in the past three decades. Therefore, public health attention needs to be drawn towards over-nutrition as well as to undernutrition. We aimed to examine secular trends and sociodemographic and parental determinants of overweight in 6-17-year-old children and adolescents in Malaysia from 2006 to 2015.
Methods: We analysed data from three nationally representative, repeated cross-sectional studies (the National Health and Morbidity Surveys) conducted in 2006, 2011 and 2015. The studies involved face-to-face interviews of the households and objective measures of height and weight. We used the International Obesity Task Force (IOTF) BMI criteria to define overweight. We performed trend analysis across the three surveys, and calculated prevalence ratios and prevalence differences of overweight from 2006 to 2015 stratified by residency area, ethnicity, household size and income, and parental education, employment and weight status. We performed all analyses separately in 6-12-year-old (children) and 13-17-year-old (adolescent) girls and boys (total n = 28,094), taking into account the complex survey design.
Results: The prevalence of overweight changed from 2006 to 2011, and further to 2015 as shown in Table. In general, overweight was more common among children and adolescents from urban areas, small households, middle- and high-income households, and overweight parents; also among those with medium and high level parental education in the surveys conducted in 2006 and 2011. The prevalence of overweight increased over time in most subgroups in children, while adolescents had several exceptions from this general trend. Overall, the increase in overweight prevalence was higher among those with indigenous origin, rural residence, unemployed father, employed mother, low parental education, low-income household or overweight mother.
Conclusion: Prevalence of overweight, especially among children is increasing in Malaysia, almost comparable to developed countries. Children and adolescents from low socioeconomic position, rural areas, indigenous origin and with overweight parents should be the main target when developing strategies to prevent over-nutrition in Malaysia.

Conflict of Interest: None Disclosed.

Funding: No funding.

Tab. 1. Prevalence of overweight (%) by gender, age and survey year in Malaysia.

Year	2006	2011	2015	
Gender/ Age Group	Prevalence (95% CI)	Prevalence (95% CI)	Prevalence (95% CI)	p-value for overall trend*
Boys 6-12 years	20.1 (18.8, 21.5)	23.4 (21.1, 25.8)	28.3 (25.3, 31.5)	<0.001
Boys 13-17 years	20.4 (18.8, 22.1)	23.0 (20.2, 26.2)	23.1 (20.1, 26.4)	0.317
Girls 6-12 years	17.8 (16.6, 19.0)	19.8 (17.4, 22.4)	24.9 (22.4, 27.5)	<0.001
Girls 13-17 years	20.7 (19.1, 22.4)	19.3 (16.7, 22.2)	23.8 (20.9, 27.0)	0.044

CI: Confidence Interval *Linear trend test.

PO2.105

How has the English city of Leeds reduced socio-economic inequalities in the prevalence of obesity in children?

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Background: Childhood obesity in England continues to rise especially in disadvantaged populations and social inequalities continue to widen. In 2009, the City of Leeds introduced a citywide prevention strategy for preschool children, focused primarily on Children Centres in deprived areas. Trends in the prevalence of childhood obesity following its implementation were explored using data from the National Child Measurement Programme (NCMP).
Methods: Prevalence of obesity at primary-school entry (age 4-5 years) and exit (10-11 years) were analysed using NCMP data from 2009 to 2017, when five-year aggregated data became available. Leeds was compared with socio-demographically comparable cities (CC) in England and England as a whole, with exploration of prevalence amongst children in the top and bottom quintiles of social deprivation.
Results: Obesity prevalence in Leeds for children starting school fell significantly (9.4% to 8.8%; p<0.005), whereas CC and England showed no change (comparison of trends: p<0.001). The reduction in Leeds was primarily in the most deprived quintile (11.5% to 10.5%, p<0.01; comparison with CC and England was highly significant: p<0.001). Prevalence also fell in the most affluent quintile (6.8% to 6.0%, p = 0.03), while CC showed no change and England showed a lesser decline (6.7% to 6.3%, p = 0.03; comparison of trends: p<0.001).
Prevalence of obesity in Leeds at the end of primary school showed no change over time (19.7% to 19.6%) while there was a significant increase in obesity in CC (20.2% to 20.9%) and England (19.0% to19.4%; comparison of trends: p<0.001). In the affluent, prevalence fell in Leeds by 2%, whereas the reduction was only 0.8% in CC, and 0.7% in England (trend comparisons: p<0.001). In the most deprived quintile, obesity increased: Leeds by 1.4%; CC 1.3%, England 1% (comparison with England, p = 0.004).
Conclusion: Trends in childhood obesity in Leeds appear more promising than comparable cities and the rest of England, especially for disadvantaged children aged 4-5 years, where obesity prevalence fell most significantly. Leeds' city-wide strategy focused on families with preschool children through working with Children Centres in disadvantaged neighbourhoods. The *Health Exercise Nutrition for the Really Young* (HENRY) approach was at the strategy's core, involving training of Centre teams, parent groups and community activity. More detailed analysis is warranted to identify how this approach has contributed to the reduction in socio-economic inequalities in early childhood obesity.

Funding: RP and SJ are supported by Oxford NIHR Biomedical Research Centre.

Competing Interests: JB is the Head of Leeds Public Health Families Directorate. KR is CEO, DS is policy manager and MR founder of HENRY.

PO2.106

Overweight and obesity in seven year old children in the Czech Republic, effect of season (COSI project)

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Introduction: Between 1990 and 2010, number of obese children in the world had risen. For children under five years, the rise in the first decade was 21 %, in the second decade it was 31 % compared to 1990 (de Onis et al., 2010). In recent years there has been a tendency towards stagnation in the prevalence of childhood overweight and obesity in some countries. The aim of this work was to determine the influence of environmental factors and effect of season of measurement on the prevalence of overweight and obesity of seven year old children in the Czech Republic.
Methodology: The 4th round of the project Childhood Obesity Surveillance Initiative (COSI) took place in 2016. The project consisted of a questionnaire survey and anthropometric measurements of children. Each child was measured by a physician during an obligatory preventive check-up. In the fourth round, data were obtained from 1,718 children (824 boys, 894 girls) in the age category of 6.5 to 7.99 years. The data from four rounds of COSI measurement (n = 6414 children) were used to determine the dependence of the child's BMI on the season of measurement. The following tests were used for statistical evaluation: ANOVA, Mann-Whitney test, Kruskal-Wallis test, Chi square, and multiple regression.
Results: The prevalence of overweight in 2016 according to the national reference data (5th National Anthropological Survey, 1991) was 6.43 % for boys and 7.16 % for girls. The prevalence of obesity was 8.74 % for boys and 6.49 % for girls. According to our results, there is no significant dependence of the child's BMI on theseason of measurement (p = 0.876). Overweight and obesity of the children were significantly affected by maternal education (p = 0.015) and incidence of obesity in the family (p <0.001). The influence of the father's education was ambiguous (p = 0.065). Waist circumference and waist/height reatio (WHtR) were evaluated for both sexes. Risky WHtR(higher than 0.5) was found also in group of normal weight children.
Conclusion: In the monitored cohort of seven-year-old children, there is no significant dependence of the BMI of a child on the season of measurement. Since 2008, the prevalence of obesity and overweight of seven year old children in the Czech Republic has stagnated.

Reference

1. De Onis M, Blössner M, Borghi E. 2010. Global prevalence and trends of overweight and obesity among preschool children. Am J Clin Nutr 92:1257–1264.

Conflict of Interest: None Disclosed.

Funding: Supported by grants MZ ČR - RVO EÚ 00023761 and AZV MZ ČR 17-31670.

PO2.107

Sleep quality and relationship with lifestyle and cardiovascular risk in obese children

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Introduction: The effect of lifestyle habits on sleep as well as the association between sleep disorders and cardio-metabolic risk have been poorly investigated in obese children.
Methods: We assessed sleep features and their relationship with obesity indexes (waist circumference, fat mass, BMI z score), lifestyle (dietary habits, physical activity) and cardiometabolic risk factors (lipids, insulin sensitivity, blood pressure) in 163 obese children (12.6±2.8 yr.,41% males, mean BMI z score 3.1±0.7). Parents filled out the sleep disturbance scale for children, exploring six sleep disorders categories: disorders in initiating and maintaining sleep (DIMS), sleep breathing disorders (SBD), disorders of arousal (DA), sleep-wake transition disorders (SWTD), disorders of excessive somnolence (DES) and sleep hyperhidrosis (SHY).
Results: Frequency of sleep disorders was: 21% DES, 17.8% DIMS, 17.2% SBD, 13.6% DA, 8.5% SWTD and 6.2% SHY. Among SBD children, 50% had also a DES, 43 % a DIMS, 25% a DA and 10.7% a SWTD and 10.7% an IPN. Sleep duration was lower than recommended for age in 77% of obese children who were older (12.9±2.7 vs 11.7±3.1 years, $p<0.05$), had more frequently a DES (30.1% vs 13.8%, $p<0.05$), hypertension-prehypertension (32.7% vs 13.7%, $p<0.05$) and consumed more animal proteins and less simple sugars than good sleepers. SDB children had a higher BMI z score (3.3±0.6 vs 3.0±0.7, $p< 0.05$ vs no SBD) and HOMA-IR values (4.6±3.1 vs 3.5±2.0, $p<0.05$ adjusted for BMI z score and puberty). DIMS was associated with excessive consumption of saturated fat and cholesterol and lower intake of PUFA and MUFA, higher blood glucose levels (87.7±5.5 vs 85.2±5.7 mg/dl, $p<0.05$ vs no DIMS). Physical activity did not affect sleep quality and quantity in our population.
Conclusion: Most obese children in this study had reduced sleep time and chronic sleep deprivation and more than one third suffered from excessive daytime sleepiness and hypertension. SBD is the sleep disorder mostly related to an increased metabolic risk. The relationship between sleep and lifestyle deserves further investigations to improve prevention strategies

Conflict of Interest: None.

Funding: Italian Ministry of Health.

PO2.108

School environment associated with obesity in Malaysian school children

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Introduction: Recently, Malaysia received the questionable honour of being the most obese country in Southeast Asia. In 2011, the National Health and Morbidity Survey showed that almost 500,000 children in Malaysia were obese, and childhood obesity is likely to continue into adulthood. This growing problem due to the society's emphasis on academic excellence resulted in additional academic work among children to the detriment of physical activities. There is evidence suggest that the school environment do have prominent contributions to the rising of childhood obesity. Malaysia Ministry of Health has been addressed to recognize the school as the most significant avenue in managing obesity among Malaysian school children. Hence, the study aimed to understand the potential factors in a school environment context that can impact on obesity of school children.
Methods: The study was a cross-sectional study involving 400 primary school children aged 9 to 11 years. School principals were interviewed face-to-face using a set of validated Malay version "Whole-school Environmental Mapping" questionnaire that consists of four domains of school environment factors: physical, economic, political and socio-cultural environment. In addition, observation of school environment also included in order to fit the list of environmental factors in this study. The school children were assessed for body mass index (BMI) according to WHO 2007 reference. Associations between school environment and obesity were estimated in multiple linear regression models.
Results: Overall, the total score for the school environment was 63.1%. Rural school scored higher compared to urban counterpart for overall school environment, physical and political environment ($p<0.05$). In multiple linear regression analysis, seven criteria of school environment were found to be associated with BMI of school children when it was adjusted for calorie intake and physical activity. The findings showed that 33.4% of the variation in BMI was explained by equation BMI (kg/m^2) = 26.396 - 3.063 (health professional involvement)- 3.753 (simple exercise available before class) + 1.120 (encouragement of walking/riding bicycle to school) - 2.999 (no high calorie food)- 1.751(healthy foods and drinks at tuck shop)- 2.735 (policy for physical activity) + 1.498 (training teacher as a role model).
Conclusion: Awareness and enhancement of school environment are needed in order to reduce the prevalence of obesity in children. Supporting such schools in a targeted way may be an efficient way to intervene and could impact both health and academic outcomes.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.109

Vitamin D status in Czech adolescents and its relationship to anthropometric and metabolic parameters

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Introduction: Vitamin D is an important nutrient for bone health and is also essential in immunity and other systems. It is well recognized that lower serum concentrations of vitamin D are found in obese individuals. The aim of our study was to study an association between vitamin D and parathyroid hormone (PTH) levels and cardiovascular risks factors in overweight/obese (OW/OB) adolescents and their normal weight (NW) counterparts.
Methods: Three hundred and ninety-three adolescents aged 13-17 years including 201 NW (median of BMI z-score 0.2) and 192 OW/OB (median of BMI z-score 2.6) were recruited from the Childhood Obesity Prevalence And Treatment (COPAT) project. Fasting serum levels of 25-hydroxyvitamin D [25(OH)D], 1,25-dihydroxyvitamin D [1,25(OH)D] and PTH, blood pressure, antropometric and biochemical parameters were assessed. Non-parametric Mann-Whitney test and Spearman correlation were used.
Results: About 75% of OW/OB adolescents and 83% of NW adolescents exhibited lower levels of 25(OH)D defined below threshold of 70 nmol/l. In all subjects, concentrations of 1,25(OH)D were within the normal reference range (43–168 pmol/l). The concentration of PTH exceeded the upper reference range in 9% (15 – 65 ng/l). Analyses taking into account body weight showed that only concentrations of 1,25(OH)D were significantly lower in OW/OB adolescents in comparison to NW adolescents (127.7 vs. 138.1 nmol/l, $p < 0.001$). Our data confirmed a significant negative correlation of 1,25(OH)D with BMI z-score ($r = -0,228$, $p < 0.001$), with the percentage of total body fat mass ($r = -0.304$, $p < 0.001$) and with z-score of waist circumference ($r = -0.219$, $p < 0.001$). We did not find any significant correlations of 25(OH)D or PTH with the other studied parameters.
Conclusion: Our data demonstrated a low level of 25(OH)-D regardless body weight status. In Czech adolescents, there was a significant inverse relationship between 1,25(OH)D concentrations and anthropometric

parameters. Further associations were found neither to vitamin D nor to PTH concentrations.
Supported by AZV 17-31670A, MH CZ-DRO (Institute of Endocrinology – EÚ 00023761).

PO2.110

Prevalence of childhood obesity in the Southeast region of Brazil: systematic review and meta-analysis

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Introduction: Childhood obesity is growing in different contexts and has become the greatest public health challenge. Recent and representative estimates of childhood obesity in Brazil aren't available in order to subsidize the planning and institution of policies in the area.
Method: Population-based studies were conducted in Brazil that evaluated the prevalence of obesity in children <10 years of age. The searches were done in MEDLINE, EMBASE, SCOPUS, CINAHL, LILACS, among others databases, as well as theses and dissertations. The protocol containing the detailed methods of this systematic review was recorded in Prospero (Register number: CRD42018091713). Researchers in pairs and independently selected the studies, extracted the data and assessed the methodological quality, initially only the Southeast region. The meta-analyzes of the prevalence and confidence interval (CI) of 95% in total and by subgroups were calculated. Stata software was used for all calculations. The final data generated by the research will be made available in full in open repositories after the publication of the main result.
Results: 8,878 publications were identified, of which 1698 were obtained in the search of articles and 7180 in the search of theses and dissertations. Of the articles selected, 475 were considered eligible and evaluated in full text. For the analysis of the region, 59 publications were included referring to 50 studies for the extraction of the data and of these, 33 studies for the meta-analysis. Most of the research selected was carried out between the years of 2009 and 2013, predominantly in a school environment, and with a cross-sectional design. The prevalence of childhood obesity was found to be 7%, being 9% higher when compared to female sex 6%.
Conclusion: It is estimated that the prevalence of childhood obesity in the Southeast region is 7% of children, with a higher prevalence among boys. The studies presented great variability among them, being necessary the definition of standardized methods for a better estimation of the scenario of the Southeast region and of Brazil.

Conflict of Interest: None Disclosed.

Received funding of The Brazilian National Council for Scientific and Technological Development (CNPq) Nº.10/2017 - Systematic Reviews in Food and Nutrition.

PO2.111

Prevalence of childhood obesity in macro-regions of Brazil: systematic review and meta-analysis

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Introduction: Childhood obesity is growing in different contexts and has become the greatest public health challenge. Recent and representative estimates of childhood obesity in Brazil aren't available in order to subsidize the planning and institution of policies in the area.
Objective: To estimate the prevalence of childhood obesity in general, by age groups of infancy and Brazilian macro-regions, through a systematic review with meta-analysis.
Method: Population based studies were conducted in Brazil that evaluated the prevalence of obesity in children <10 years of age. The searches were done in MEDLINE, EMBASE, SCOPUS, CINAHL, LILACS, among others databases, as well as theses and dissertations. The protocol containing the detailed methods of this systematic review was recorded in Prospero (Register number: CRD42018091713). Researchers in pairs and independently selected the studies, extracted the data and evaluated the methodological quality, at first only of theses and dissertations. As a next step, the meta-analyzes of prevalence and confidence interval (CI) of 95% in total and by subgroups will be calculated. Stata software will be used for all calculations. The final data generated by the research will be made available in full in open repositories after the publication of the main result.
Preliminary Result: 8,878 publications were identified, of which 1698 were obtained in the search of articles and 7180 in the search for theses and dissertations. Of the articles selected, 489 were considered eligible and evaluated in full text. Of the theses and dissertations, 44 were eligible for extraction. The project is currently underway.

Conflict of Interest: None Disclosed.

Funding: The Brazilian Ministry of Health included this theme as a financing line in the edict of The Brazilian National Council for Scientific and Technological Development (CNPq) Nº. 10/2017 - Systematic Reviews in Food and Nutrition, in which the present research was contemplated.

PO2.112

Study of the rare forms of monogenic obesity early severe mutation homozygous and heterozygous in leptin and leptin-receptor gene in Moroccan children

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Monogenic obesity is a recessive genetic disorder that may be caused by leptin gene mutation (<100 cases) or its receptor (2-3% case), which are key factors in the regulation of energy balance in the central nervous system. In Morocco few studies have been done in this direction.
Objectives: Study of genetic markers predisposing to severe early-onset obesity in children.
Material and Methods: We identified nine index cases with severe early-onset obesity six have a family history of obesity. Among 5 CI obese, one CI present micropenis 2 CI dyslipidemia associated with hypothyroidism and hypogonadism, one CI present type 2 diabetes associated with metabolic syndrome. Sex ratio is 1 (5G / 4F). Their average age: 3 years 8 months with an age of onset of obesity ranging from birth to 7 months. The mean birth weight of patients is 3800 ± 1209 Kg and their average BMI was 32.4 ± 7.2 kg/m^2.
The search for genetic mutations was performed in a specialized laboratory (Center Human Genetics of the Institute of Biology of Lille-France). The sequencing was performed on the gene for the leptin / leptin receptor using the sequencer (or Haloplex Rain Dance).
Results: Four CI with a severe deficiency of leptin (<1 percentile) and a CI that has a resistance to leptin (> 99th percentile) compared to the reference values of leptin found in children of the same BMI and same stage of puberty. Their rate mean leptin: 32.4 ± 24 1 ng/ml. The molecular study identifies four novels mutations: two homozygous mutations of which on the leptin gene and the other on the receptor gene to leptin and two mutations are identified with a heterozygous mutation and another double heterozygous gene on the leptin receptor.
Conclusion: This original work relates two very interesting homozygous mutations: a mutation in the leptin gene which generates the phenotype (Ob/Ob) due to dysregulation in the hypothalamus and a mutation in the receptor (LEPR), expressed by damage hypothalamic endocrine (hypothyroidism and hypogonadism), the cause of severe early-onset obesity.

PO2.113

How many of the children in fourth grade with obesity have contact with a pediatrician?

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Introduction: In Sweden it is free of charge to visit a pediatrician and it is recommended when the child suffers from obesity. Most of referrals to pediatricians comes from the school nurse, who measures all children every second year. We know that the prognosis is best with younger, less obese children. So how is it when the children are I fourth grade (about 10 years of age). How many have obesity and of those who have it, how many have an adequate contact with the pediatrics?

Methods: During the school year 2017/18, in the south east district of Sweden school nurses in 12 municipalities were asked to collect data from the children in fourth grade which they examined as a health visit. Then they answered following questions:

1 How many children did they totally examine?
2 How many of them suffered from obesity (isoBMI >30)
3 How many of those had already an adequate contact with a pediatrician?
4 How many families accepted a referral to a pediatrician after the health visit?
5 How many did not have a health contact in spite of obesity, because the family did not want it or for other reasons.

Results: The12 municipalities referred children to 4 different pediatrics. That year it was 3532 children that were measured in fourth grade for the health visit. 185 of them suffered from obesity, that is 5.2%. Only 26% had already an adequate pediatric contact. Only 9.2% of the families wanted the school nurse to make a referral to a pediatrician after the health visit. 57% of the children with obesity did not have a pediatric contact because the family did not want that or because of other reasons. The prevalence of obesity and the ability to motivate the families to an adequate pediatric contact varied considerably between the different municipalities.

Conclusion: None of the 12 municipalities had a habit of measure or follow up the numbers above. In order to improve the amount of children with obesity who will get an adequate pediatric contact it is essential to continue to analyze and measure those numbers every year. The school nurses were very interested to see their own results and to compare them with the 2-4 other municipalities which referred children to the same pediatrics. Once a year all 4 of the pediatrics in this part of Sweden have offered a free of charge half day lecture for the school nurses. After analyzing their results the nurses wanted more information about how to motivate families and they wanted to know more about child obesity.

Conflict of Interest: None Disclosed. No payment was received.

Funding: No Funding.

Health, Behaviour and Environment

PO2.114

The escalating trend of using weight loss supplements with a view to safety concerns among overweight patients with diabetes mellitus type 2. The situation in Albanian Community Pharmacies

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Objective: The main purpose of this study was to determine the rising trend in the usage of herbal supplements by patients with diabetes mellitus type 2 as a "safe" option for weight loss. This descriptive study was conducted in several major cities in Albania, from June until September 2017. Many patients due to heavy marketing use herbal supplements as weight loss aid and often combine herbal ingredients with anti-diabetic medications with no regard to any possible interactions. However, GPs do not regularly request a history of herbal use from their patients and may overlook herbal supplements' adverse effects. Although often considered harmless by patients, herbal supplements may cause adverse effects from an herbal ingredient, a contaminant, an adulterant or from a possible herb-drug interaction.

Design And Method: The study group included 273 patients with and established diagnosis of diabetes mellitus type 2 and BMI ≥30 who were regular patients of 8 largest community pharmacies in these cities and accepted to participate in the study. Data were collected through an investigator-made questionnaire including questions about socio-demographic features and herbal supplements they have used in the last year for helping with weight loss. Percentiles and chi-square statistics tests were used to evaluate the data through SPSS 23.0 program.

Results: In the study were selected patients with an established diagnose of diabetes mellitus type 2 for at least 3 years and all the patients were using anti-diabetic medications. Of all patients with diabetes, 61.9% declared that at least once in the last year they have used a herbal weight loss product. The major reason for selecting herbal weight loss was the perceived idea that the patients had, that these products were clinically safe. Also 70% of them stated that they didn't receive any information from their pharmacist on the possibility of interactions, allergy from any of the ingredients or any other safety concerns.

Conclusion: Since community pharmacists are the most accessible healthcare professionals from patients, they need to follow patients regularly and provide patient education on any herbal supplements requested from the patients, especially the so called "Safe" weight loss products.

This small scale study highlighted the need for further training for community pharmacists to evaluate on an individual base the safety profile of these products in patients with chronic diseases like diabetes or CVDs who are on regular pharmacotherapy. Considering that the growing appeal of weight loss remedies fuelled by internet and social media is likely to continue, community pharmacists' should be updated regularly with the available safety information on weight loss supplements.

PO2.115

Adiponectin, leptin and total ghrelin concentration after meals with various fat and carbohydrate content in men with different nutritional status

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Introduction: Hormonal signals, that regulate hunger and satiety, include neuropeptides, which are synthesized in the central nervous system, in the gastrointestinal tract, and they are also released by adipocytes. Among them the key role is played by ghrelin, leptin and adiponectin. The purpose of the study was to determine the hormonal response to consumption of meal with different carbohydrate and fat content and determine the differences between hormonal response in people with normal weight and people with overweight/obesity.

Methods: The study was conducted among 46 healthy men aged 21-58. In two groups, a crossover study was conducted – the subjects received standardized isocaloric (450 kcal) meals with different contents of essential nutrients during two subsequent visits. People from group I received a standardized, isocaloric (450 kcal), high carbohydrate (HC – Nutridrink Fat Free) meal and after 1-2 weeks – isocaloric (450 kcal) normo carbohydrate (NC – Cubitan) meal. Similarly, men from group II initially received standardized, isocaloric (450 kcal) high carbohydrate (HC – Nutridrink Fat Free) meal and after 1-2 weeks – isocaloric (450 kcal), high fat (HF – Calogen) meal. On the empty stomach, all anthropometric measurements were taken and venous blood was collected (immediately before a meal, then at 30, 60, 120, 180 and 240 minutes after a meal intake) to perform the determination of total adiponectin, leptin and total ghrelin concentrations.

Results: In people with normal weight and people with overweight/obesity, a different postprandial hormone response was observed. In overweight/obese people, significantly higher leptin concentrations were observed both on fasting and throughout the study after each tested meal. Higher concentrations and/or greater increase in concentrations of adiponectin and leptin and lower concentrations and/or more pronounced reduction in concentrations of total ghrelin in subjects with normal body weight were inducted by a HC meal compared to the remaining meals, whereas in overweight/obese people by NC and/or HF meal.
Conclusion: The observed trends suggest that people with normal body weight may experience a more pronounced feeling of satiety after HC meals, which in people with overweight/obesity may exacerbate the feeling of hunger, while the feeling of satiety in this group may be stimulated by meals with HF content.

Conflict of Interest: None.

Funding: The study was supported by grants from Medical University of Bialystok, Poland.

PO2.116

Maternal nutrition in pregnancy: a protocol for the development of a core outcome set

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Introduction: Maternal nutrition during pregnancy is a modifiable risk factor for health for both the mother and offspring making it an important area of research. Variability in outcome selection between studies however, limits their comparability and is a barrier for high quality evidence generation. There is also lack of stakeholder representation in outcome choice. A core outcome set (COS) is set of outcomes which are agreed by consensus, to be a minimum standard to report in all trials within a particular area of research. Therefore, we present a study protocol for the development of a COS for research on maternal nutrition during pregnancy.
Methods: The COS is registered with the Core Outcomes for Measurement of Effectiveness Trials (COMET) registry. The study will involve 3 distinct steps. Firstly, a systematic review will be conducted following PRISMA guidelines to identify studies evaluating maternal nutrition during pregnancy. Outcomes related to nutrition, their definitions and measurement details will be extracted from eligible studies. Outcomes will be catalogued using the taxonomy of the COMET initiative. Secondly, a multi-stage, electronic Delphi survey will be conducted with relevant international stakeholders including healthcare professionals, researchers and pregnant women. Participants will be presented with the full list of outcomes from step 1 and invited to rank the importance of including each of them in the final COS using a 9-point Likert scale. Subsequent rounds of the survey will feedback the group consensus of the previous round and participants may change their scores or specify reasons for remaining outside the consensus. The survey will continue until a consensus is reached or there is stability in responses. Finally, on completion of the survey, a consensus meeting will be held with a select group of experts to finalise the COS.
Discussion: This COS will support the design of high-quality studies through the selection of meaningful outcomes and strengthen the standards for research on the nutritional care of pregnant women. This will help broaden our understanding of the role that maternal nutrition plays in offspring and maternal health and support the development of robust clinical guidelines to improve the nutritional care of women during pregnancy.

PO2.117

Weight gain and weight loss during and between pregnancies – a cross-sectional survey of UK mothers

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Introduction: Maternal obesity is a significant risk factor for adverse perinatal health outcomes for both mother and infant, and is a significant contributor to the obesity epidemic. There is limited data available in the UK regarding pregnancy-related weight gain and access to weight management programmes. This cross-sectional study explores pregnancy-related weight gain and opinions / experiences regarding pregnancy & postpartum weight management.
Methods: A mixed-method study combining online questionnaire and individual telephone interviews was undertaken between May 2016 and August 2017, targeting female UK residents, aged 18-45 years, who were pregnant / had given birth in the previous 10 years. Recruitment was carried out through social media, advertising at public locations within Glasgow city and surrounds, and face-to-face recruitment at public locations. Interviews were audio recorded, transcribed and then analysed using NVivo Software.
Results: Respondents (n = 339, aged 30±6y, 61% presently with overweight or obesity) reported one (55%), 2 (31%) or >3 pregnancies (14%). Reported pregnancy weight gain was 13±10 kg, 11±8 kg, 13±9 kg, 12±5 kg, after 1st, 2nd, 3rd and 4th pregnancy, respectively. The median inter-pregnancy period lasted 34 months after the first pregnancy, and 23-26 months for subsequent pregnancies. After each pregnancy, 11-27% of respondents reported having lost none of the gestational weight, with 48-55% reporting having lost less than they gained. Overall, 62% had retained weight gained during one or more of their pregnancies, yet 83% had never received advice regarding weight management during or after pregnancy. There was a general agreement that obesity in pregnancy can be harmful for the offspring (67%). Barriers for weight management included lack of time (44%), tiredness (13%) and breastfeeding (13%), while motivators included improved health (44%), confidence or self-esteem (28%). Qualitative interviews (n = 29) revealed lack of unawareness regarding pregnancy weight management recommendations, and lack of weight management advice. Respondents were willing to engage with weight management strategies around pregnancy, although there was a lack of consensus regarding when is best to initiate such programme, in the context of birth and breastfeeding.
Conclusion: As gestational weight gain is a contributor toward overweight and obesity in women, there is scope to develop pragmatic weight loss interventions and training for better support during and after pregnancy.

Conflict of Interest: None to disclose.

Funding: No Funding.

PO2.118

Food preferences and attitudes towards ready-to-eat-products (RTEP) in adults aged 65+ years

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The UK population is ageing; around 20% were aged 65+ years in 2017 and this is projected to reach 25% by 2037. Malnutrition increases health risks in the older population and good nutritional status and health in older adults are closely related. Whilst market research suggests that there is a need for healthy, ready-to-eat products (RTEP) specifically designed for this cohort, little is known about the purchasing and consumption patterns, or the nutritional adequacy and price acceptability of RTEP for these consumers.

This study received a favourable opinion from the University of Surrey Ethics Committee (1280-FHMS-17) and was designed to assess the role of RTEP in the diets of people aged 65+ by examining overall drivers for their consumption. Sixty-one older adults (39 females) were recruited over a two-month period for the study. Participants were required to complete a questionnaire which asked about specific characteristics, including eating and shopping habits and a varied selection of differently priced RTEP were chosen and analysed by researchers to compare both their nutritional content and price.

Mean age was 78.9 (±10.3) years and mean BMI was 26.2(±4.6) kg/m^2. 46% of participants were widowed and all but six (90%) were retired. 61% cooked their own meals, 88.5% regularly consumed RTEP with 51% doing so at least once daily. The main drivers for RTEP consumption were convenience and taste. There were no significant differences in meal preparation patterns, frequency of, or overall RTEP consumption between genders. Selected RTEP differed greatly in price, portion size, and nutrient content and the more expensive RTEP had no nutritional advantage when compared with cheaper versions. Participants indicated that 'overall cooking time' and 'type of cuisine' were the most important factors when selecting an RTEP. They also indicated that they would like the option to be able to purchase products with reduced salt, sugar, and saturated fat, and with more competitive pricing and greater variety.

Meeting the nutrition needs of this growing older population is crucial for the maintenance of their health, functional independence and quality of life. Nutritionally balanced, readily available, competitively priced RTEP could contribute to their overall improved nutritional status. Future research could further investigate consumer requirements and aid in the development of a range of targeted RTEP.

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PO2.119

Mid-pregnancy changes in maternal upper body subcutaneous fat assessed using skinfold measurements and oral glucose tolerance test results amongst women with obesity in the UK

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Introduction: In the UK, antenatal care tends to be based on pre-pregnancy body mass index (BMI) and there are no guidelines for gestational weight gain (GWG). However, it is widely acknowledged that maternal obesity and excessive GWG are associated with increased risk of adverse maternal and fetal outcomes such as gestational diabetes mellitus (GDM), and recent studies have suggested a role for the timing and composition of GWG (1,2). Our objective was to examine the effect of changes in maternal upper body subcutaneous fat on maternal plasma glucose values following the 2-hour 75 g oral glucose tolerance test (OGTT) routinely used in the UK amongst women with obesity.

Methods: Expectant women (n = 75) were recruited at 12 weeks gestation. Maternal height, GWG and body composition were assessed using skinfold thickness (SFT) measurements at the biceps, triceps and subscapular collected at baseline and repeated at 28 weeks gestation. All women took a 2-hour 75g OGTT at the end of their second trimester. Multivariable regression was used to evaluate associations between changes in upper body SFT between early and mid-pregnancy and OGTT results.

Results: The multiple regression model statistically significantly predicted 2-hour plasma glucose values, F (5,57) = 4.056, p = 0.03, adjusted R2 = 0.20, but not fasting plasma glucose values, F(5, 57) = 2.124, p = 0.076. Higher 2-hour plasma glucose values were significantly associated with greater increases in the sum of the upper body SFT measurements in the second trimester, higher maternal age, and inversely associated with previous number of pregnancies. No associations were observed between BMI or rate of GWG during the second trimester and 2-hour plasma glucose values.

Conclusion: Increases in maternal upper body subcutaneous body fat may influence maternal 2-hour 75 g OGTT results in women with obesity in the UK more strongly than GWG. Further research is required in larger populations to determine whether the measurement of maternal upper body SFT could be a useful clinical tool alongside weight and/or BMI for identifying women at risk of hyperglycaemia in pregnancy.

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Conflict of Interest: None Disclosed.

Funding: No funding.

PO2.120

Physical and psychological impacts of bariatric surgeries. Comparative study between preoperative and post-operative patients

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Today, obesity is recognized as an important public health problem because of its prevalence and consequences in the short and long term on people's health. Bariatric surgery appears to be the best treatment against obesity, compared to traditional treatments (Bult, Fri Dalen & Muller, 2008). Therefore, the stakes are high as regards its effectiveness in the long term. One must question the physical and psychological effects induced by an intervention.

The purpose of this work is to evaluate the impact of bariatric surgery on the patients' physical and psychological health. The sample is composed of 96 adults who wish to undergo or have undergone bariatric surgery (25% waiting for surgery and 75% from 1 month to more than 2 years after surgery). It is made of 78 women (81.25%) and 18 men (18.75%). The average body mass index is 37.79 ± 8.72 (46.01 ± 6.54 for preoperative patients and 34.83 ± 7.48 for postoperative patients). The participants were selected from a clinical population and answered to 7 self-administered questionnaires: the general questionnaire, the State-Trait Anxiety Inventory (STAI), the Medical Outcomes Study 36-item Short-Form Health Survey (SF 36), the Questionnaire of Eating and Weight Patterns-Revised (QEWP-R), the Rosenberg Self-Esteem Scale (RSES), the Body Esteem Scale (BES) and the Beck Depression Inventory Second Edition (BDI-II).

The results indicate that there are many differences between patients waiting for surgery and those who have undergone it, namely an improved health condition but also the development of nutritional deficiencies. In addition, candidates for surgery have higher rates of psychological problems than patients who have already undergone bariatric surgery concerning depression, eating disorders and body dissatisfaction. Physical quality of life is significantly higher in patients who have had an operation than in patients awaiting surgery. Finally, in patients who have undergone surgery, the percentage of weight loss is positively linked with physical quality of life as well as body esteem. Furthermore, a weight regain is observed for 15.63% of patients more than a year after surgery.

These results seem interesting in particular as regards prevention, intervention and care strategies in the field of bariatric surgery.

PO2.121

Appetitive traits and weight change in first year university students in Mexico

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Introduction: The Adult Eating Behaviour Questionnaire (AEBQ) measures food approach and avoidance appetitive traits that are associated with weight. Studies in children have demonstrated that these traits predict changes in weight, but this has not been explored in adults. There is consistent evidence for a connection between young adults´ entrance to university and weight gain. This study aimed to explore whether appetitive traits predict weight changes in first year university students in Mexico.
Methods: First-year students from five campuses in the state of Jalisco were invited to take part. Students completed a survey and had their weight and height measured by a researcher at the beginning of the academic year. The survey included sociodemographic questions and the AEBQ Spanish version (AEBQ/Esp), which captures 7 appetitive traits [3 food approach traits: Food Responsiveness (FR), Emotional overeating (EOE), Enjoyment of food (EF), and 4 food avoidance traits: Satiety responsiveness (SR), Emotional under-eating (EUE), Food fussiness (FF), Slowness in eating (SE)]. Weight and height were measured again at the end of the students' first year. Multiple regression analysis explored associations between each appetitive trait at baseline and weight change at follow up. Baseline BMI, sex, campus and living at home, where entered as covariates.
Results: A total of 690 students completed the study [455 women (65.9%), 18.6±1.3 years old at baseline, and 471 (68.3%) lived with their families]. A mean weight change of 0.5±0.1 kg, was observed over the year (Initial weight 63.7±13.4 kg and final weight 64.2±13.5). All 7 appetitive traits were associated with changes in weight at follow up ([FR: β = -0.516; p = 0.041; EOE: β = -0.539; p = 0.033; EF: β = -0.542; p = 0.032; SR: β = -0.537; p = 0.034; EUE: β = -0.526; p = 0.038; FF: β = -0.542; p = 0.032; SE: β = -0.547; p = 0.30). Higher food approach scores and higher food avoidance scores were related to lower weight changes at follow-up.
Conclusion: This study suggests appetitive traits are associated with change in weight after the first year of university, but these associations appear to be small. As expected, and in line with studies in childhood, higher scores for food avoidance traits were associated with lower changes in weight. However, contrary to expectations, higher scores for food approach traits were also associated with lower changes. Future research should explore interactions between the traits and regulation of eating behaviours or dieting, as well as relationships with dietary intake, to better understand the influence of these traits on weight changes in early adulthood.

Tab. 1. Multiple linear regression for change in weight at follow up and appetitive traits in Mexican First year university students (n = 690).

Appetitive traits	β coefficient (SE)	95% CI for β	p	R2
'Food approach'				
Food responsiveness	-0.516 (0.25)	-1.011 to -0.021	0.041	0.240
Emotional over-eating	-0.549 (0.25)	-1.034 to -0.044	0.033	0.242
Enjoyment of food	-0.542 (0.25)	-1.038 to -0.046	0.032	0.241
'Food avoidance'				
Satiety responsiveness	-0.537 (0.25)	-1.033 to -0.041	0.034	0.243
Emotional under-eating	-0.526 (0.25)	-1.023 to -0.029	0.038	0.248
Food fussiness	-0.542 (0.25)	-1.038 to -0.047	0.032	0.243
Slowness in eating	-0.547 (0.25)	-1.043 to -0.052	0.030	0.244

Adjusted for sex, initial BMI, living at home and campus; β coefficient: Un-standardised values of β; CI: Confidence Intervals; p: significance values; SE: Standard Error; R2: Coefficient of determination.

PO2.122

Effects of antidepressant and antipsychotic use on weight gain: a systematic review

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Introduction: Weight gain is an adverse effect of patients using antidepressants and antipsychotics. This side effect can cause numerous comorbidities and reduces lifespan. The use of these drugs is increasing worldwide due to the frequency of mental disorders that are affecting many people (22.8% of the global burden of diseases) (1). This systematic review aims to evaluate the association between antidepressants and antipsychotics therapy and weight gain in cohort studies.
Methods: We systematically reviewed articles from 2008 to 2018 through the PubMed database following the PRISMA statement. We included cohort prospective and retrospective studies. The main outcome was body weight gain. Two authors selected the data.
Results: Twenty-one cohort studies that included children (2-18 years old) and adults (18-103 years old) were selected according to the inclusion criteria, with a total of 119,183 subjects mean age of about 40.83 years, mainly females (62.20%), followed by 3.86 years. Most of the included antidepressants (80%) showed increased risk of about 5% body weight in patients using antidepressant therapy. However, patients prescribing Duloxetine, Bupropion and Ziprasidone showed a negative association with weight gain. Furthermore, Quetiapine, Haloperidol, Risperidone, Olanzapine, Trifluoperazine and Clozapine, which are Second Generation Antipsychotics (SGA), were found to induce weight gain from baseline greater than 7% in patients under 65, which is considered weight gain by the Food and Drug Administration.
Conclusion: An association between weight gain and many antidepressants and antipsychotics was observed. Several antidepressants increased a 5% the risk of weight gain in patients taking them; and several SGA were associated with a further increase up to 7%. Studies with higher sample sizes and longer durations (over 4 years) of treatment are needed to confirm these observations.

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Conflict of Interest: none declared.

Funding: L. A.-P. acknowledges the fellowships from the Asociación de Amigos de la Universidad de Navarra (ADA).

PO2.123

The assosiation between childhood trauma and eating pattern on the type 2 diabetes or obese patients at a university hospital clinic

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Introduction: The aim of this study is to evaluate the correlation between psychological trauma and eating pattern on the type 2 diabetes or obese patients.
Methods: Between August 2018 and October 2018, it was evaluated 74 type 2 diabetes or obese patient and 55 non obese and non diabetes person at an University Hospital in Istanbul. Datawas optained by using 19-item General Information Questionnaire and 28-item questionnaire Childhood Trauma Questionnaire.
Results: In this study, it was found that BMI values and waist circumference had a low level of correlation with number of trauma, sexual abuse and total childhood trauma score. There was a moderate significant relationship between HbA1c and physical abuse on male subjects, whereas no significant relationship was found on female subjects. There is a low negative negative correlation between weekly vegetable consumption and sexual abuse. It is also found that there is a low negative correlation between the number of regular soda consumption and the number of trauma on female subjects. Significant differences were also found between the groups total trauma scores and subgroup scores.
Conclusion: As a result, it can be said that psychological examination and support deserves more attention on type 2 diabetes or obese patients.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.124

Impact of health-related quality of life and depression on obesity in Koreans

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Introduction: Obesity is one of the most significant issues in global health due to its impact on health and socioeconomic burden. Understanding its etiology is both complex and an important challenge. This study investigated the cross-sectional association between obesity and general characteristics (age, sex, income, and education). Additionally, this study mainly focused on assessing two variables related to obesity: health-related quality of life (HRQoL) and current presence of depression.
Methods: This survey investigated a representative sample of South Korean population (n = 8150) from the Korea National Health and Nutrition Examination Survey conducted in 2016. Body mass index was used to classify an individual as obese. We used EQ-5D to assess quality of life and examined if there was any current depression. Chi-squared test, t-test, and logistic regression analysis were adopted to explore the relationship between general characteristics and obesity. Multiple logistic regression was used to assess the relationship between depression and obesity.
Results: The odds ratio (OR) for the lower quartile of income distribution to obesity was 1.380 (95% CI 1.124-1.692), and OR for highest group in level of education to obesity was 1.712 (95% CI 1.456-2.013). The OR of higher EQ-5D score group to obesity was 0.232 (95% CI 0.127-0.422), and that of current depression to obesity was 2.384 (95% CI 1.304 – 4.358). Multiple logistic regression showed that the adjusted OR of depression to obesity was 2.488.
Conclusion: Lower HRQoL and depression were significantly associated with obesity. These results suggest that HRQoL and mental health should be considered as important factors contributing to obesity.

Conflict of Interest: None Disclosed.

Funding: No Funding.

Tab. 1. General characteristics and obesity.

		non-obese		obese		p
sex	Male	2,351	64.0%	1,140	36.0%	<0.0001
	Female	3,180	74.6%	1,117	25.4%	
age		37.59	0.44	46.84	0.51	<0.0001
level of income (by percentile)	> 75%	854	64.3%	480	35.7%	0.013
	50% - 75%	1,392	69.8%	568	30.2%	
	25% - 50%	1,588	69.2%	630	30.8%	
	< 25%	1,673	71.3%	573	28.7%	
level of education	Elementary or less	2,076	77.2%	583	22.8%	<0.0001
	Middle school	561	68.7%	257	31.3%	
	High school	1,249	66.8%	632	33.2%	
	University or more	1,428	66.4%	671	33.6%	
heavy alcohol use	no	2,242	68.3%	1,044	31.7%	0.008
	yes	2,117	64.3%	1,158	35.7%	
current smoker	no	3,206	65.6%	1,678	34.4%	0.011
	yes	688	60.7%	436	39.3%	
perception of stress	no	3,206	67.0%	1,567	33.0%	0.017
	yes	1,147	63.7%	634	36.3%	
presence of depression	no	69	76.9%	28	23.1%	0.004
	yes	108	58.3%	72	41.7%	
EQ-5D index*		0.96	0.00	0.94	0.00	<0.0001
total		5531		2257		

Chi-Square and t Tests for Research Variables
*EQ-5D index value sets generated using 'South Korean time trade-off values for EQ-5D health states'

Tab. 2. The OR of each variables for obesity.

		OR (95% CI)
Sex	Male	1.650 (1.475-1.845)
Age		1.023 (1.020-1.026)
level of income (by percentile)	> 75%	1.380 (1.125-1.692)
	50% - 75%	1.073 (0.899-1.281)
	25% - 50%	1.105 (0.931-1.311)
	< 25%	-
Level of education	Elementary or less	-
	Middle school	1.537 (1.236-1.912)
	High school	1.680 (1.434-1.968)
	University or more	1.712 (1.456-2.013)
heavy alcohol use	yes	1.196 (1.049-1.365)
current smoker	yes	1.236 (1.049-1.456)
perception of stress	yes	1.159 (1.027-1.308)
presence of depression	yes	2.384 (1.304-4.358)
EQ-5D index		0.232 (0.127-0.422)

The odds ratios (ORs) with their 95% confidence intervals were estimated by logistic regression models.

PO2.125

Health behaviors and mental health during pregnancy depending on maternal pre-pregnancy weight status

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Background: Although it is known that maternal overweight and obesity can lead to complications in the perinatal period, little is known about the influence of pre-pregnancy weight on maternal health behaviors and mental health during pregnancy. Therefore, the aim of the study was to examine the extent and relations of different health behaviors, stress, and depression in pregnant women depending on their pre-pregnancy weight status.
Methods: Self-report questionnaires on pre-pregnancy weight, substance use, snack food intake, physical activity, sleep quality, stress, and depressive symptoms were completed by N = 466 pregnant women (29.8 ± 4.2

years) from the German general population during their 2nd trimester. Gestational weight gain during pregnancy was measured objectively. Potential stress effects of pre-pregnancy weight on the ratio of cortisol and cortisone was studied in a subset of hair samples (n = 63 pregnant women) by LC-MS/MS.
Results: Compared to pregnant women without pre-pregnancy overweight (n = 348), those with pre-pregnancy overweight (n = 118) showed significantly lower scores on self-reported physical activity and sleep quality as well as higher scores in self-reported stress and depressive symptoms, but no differences in endocrinological stress burden were indicated by the cortisol and cortisone ratio in hair. Correlation analyses indicated differential associations between maternal health behaviors and mental health depending on pre-pregnancy weight status.
Conclusion: The results showed that maternal health behaviors and mental health during pregnancy are related to the weight status of the expectant mother. This is meaningful because both factors have an important influence on maternal and child health. Health care professionals need to support women with overweight and obesity to lose weight by minimizing health-impairing and maximizing health-promoting behaviors before and during pregnancy in order to prevent long lasting effects for the mother and child in the perinatal period.

PO2.126

A qualitative evaluation of the use of Compassion Focussed Therapy (GFT) groups in the treatment of complex obesity

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Introduction: Compassion-focused therapy (CFT) was specifically developed to address shame, self-criticism, and self-directed hostility by helping people to cultivate affiliative emotions and compassion (Gilbert, 2010). It has been found that people with high levels of shame and self-criticism do poorly in traditional cognitive-behavioural (CBT) based therapy (Rector, 2000); the main evidence based psychological model used in the treatment of obesity (NICE, 2017). CFT has a growing evidence base, including group approaches in the treatment of people with eating disorders (Gale et al., 2012) and heterogeneous mental health problems (Judge et al., 2012). Importantly, adult patients seeking treatment for obesity share many beliefs & behaviours in common with adult patients seeking treatment for an eating disorder (Franks, 2011). There is increasing recognition of the value of CFT for the obese population (e.g. Goss, 2011). Additionally, previous research by Wallace (2013; unpublished thesis) on the role of emotion regulation and coping in binge eating disorder highlighted the importance of early attachment experiences and subsequent developed/poorly developed emotional regulation skills as pivotal in the intensity of problematic eating behaviours. It has been acknowledged that the often predominantly behavioural focus of current treatments fails to acknowledge that to change eating behaviours would remove a key strategy for coping (Buckroyd, 2011); perhaps explaining why the impact of CBT is not greater in this population (Brownley, 2007; Shaw et al., 2005). Consequently, piloting the group delivery of CFT was deemed appropriate to attempt to efficiently and effectively increase the availability of this therapy within a specialist obesity setting.
Methods: Clients attending tiers 3&4 of a weight management programme were triaged via psychological assessment to CFT groups. Three pilot groups were delivered and qualitative interviews carried out with 5 participants by an assistant psychologist who did not deliver the groups. The assistant then analysed the transcribed interview transcripts using Thematic Analysis.
Results: Three overarching themes emerged from analysis: 1. enhanced overall wellbeing; 2. group bonding; 3. difficulties in group process.
Conclusion: CFT delivered in a group appears a highly acceptable treatment for this population, resulting in clients' feeling improved emotional wellbeing via developing: greater self-compassion, self-acceptance and non-food based strategies to cope with distress. Lessons have been learned about the delivery of CFT in a group setting. Quantitative analysis is planned to explore the impact of CFT on specific outcomes such as weight, confidence in managing weight, anxiety, depression and quality of life.

PO2.127

Associations between mental health, quality of life, and obesity/metabolic risk phenotypes

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Introduction: Obesity is a risk factor for many health issues, as are metabolic abnormalities, which could affect mental health and health-related quality of life. Therefore, we investigated the associations between the combined obesity and metabolic status and mental health and quality of life in a Korean population.
Methods: We used data from the Korean National Health and Nutrition Examination Survey, a cross-sectional survey of Korean civilians, conducted in 2016. Data on a total of 6,057 participants were analyzed. Obesity subtypes were classified as normal weight without metabolic abnormality (metabolically healthy normal weight; MHNO), obesity without metabolic abnormality (metabolically healthy, but obese; MHO), normal weight with metabolic abnormality (metabolically unhealthy, but normal weight; MUNO) and obesity with metabolic abnormality (metabolically unhealthy and obese; MUO). Quality of life was assessed using the EuroQol 5-dimension instrument.
Results: The MHO subtypes showed positive associations with the problems of mobility and pain/discomfort and having stress compared to the MHNO control group (adjusted odd ratio [aOR] 1.43, 95 % confidence interval [CI] 1.01-2.04; aOR 1.35, 95% CI 1.06-1.73; aOR 1.27, 95% CI, 1.05-1.54, respectively). The MUO group was positively associated with the problems of mobility, self-care, usual activity, and pain/discomfort, and improper sleep duration and stress condition, compared to the MHNO control. The values of EuroQol 5-dimension index in MHO and MUO were significantly lower than those of MHNO control (1.032 ± 0.101 and 1.023 ± 0.101 vs. 1.042 ± 0.097, p = 0.011 and <0.001, respectively).
Conclusion: Obesity in adults with or without metabolic disturbance was associated with problems of mobility and pain/discomfort, and stress. These findings suggest that obesity is associated with mental- health related problems and decreased quality of life.

PO2.128

Cortisol level is linked to depression in patients with obesity

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Introduction: Higher levels of cortisol are known to be a risk for depression as glucocorticoids are central to the chronic stress response as well as the acute response. Obesity is also a risk factor for depression. Here, it was aimed to search for the relationship between obesity degree and cortisol levels in presence and absence of depression in obesity patients.
Methods: All patients who applied to obesity outpatient clinic in the last 3 months were included in the study. Exclusion criteria were: using exogenous corticosteroid, having Cushing's disease or a psychotic disorder. BMI (body mass index), plasma free cortisol levels and presence of depression diagnosis/medication/signs&symptoms were screened. The relationship between these parameters were evaluated using SPSS.
Results: 58 female, 22 male, totally 80 patients were included in the study. Mean age was 42.8±14.36 years, mean BMI was 39.95±6.04 kg/m^2 and mean cortisol level was 10.92±4.89 µg/dL. 32 patients (40%) had clinical depression (previous or new diagnosis by a psychiatrist). There was no significant difference between depression positive and negative groups for

mean age and BMI (p > 0.05).The cortisol level was higher in depression positive group (13.4±5 µg/dL) when compared to depression negative group (9.3±4.2 µg/dL) (p < 0.05).
Conclusion: Hypercortisolemia may play an important role in the pathogenesis of depressive symptoms which may result from the neurocytotoxic effects of increased cortisol levels in patients with obesity. Hypothetically direct antagonism of glucocorticoids may be a therapeutic option in the treatment of depression in obesity.

Funding: No funding.

Conflict of Interest: None Disclosed.

PO2.129

Evaluating inpatient perceptions of body weight, the associated health effects and achieving body weight goals

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Background: Individual patient motivation is key to tackling obesity-related health problems. We know of no initiatives to systematically tackle weight management in hospital inpatients, who could be the people affected most acutely by their weight and its attributable health issues. It is unclear if these patients are aware that their weight is a potential contributing factor to their illness, and also where they could turn should they want advice/help on weight management.
We assessed inpatient perceptions of weight, its health impact, barriers/motivators to weight change and awareness of available weight management programmes.
Methods: This was a questionnaire-based pilot project. Patients admitted to general surgery or acute medicine wards were invited to take part. Ethical permissions were obtained through proportionate ethical review and the project was supported through NHS Grampian Research and Development. Informed consent was obtained from all patients.
Results: 100 participants (50 medical, 50 surgical), median BMI 27.9 kg/ m^2 (IQR 9.07). 32.6% were of healthy weight and 67.3% overweight. In the overweight category, 6.8% overestimate their weight, 30.5% underestimate. 60% were concerned their weight was too high, leaving 40% with no weight concerns. Weight Management Programme use was low (26 reported uses in 62 overweight participants, 11 reported uses in 30 normal weight participants). Barriers to engagement were pain (26 participants), time (32) and physical health (36). Motivators included improving fitness (74 participants), health (89), body image (64) and self-confidence (48). Of participants with weight concerns, 81% of surgical participants felt they received information on weight management, whereas only 25% of medical participants felt the same (p = 0.013). 15 people who were overweight, and had weight concerns, were not given information on how to maintain a healthy weight.
Conclusion: In this pilot study, there is an apparent lack of perception regarding weight and its heath issues. When people are in hospital, there is an opportunity to intervene that appears to be being missed. This pilot study will be used to develop strategies for enhancing engagement with weight management programmes and consider options for inpatient interventions.

PO2.130

Experience and expectations of patients on weight loss: the Learning Health System Network Experience (LSNet)

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Introduction: Individuals' weight perception and competence in achieving healthy lifestyle can be determinants of engagement in obesity interventions. We analyzed data from a survey conducted among primary care patients within 5 sites of the Learning Health Systems Network (LHSNet); it aimed to identify barriers to successful weight loss and patients' expectations on primary care physicians' role in weight management (1, 2). A section of the survey explored participants' prior experience with weight management, perceived need for weight loss, and degree of self-readiness and self-confidence in ability to lose weight. We identified factors associated with patients' self-confidence in ability to lose weight.
Method: The survey was mailed to eligible patients (adults with height and weight information for BMI calculation); the section on patients' experience and expectations with weight loss consisted of 7 items with combined close and open ended questions including 2 questions with Likert scale responses.
Results: Among the 2263 participants who completed the survey section on "Patients' Experience with Weight Management", 648 (29%) falls in the category of overweight, 619 (27%) class I obesity, 474 (21%) class II obesity and 522 (23%) class III obesity. Expectations on need to lose weight and need to lose 51 pounds or more were statistically significant among those with class III obesity compared to other BMI groups (p value: <0.001). Two questions asked responders to rate, on scale of 1-10, their desire to lose weight and belief on their ability to lose weight. Those with highest BMI reported significantly higher desire to lose weight than those who are overweight (8.7 +/- 1.8 SD vs. 7.7 +/-2.2 SD, p value: <0.001). However, this same group had the lowest belief in ability to lose weight (6.5 +/-2.7 SD vs. 7.7 +/-2.2 SD, p value: <0/001). On multiple regression analysis, being female, higher BMI, need to lose 11 pounds or more were each independently associated with less belief in being able to lose weight.
Conclusion: Overweight and obese patients have varying expectations on weight loss; those with category III obesity have the highest desire to lose weight but have the least confidence in ability to lose weight. Focusing on coaching and other strategies to enhance self-management skills on this group of patients is essential to successful weight loss interventions.

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PO2.131

Residential obesity care: a qualitative service evaluation

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Purpose: The escalating prevalence in obesity among adults is a burden shared among most European Countries, including Malta. Amongst many initiatives to address the problem of obesity in Malta, a centre called "Dar Kenn għal Saħħtek" *lit trans – 'Haven for your health'* providing a

semi-residential programme for obesity care was founded. The residence offers an 8-week multidisciplinary programme, rehabilitating clients in need of healthy lifestyle changes.
The aim of this qualitative study is to evaluate this 8-week obesity programme offered at this residence from their clients' perspective and experience.
Method: Data was obtained through semi-structured interviews, with added field notes. Six out of Fifteen participants with obesity were recruited via snowball sampling. The service was evaluated against the semi-residential centre's own set of aims and objectives. Interview-data was transcribed and then analysed thematically.
Findings: 'Stress and overeating as a coping mechanism' and 'Discipline', emerged as the main thematic conceptions from the data. Participants seemed to overeat in order to cope with stressful events in their lives. However, this maladaptive coping mechanism became a problem in itself. When participants realise that they have added weight gain as a problem, they find themselves overwhelmed and unable to cope. It is at this stage that they seek professional help. Participants repeatedly referred to themselves as 'undisciplined'. Yet, they paradoxically valued the same discipline that they didn't have.
Conclusion: The main critique that this dissertation puts forward is that residential care sustains participants' dependency on institutional discipline rather than empowering the individual to take control over his own health. Conclusively, follow-up care for long term management of obesity is highly recommended.

Conflict of Interest: None Disclosed.

Funding: This research project was carried out in part-fullfilmemnt of the Master in Obesity and Weight Management for the University of South Wales. No Funding relating to this research was required.

PO2.132

Physical activity, anthropometric measurements and self-esteem in adult obese women primary health-care users: the "Pas-a-Pas" community intervention trial

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Background: The prevalence of obesity is increasing markedly in women. Physical inactivity contributes to weight gain and it is associated to the poor self-esteem in adult obese women.
The objective of this study was to assess the effectiveness of a supervised physical activity (PA) program, including sociocultural activities, on anthropometric measurements and self-esteem in adult obese women primary health-care users.
Methods: A randomized clinical trial, with a physical activity (PA) intervention programme of 9 months duration, consisted of supervised group walking sessions (396 METs/min/week over 120 min, in 2 sessions of 60 min), and with monthly socio-cultural activities. Participants were 150 adult obese women from four primary health-carecenter (mean age 69.25 years; 52.7% medium social class), assigned to a control group (CG = 51) or intervention group (IG = 99). PA (IPAQ-s), weight, waist circunference, BMI, self-esteem (Rosenberg scale) were assessed at baseline and at the end of the intervention.
Results: At the end of the intervention period, in the IG there was a significant increase in total PA (539.1 METs/min/week), whereas it decreased in the CG (786.5 METs/min/week). In the IG, the PA intervention programme decreased weight (-2.8 Kg) and increased self-esteem (0.51 points) in multivariate models adjusted for potential confunder (socio-demographic, morbidity and anthropometric measures).
Conclusion: This PA intervention programme increased the total PA, decreased weight and improved the seelf-esteem in obese women primary health-care users.

PO2.133

What is the link between physical activity, obesity and cancer risk? Evidence and policy implications from the WCRF/AICR Third Expert Report

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Introduction: Cancer causes one in six deaths worldwide[1] and is rapidly becoming a global pandemic. Modifiable lifestyle determinants play a key role in the prevention of cancer and other NCDs. This abstract presents the findings and policy implications from the WCRF/AICR Third Expert Report[2] linking physical activity, obesity and cancer risk.
Methods: WCRF/AICR's Continuous Update Project conducts rigorous systematic reviews of the global evidence on cancer incidence and survival related to diet, nutrition and physical activity. The systematic reviews, supported by evidence of biological plausibility, are judged as strong or limited by an independent expert panel against pre-defined criteria. The conclusions inform the WCRF/AICR Cancer Prevention Recommendations and policy frameworks.
Results: There is strong evidence that physical activity decreases the risk of colon, postmenopausal breast and endometrial cancers; and strong evidence that vigorous physical activity decreases the risk of pre- and postmenopausal breast cancer. Physical activity may directly impact on the hallmarks of cancer independent of adiposity, for instance by increasing apoptosis and reducing genome instability, and may also exert a protective effect through modifying risk of obesity.
Additionally, strong evidence from the Third Expert Report shows that aerobic physical activity, including walking, decreases the risk of weight gain, overweight and obesity. Overweight and obesity are causally linked to 12 cancers, so physical activity has an indirectly protective effect over those cancers as well.
As part of the Cancer Prevention Recommendations package, WCRF/AICR recommends being more physically active as part of everyday life, walking more and sitting less.
Discussion And Conclusion: There is triangular relationship between physical activity, obesity and cancer risk. Physical activity presents an opportunity to reduce the risk of three cancers directly, and 12 cancers indirectly. Governments should implement a package of policies as part of a framework approach in order to create environments that are conducive to physical activity. Governments can use policy frameworks such as Driving Action[3].

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PO2.134

Impact of a physical activity program during pregnancy on newborn BMI at birth

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Background: Physical activity during pregnancy is considered an influential and positive factor in the health of the newborn. However, several studies show inconsistency in the results found. This study aimed to analyze the impact of a physical activity intervention program during pregnancy on newborn health, specifically on BMI at birth.
Methods: 296 pregnant women participated on this nonrandomized trial, 178 (60.1%) included in the control group and 118 (39.9%) in the intervention group, with ages between 19 and 44 years. Data collection were taken at baseline (beginning of the program) and after the intervention (between the 1st and 3rd day after delivery). At baseline, data collection included pregnant anthropometry, sociodemographic profile, depressive symptoms, dietary intake and a physical activity questionnaire. After intervention was collected information regarding childbirth, as well as the anthropometry of pregnant and newborn. The intervention program was developed for pregnant women (from 12 weeks of gestation until the end of pregnancy) and included 3 days a week classes of physical exercise, one of which developed in the aquatic environment. Classes last for 45/50 minutes and consisted of: a warm up (7/8 minutes), a fundamental part (30 minutes) and cool down (10 minutes). The exercises performed were of moderate / vigorous intensity, and included aerobic workout, strength, coordination and flexibility. The control group received the standard care that is usually provided by health professionals to pregnant women.
Results: The newborns of the participants in the intervention group presented lower percentiles and z-scores of BMI [mean (SD) of 38.74 (24.17) and -0.41 (0.87) respectively] compared to those in the control group [mean (SD) of 50.68 (28.65) and -0.02 (1.11)].
After adjusting for confounders, such as age, socioeconomic status, pre-pregnancy weight, baseline energy intake, physical activity, depressive symptoms and gestational age at delivery, the BMI percentiles and z-scores were significantly lower in the intervention group when compared to the controllers ($p < 0.001$ and $p = 0.001$, respectively).
Conclusion: In conclusion, this program had positive results in newborn health and has the potential to contribute with evidence to programs and policies to promote healthy lifestyles.

PO2.135

Associations between cardiorespiratory fitness and weight loss in patients with severe obesity undergoing an intensive lifestyle intervention program

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Objective: To assess the association between cardiorespiratory fitness (CRF) and weight changes in treatment seeking patients with severe obesity who underwent a 1-year intensive lifestyle intervention (ILI) program.
Methods: Retrospective cohort study conducted at a tertiary care outpatient rehabilitation center from November 1, 2013 through January 1, 2017. CRF was measured as maximal oxygen consumption during a maximal oxygen uptake (VO2max) test on a treadmill or bicycle at baseline and after 3 months.
Results: A total of 180 patients had a baseline mean (SD) BMI 41.1 (4.8) kg/m² and CRF of 79.4 (14.9) mL·kg-0.75·min-¹. Patients with a baseline CRF above median achieved a greater 3-month and 1-year weight loss compared with patients with CRF below median; mean (95 % CI) 2.5 kg (1.3, 3.8) and 4.0 kg (0.8, 7.2), respectively. In addition, patients with 3-month changes of CRF above median had 4.0 kg (0.9, 7.1) greater weight loss at 1-year follow-up than those below median.
Conclusion: Among patients with severe obesity who underwent a 1-year ILI program, higher baseline CRF was associated with significantly larger weight loss after 3 months and 1 year. In addition, those with higher initial 3-month CRF changes had greater weight loss at 1 year.

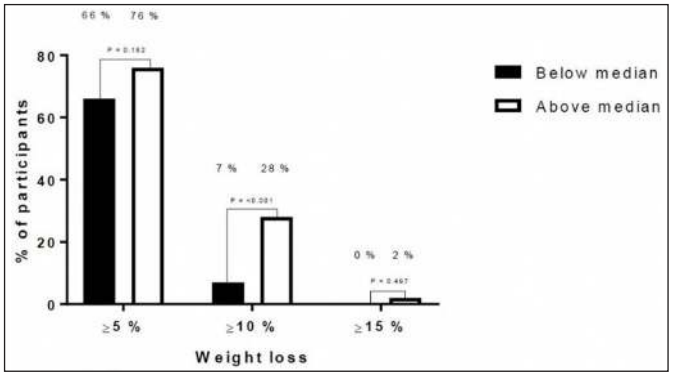

Fig. 1. Proportions of patients in the two groups (baseline CRF above or below median) who at 3-month follow-up achieved at least 5 %, 10 % or 15 % weight loss.

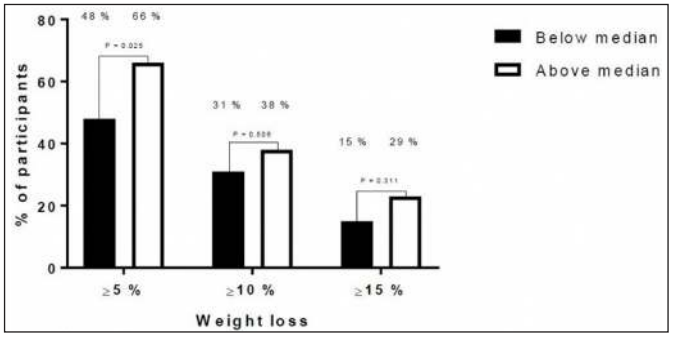

Fig. 2. Proportions of patients in the two groups (baseline CRF above or below median) who at 1-year follow-up achieved at least 5 %, 10 % or 15 % weight loss.

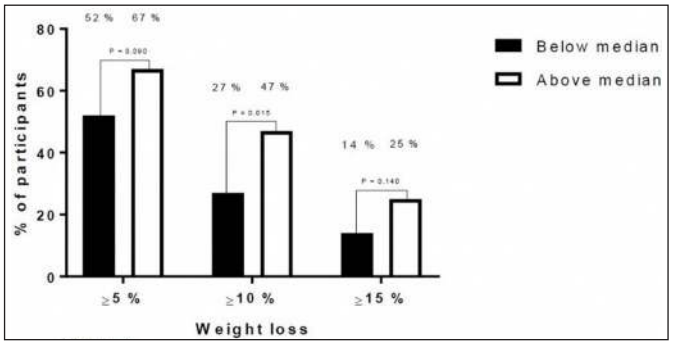

Fig. 3. Proportions of patients in the two groups (who achieved either above or below median 3-month increases in CRF) who at 1-year follow-up achieved at least 5 %, 10 % or 15 % weight loss.

Tab. 1.

	Cardiorespiratory fitness (mL·kg-0.75·min-1)	Cardiorespiratory fitness (mL·kg-0.75·min-1)	P-value	Adjusted differences between groups	P- value adjusted differences between groups
	Below median (N = 87)	Above median (N = 87)			
Baseline					
Age (year)	45.8 (10.1)	41.2 (7.9)	0.001	-	-
Gender (female)	75 (86.2 %)	63 (72.4 %)	0.039	-	-
Weight (kg)	119.9 (18.9)	117.4 (19.6)	0.401	-	-
BMI (kg/m^2)	42.2 (4.5)	40.0 (5.0)	0.003	-	-
Waist circumference (cm)	119.7 (11.7)	113.8 (13.2)	0.004	-	-
VO2max (mL·kg-0.75·min-1)	68.0 (8.9)	91.1(10.0)	<0.001	-	-
Changes					
Weight change (%)	-6.0 (-6.7, -5.4)	-7.6 (-8.3, -6.9)	0.002	-	-
Weight change (kg)	-7.3 (-8.1, -6.4)	-9.0 (-9.9, -8.0)	0.008	2.5 (1.3, 3.8)	<0.001
BMI change (kg/m^2)	-2.6 (-2.8, -2.3)	-3.0 (-3.3, -2.7)	0.026	0.9 (0.4, 1.3)	<0.001

Baseline anthropometrics and cardiorespiratory fitness, and weight changes at the 3-month follow-up in patients with cardiorespiratory fitness below or above median before treatment.

Tab. 2.

	Cardiorespiratory fitness (mL·kg-0.75·min-1)	Cardiorespiratory fitness (mL·kg-0.75·min-1)	P-value	Adjusted differences between groups	P- value adjusted differences between groups
	Below median (n = 80)	Above median (n = 80)			
Baseline					
Gender (female)	68 (85.0 %)	55 (68.7 %)	0.024	-	-
Age (years)	45.8 (10.1)	41.9 (7.5)	0.006	-	-
Weight (kg)	120.2 (19.5)	117.7 (19.6)	0.427	-	-
BMI (kg/m^2)	42.2 (4.6)	39.9 (4.8)	0.002	-	-
Waist circumference (cm)	119.8 (12.2)	114.7 (13.8)	0.015	-	-
VO2max (mL·kg-0.75·min-1)	67.8 (9.1)	91.5 (10.2)	<0.001	-	-
Changes					
Weight change (%)	-6.4 (-8.1, -4.8)	-8.9 (-10.8, -7.0)	0.050	-	-
Weight change (kg)	-7.7 (-9.6, -5.7)	-10.3 (-12.5, -8.1)	0.078	4.0 (0.8, 7.2)	0.014
BMI change (kg/m^2)	-2.7 (-3.4, -2.0)	-3.5 (-4.2, -2.7)	0.118	1.3 (0.1, 2.4)	0.029

Baseline anthropometrics and cardiorespiratory fitness, and weight changes at the 1-year follow-up in patients with cardiorespiratory fitness below or above median before treatment.

Tab. 3.

	Cardiorespiratory fitness (mL·kg-0.75·min-1)	Cardiorespiratory fitness (mL·kg-0.75·min-1)	P- value	Adjusted differences between groups	P- value adjusted differences between groups
	Below median (n = 71)	Above median (n = 72)			
Baseline					
Gender (female)	58 (81.7 %)	54 (75.0 %)	0.418	-	-
Age (years)	44.3 (8.7)	42.3 (8.6)	0.156	-	-
Weight (kg)	116.9 (18.6)	120.2 (19.3)	0.303	-	-
BMI (kg/m^2)	40.7 (4.7)	41.2 (4.7)	0.548	-	-
Waist circumference (cm)	116.0 (12.6)	117.2 (13.0)	0.576	-	-
VO2max (mL·kg-0.75·min-1)	81.7 (13.2)	79.6 (15.6)	0.374	-	-
Changes					
VO2max change (%) #	3.9 (2.5, 5.3)	22.3 (20.2, 24.4)	<0.001	-	-
Weight change (%)	-6.4 (-8.1, -4.7)	-9.7 (-11.7, -7.7)	0.014	-	-
Weight change (kg)	-7.5 (-9.6, -5.5)	-11.4 (-13.8, -9.1)	0.013	4.0 (0.9, 7.1)	0.012
BMI change (kg/m^2)	-2.6 (-3.3, -1.9)	-3.9 (-4.8, -3.1)	0.013	1.4 (0.4, 2.5)	0.010

Baseline anthropometrics and cardiorespiratory fitness, and weight changes at the 1-year follow-up in patients who achieved either above or below median 3- month increases in cardiorespiratory fitness.

PO2.136

Proportion of Japanese primary school children meeting recommendations for 24-hour movement guidelines and associations with weight status

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Introduction: 24-h movement guidelines were recently developed with the hope of improving the present and future health of children. The purpose of this study was to evaluate adherence to the three recommendations most strongly associated with health outcomes in 24-h movement guidelines and their relationship with weight status (overweight/obesity or underweight) in Japanese primary school children.
Methods: This cross-sectional study was based on 902 children. Weight status according to measured body mass index (BMI) was classified by the WHO growth reference. Meeting the overall 24-h movement guidelines was defined as: 9 to 11 h/night of sleep, ≤2 h/day of screen time, and at least 60 min/day of moderate-to-vigorous physical activity (MVPA).
Results: The prevalence of children meeting the all three recommendations was 10.5% and 13.2% met none of the three recommendations. Children meeting all three behaviors recommendation, screen time and MVPA or sleep recommendations, or only screen time recommendation had lower odds ratios adjusted for age, gender and socioeconomic status of each school for overweight/obesity compared to those meeting none of the recommendations.

Conclusion: The individual or combined recommendations were associated with overweight/obesity. On the other hand, none of the recommendations was associated with underweight in this sample.

Conflict of Interest: Dr. Shigeho Tanaka received consigned research funds from Omron Healthcare Co., Ltd. The remaining authors declare no competing interests.

Funding: Research relating to this abstract was funded by a Grant-in-Aid for Scientific Research (A) (24240092) and a Grant-in-Aid for Scientific Research (C) (24500832).

PO2.137

Association between body mass index, physical activity, and risk of major adverse cardiovascular events in people with diabetes

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Introduction: Lower physical activity and higher body mass index (BMI) are independently associated with risk of cardiovascular disease. However, it is unclear if this relationship is consistent in people with diabetes. We investigated associations between BMI, physical activity, and risk of major adverse cardiovascular events (MACE) in people with diabetes.
Methods: In total, 48,438 people with diabetes aged 40–79 years were enrolled in the Korean National Health Insurance Service-Health Screening Cohort from 2002 to 2003 and were followed until 2013. Baseline BMI was categorized as underweight (<18.5 kg/m^2); normal-weight (18.5–22.9 kg/m^2); overweight (23.0–24.9 kg/m^2); and obese (≥25.0 kg/m^2). Physical activity was divided into two categories based on a standardized questionnaire: low, moderate-high physical activity. We defined MACE as a composite of hospitalization for myocardial infarction (ICD-10 codes I21–I22), stroke (ICD-10 codes I60–I69 or G45.9), and cardiovascular death (ICD-10 codes I00–I99). People with diabetes were divided according to the combination of BMI and physical activity, and we assessed the association of the eight categories with MACE risk using Cox proportional hazard models adjusted for confounders. Normal-weight and moderate-high physical activity was used as the reference group.
Results: During a median of 10.7 years of follow up (interquartile range, 10.2–11.2), 7,360 (15.2%) people with diabetes experienced a MACE event. Compared with normal-weight people with moderate-high levels of physical activity, the risk of MACE was not significantly different in underweight ([hazard ratio (HR), 0.93; 95% confidence interval (CI), 0.64–1.35], overweight (HR, 0.93; 95% CI, 0.84–1.03) and obese (HR, 0.95; 95% CI, 0.90–1.01) people with a moderate-high levels of physical activity. However, in people with a low level of physical activity, the corresponding HRs were 1.39 (1.14–1.69), 1.04 (1.00–1.10) and 1.09 (1.00–1.19), respectively.
Conclusion: Our findings suggest that the beneficial impact of physical activity on CVD in people with diabetes.

Conflict of Interest: No potential conflicts of interest relevant to this article were reported.

Funding: This research was supported by a grant of the Korea Health Technology R&D Project through the Korea Health Industry Development Institute (KHIDI), funded by the Ministry of Health & Welfare, Republic of Korea (grant number: HI13C0715).

PO2.138

Timing of meal and caffeine intake on energy expenditure and delta efficiency in healthy male subjects

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Introduction: Caffeine supplementation in small to moderate doses (3-6 mg/kg) by athletes has been proven to be an effective ergogenic aid for sports performance. Studies have recognized the effect of caffeine in decreasing perceived exertion, delaying fatigue in endurance events and improving time trial performance. Mechanisms explaining this effect are many and include the fact that caffeine seems to alter substrate metabolism, increasing fatty acid mobilization and sparing glycogen. However, in rats, caffeine has been shown to have a biphasic action on postprandial glucose metabolism. When ingested before a meal, hepatic glycogenesis is blunted. Its ingestion during and after a meal allows glycogenesis to occur. Manipulating meal and caffeine timing before low to moderate intensity exercise, comparable to everyday life activities, is of great interest in assessing energy expenditure (EE) and delta efficiency (DE).
Objective: To investigate the effect of timing of caffeine and meal intake in normal life situations (caffeine before meal or vice versa followed by exercise) on EE and DE in healthy males.
Methods: 8 recreationally active and untrained males were given 3 mg caffeine per kg body weight followed by a standardized meal one and a half hours later (C2M), and vice versa (M2C), before they were required to cycle at low to moderate intensity. EE was measured by face-mask indirect calorimetry during cycling for 5 min each at 20W, 35W, 50W, 65W, and 80W.
Results: No significant differences in ΔEE were seen between C2M and M2C across varying cycling intensities ($p>0.05$). DE was significantly greater in C2M than in M2C (25.9% ± 3.3 vs 23.3% ± 2.1, $p = 0.008$).
Conclusion: Timing of meal and caffeine intake seems inefficient in altering changes in energy expenditure, however, it has an effect on delta efficiency. Further research is needed to assess the timing effect of caffeine on other metabolic parameters in daily life situations.

PO2.139

Body composition in elite atheletes

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Rationale: In sport, body composition (BC) is related to the fitness performance. Bioimpedance phase angle (PhA) seems to be relate to the muscular strength in athletes. The aim of this study was to evaluate BC, and the relation between PhA and muscular strength in female volleyball players compared with controls.
Methods: 12 female volleyball players (age 23.8 ± 3.6 years; weight 63.0 ± 5.1 kg; BMI 21.9 ± 1.3 kg/m^2) and 22 healthy females as control group (age 23.6 ± 2.0 years; weight 60.7 ± 4.8 kg; BMI 21.9 ± 1.3 kg/m^2), participated in the study. For BC, skinfold thickness was performed and PhA assessed for whole-body and limbs (upper and lower). Additionally, volleyball players carried out hand grip strength (HGS) test for the evaluation of muscular strength.
Results: BC estimated by skinfold thickness using Durnin & Womersley's equation results significantly different in volleyball players than controls (FM (kg) = 15.7 ± 2.7 vs. 18.0 ± 3.0; FM (%) = 24.8 ± 3.0 vs. 29.5 ± 3.8; FFM (kg) = 47.4 ± 3.5 vs. 42.8 ± 3.6). Both whole-body and segmental PhA values were significantly higher in volleyball players than controls whereas no significative differences were observed for HGS. In the volleyball group HGS results significantly related to PhA of the upper limbs ($r = 0.821$, $p = 0.003$) and whole-body but not with lower limbs.
Conclusion: This study shows that BC is different between volleyball players and controls. PhA is sensible in the evaluation of fluids distribution also in a segmental evaluation. Additionally, a strength relation between PhA and HGS was found, also in control group.

Conflict of Interest: None Disclosed.

Funding: No funding/research relating to this abstract.

PO2.140

The mouse that roared

Tulloch, L.; Gryka Mcphail, A.

Obesity Action Scotland

Introduction: Scotland faces a significant challenge with overweight and obesity with the highest rate in the UK and one of the highest of OECD countries. Health policy is devolved to Scottish Government and the implementation of obesity strategies since 2008 had focused on education and socio-cultural interventions rather than the fiscal and legislative interventions viewed as most effective 1. Advocacy groups within Scotland tended to be focused on NCDs or health endpoints associated with obesity (such as cancer or diabetes) but not obesity itself. Obesity Action Scotland was the first third sector organisation focused solely on obesity 2.
Methods: By presenting a rapid review of obesity policy development in Scotland over the last five years we will highlight the importance of advocacy work in linking science and policy. We will consider the development of the Scottish Diet and Healthy Weight Delivery Plan 3, along with consultations from national government on legislative developments. We will also highlight the outputs and outcomes of the advocacy work of OAS.
Results: Despite being a small and relatively new advocacy unit (established in 2015), Obesity Action Scotland has had significant successes. It has influenced the development and content of new national government strategy on obesity. Obesity Action Scotland has worked effectively on lobbying politicians. It has established Scottish Obesity Alliance within Scotland. Effective publications, communications, connections and partnerships have enabled effective influencing which has resulted in improved national policy and actions.
Conclusion: Effective advocacy work can have a significant positive influence on the development of national policy to tackle a significant public health challenge such as obesity.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.141

Policies for healthier environments – policy frameworks and databases of implemented polices to promote healthy diets, physical activity & reduce obesity

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World Cancer Research Fund International

Purpose: To establish policy frameworks for reporting, categorising and monitoring policy actions around the world, and through which the policy evidence can be systematically categorised, updated, interpreted and then communicated. The NOURISHING and MOVING policy frameworks formalise a comprehensive package of policies to promote healthier eating and physical activity to prevent obesity. Implemented government actions are collected to populate corresponding policy databases.
Methods: Literature reviews were undertaken to inform the policy frameworks. The published literature on the evidence of various interventions and the policy actions recommended by the global peer reviewed literature, grey literature and World Health Organization were distilled into distinct policy categories. Academics and policy experts were consulted to provide feedback throughout the framework development. A corresponding policy database was populated with implemented government policies after a scan was undertaken of the global policy landscape. A bespoke methodology was designed for the scans and implemented to identify policies that fit within the databases scope. Relevant policies were verified with an in-country source before inclusion, to ensure the policy descriptions were correct and had been implemented.
Results: The NOURISHING and MOVING frameworks and policy databases are logical and practical tools that allows the end user to identify a series of policy actions, categorised into distinct policy areas, that can be taken as part of a comprehensive approach. Grouping similar actions into distinct policy areas, assists the end user in searching and accessing relevant implemented policy actions in the policy databases.
Conclusion: Policy frameworks and databases are innovative, helpful tools to help governments implement more evidence-informed policies. More government action is needed to implement evidence-informed policies from across the frameworks. The frameworks and policy databases can be used by policymakers to identify where action is needed, tailor options suitable for their populations and assess whether their approach is sufficiently comprehensive. Researchers can identify the evidence available for different policies, identify research gaps and monitor and evaluate policies. Civil society organisations can monitor what governments are doing, benchmark progress and hold governments to account.

PO2.142

Evidence synthesis for government policy-making

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Introduction: Policy-making requires the timely provision of information and intelligence about a range of relevant issues, in which scientific findings are an important contribution. High-quality systematic reviews and meta-analyses are commonly undertaken to assist policy-making, but they may not be the best or only forms of evidence synthesis needed by policy-makers, especially if the reviews take several months to produce and the findings are difficult to generalise.
Methods: We examined 28 major policy documents concerning obesity and related chronic diseases which have been published in the last decade by national governments and by regional and global health organisations. We classified the references cited in those documents into different categories of evidence.
Results: Over 1400 references were cited. Some of them covered several categories of evidence, leading to over 1700 forms of categorised evidence. Systematic reviews and meta-analyses comprised under 4% of the categorised citations, and narrative reviews and rapid reviews together formed a further 4%. Previous policy documents were the most frequently cited references (over 25%) followed by, individual expert commentary or expert panel commentary (nearly 13%) and epidemiological data and survey results (over 12%). Also relatively common were case studies of enacted policies (nearly 7%),
Conclusion: In order to improve the value of the scientific contribution, evidence reviews need to be aware of policy-makers' needs, and in particular to provide syntheses of evidence from multiple sources and disciplines, identifying evidence gaps and weaknesses, quantifying uncertainty and acknowledging potential bias. For timeliness, a rapid evidence review for policy-makers should first describe the scope of included material and justify exclusion, summarise any systematic reviews already available and add information from single studies published subsequently, and provide a narrative commentary based on previous reviews.
Preferably, evidence reviews should attempt to include information of specific value to policy-makers concerning the costs, sustainability and transferability of interventions, and to maintain transparency in their methods so that subsequent reviewers can consistently replicate and build on the findings.
This study was undertaken as part of the H2020 STOP project (http://www.stopchildobesity.eu/) supported by the European Union.

PO2.143

Nutritional quality and use of health and nutrition claims in yoghurts marketed to children in the UK and Latin America

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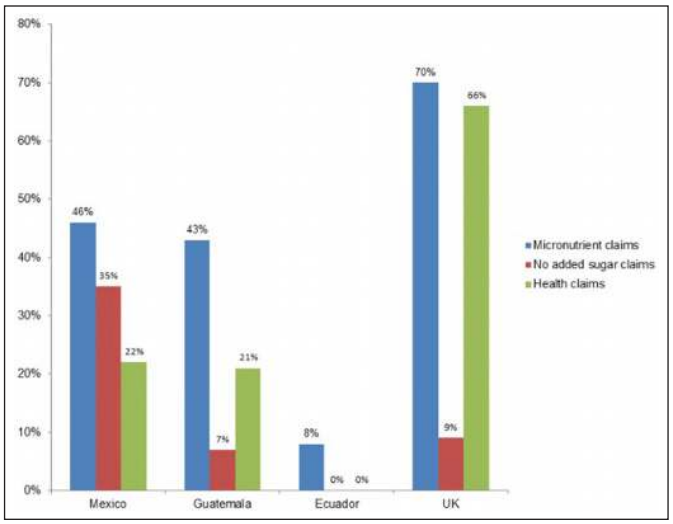
Introduction: Yoghurts and related products are an expanding commodity in the children's food market because of their nutrient density. They benefit from a "healthy halo" but concerns about their high sugar content have been raised in the UK1. Transnational food companies have expanded their yoghurt product portfolio to Latin America (LA). We aimed to compare the nutritional quality and use of health and nutrition claims in children's yoghurts in three LA countries with similar products in the UK.
Methods: This cross-sectional study explored the child oriented yoghurt market in four countries, Mexico (MX), Guatemala (GT), Ecuador (EC) and the UK. Products were included if they child imagery and/or other child related themes on the food packaging. Data was obtained in store or online from large supermarkets targeted to low, middle and high income populations respectively in four large cities in MX, GT, EC and the UK during October-December 2018. Nutritional information (g/100g) and health and nutrient claims on yoghurt packaging was recorded by at least 2 independent researchers.
Results: A total of 107 yoghurt products, 90% of which, featured cartoon characters were included in the analysis. Products were fromage fraiche/ standard yoghurt (50%), yoghurt drinks (32%) and yoghurt pots combined with cereal (18%). A larger proportion of products were found in the UK (n = 44, 41%), followed by MX (n = 26, 24%), EC (n = 23, 21%) and GT (n = 14, 13%). Products were mostly produced by transnational companies in GT (n = 14, 100%) and MX (n = 21, 81%) while country specific companies were predominant in EC (n = 20, 87%) and the UK (n = 31, 70%). The portion size and nutritional quality of yoghurts varied between countries with significantly larger portions in all LA countries compared to the UK (Table 1). Energy, total fat, carbohydrate and sugar content was similar across the four countries. Saturated fats were higher in EC compared with UK (p = 0.004) whereas protein content was lower (p = 0.006). Protein content was lower in MX compared with the UK (p = 0.000). Salt content was higher in the UK compared with all other countries. Micronutrient claims and health claims were mostly used in the UK although the majority of products in MX had 'no added sugar claims (Figure 1).
Conclusion: Higher portion sizes in LA might promote increased energy intake. Yoghurts in LA may be considered of lower nutritional quality with lower protein and higher saturated fat content. Nutrient and health related claims are used less frequently in LA than the UK, except for 'no added sugar' claim in MX. Closer monitoring of food and nutrition labels is urgently needed in LA as part of a healthy diet strategy.

Reference

1. Garcia AL et al, 2018. ADC. (In press).

No Conflict of Interest: Disclosed/No funding.

Fig. 1. Nutrient and Health Claims.



Percentage of reported nutrient and health claims in yoghurts.

Tab. 1. Nutritional information and claims in yoghurts (mean SD).

Values per 100g	Mexico	Guatemala	Ecuador	UK
Portion (g)	140±64	107±35	126±43	78±41
P value	0.000	0.256	0.001	
Energy (Kcal)	81.97±20.47	95.92±22.49	111.80±46.19	95.25±29.43
P value	0.539	1.000	0.257	
Protein (g)	3.00±1.75	3.56±1.42	3.38±1.00	4.66g±1.50
P value	0.000	0.098	0.006	
Total fat (g)	2.02±0.62	2.50±0.48	3.32±1.44	2.59±1.45
P vlaue	0.332	1.000	0.124	
Saturated fat (g	1.77±0.41	1.44±0.38	2.46±1.21	1.70±0.92
P value	0.083	1.000	0.004	
Carbohydrate (g)	13.18±3.24	16.31±3.56	15.61± 5.83	12.95±3.96
P value	1.000	0.066	0.097	
Total sugar (g)	10.71±2.94	11.39±3.94	10.93±4.80	11.06±2.02
P value	0.083	1.000	0.004	
Carbohydrate (g)	13.18±3.24	16.31±3.56	15.61± 5.83	12.95±3.96
P value	1.000	0.066	0.097	
Total sugar (g)	10.71±2.94	11.39±3.94	10.93±4.80	11.06±2.02
P value	1.000	1.000	1.000	
Salt (mg)	40.7±15.5	54.4 ±27.1	62.2 ±24.3	130.7±71.9

P values are for individual country comparisons against the UK.

PO2.144

Building momentum: lessons for policymakers on implementing robust national level nutrition policies

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World Cancer Research Fund International

Introduction: The prevention of cancer and other non-communicable diseases (NCDs) is one of the most significant public health challenges of the 21st century, requiring a whole-of-government, whole-of-society approach in response. However, governments are not taking sufficient action to meet global NCD targets. Implementing evidence-informed nutrition policies is essential to tackle the growing burden of diet-related NCDs. Policymakers face increasing barriers and challenges to developing and implementing such policies because of lack of political will and industry influence. The WCRF International Building Momentum series takes the lessons learned from governments who have successfully implemented

nutrition policies, such as SSB taxes and front of pack labelling, and integrates this knowledge with the published literature to succinctly outline how to design and implement an effective policy.
Methods: Literature reviews were undertaken using relevant key search terms on the challenges governments have encountered when designing and implementing particular nutrition policies. Semi-structured interviews were carried out with key policymakers, academics and advocates from around the world who were involved with advocating for, designing, and implementing the relevant nutrition policies. A thematic analysis of this collated evidence was carried out.
Results: Common elements were identified that are important for the development and implementation of robust nutrition policies that can withstand common challenges. These elements include: considering the local context; using evidence as a foundation; setting clear policy objectives; carefully designing the policy; setting a plan for stakeholder engagement; and including monitoring and evaluation early on in the process. Six key lessons were identified from those interviewed that policymakers can apply to nutrition policy development and implementation: be prepared with evidence; carefully consider the local context; be strategic; develop a broad base of support; scrutinise the policy design; and be prepared for push back from those opposed to the policy measure.
Discussion and Conclusion: Governments need more assistance to overcome the numerous barriers and challenges they face to increase political will to implement nutrition policy, especially in the face of industry interference. This research provides advice to policymakers to help overcome these barriers and challenges.

PO2.145

The prevalence and economic burden of obesity in Hungary

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Since 1988, only limited epidemiological data are available from Hungary. There was no systematic analysis on expenses of obesity related morbidities.
Anthropometric parameters were measured, presence of metabolic diseases were questioned in primary&community care settings and in workplaces. Age, BMI, waist circumference, educational level, presence of hypertension or/and diabetes were analysed statistically and compared with previous data from 1988.
Yearly data of the Hungarian National Health Insurance Fund Administration (NHIFA) were collected, regarding finances of secondary care, hospital services and health insurance reimbursement for medications, based on the International Classification of Diseases (ICD) codes of selected morbidities linked to obesity.
Data of 0.55 percent of the population above 18 year were registered in all geographical regions of Hungary (43,287 persons; 17,901 males and 25,386 females), close to the proper national representativeness.
The overall prevalence rate of overweight among men was 40%, while obesity 32%, by women both was close to 32%. In the different age groups of men, the prevalence of overweight and obesity was: 18–34 y = 32.7% and 18.2%, between 35–59 y = 40.1% and 34.4%, over 60 y = 43.5% and 38.8%. Among women, in the same age categories were: 19.6% and 5.7%, 36.8% and 38.7%, 36.5% and 39.7%. Data of BMIs and waist-circumference were presented according to age, by decades and by type of residency as well. The highest ratio of overweight was registered among men with the highest educational level, while highest ratio of obesity among women having the lowest education. Obesity according to BMI and abdominal obesity was the highest in the villages, especially among females. Registered metabolic morbidities were strongly correlated with BMIs and both were inversely related to the level of urbanization.
The estimated total public health expenditures were 58,986 Million HUF (190.3 Million EUR) and the financial contribution of patients was calculated as 25,316 Million HUF (82 Million EUR). These data represent 9.3 % of the whole national health services budget (908,011 Million HUF - 2929 Million EUR)) and 30 % of the whole drug-reimbursement budget (296,024 Million HUF - -955 Million EUR).
Over the previous decades, the ratio of the overweight and even the obese persons increased significantly, it was most prominent among males, mainly in younger generation.
Expenditures for all obesity related pathologies could be estimated between 0.5 - 1 % of the national GDP.
Obesity means a serious medical, public health and economic problem, requires higher public awareness and political support

PO2.146

Nutritional composition of yogurts available in the Mexican market

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Introduction: Mexico faces a high burden of obesity. Policy actions to combat obesity include levies on soft drinks and pastries[1] aimed at reducing sugar intake. Whilst yogurt consumption is recognised as beneficial to health[2], yogurt products can be a high source of free sugars and aren't covered by current regulations. According to the latest national dietary survey[3], yogurt, contributes to 4% of total energy intake in toddlers, 2.6% in children and 2.4% in adults. This study analysed the nutritional composition of the different types of yogurts available in the Mexican market.
Methods: A cross-sectional study in Mérida, Mexico, collecting data from 6 large supermarkets targeting low, middle and high income populations, respectively. Nutritional information and low or no added sugar claims were recorded from yogurt labels between October-December 2018 by 2 independent reviewers. Products were considered to be marketed exclusively to children if they displayed any child related imagery or child related terms on the packaging. Public Health England's threshold (>12.3 g/100g) was used to define a high sugar product.
Results: A total of 161 products were identified: yogurts (n = 64), yogurt drinks (n = 83) and yogurts with toppings (n = 14). Significant differences were found in energy, protein and total fat content between yogurts and yogurt drinks (P<0.001). No differences were found in sugar content between these categories (P = 0.43) Most products were targeted at adults (n = 135), of which 62% met the 12.3g/100g sugar threshold; 26 mentioned being "low in sugar" and 40 "low in fat". Of those for children (n = 26), 70% met the sugar threshold; 9 mentioned being low in both sugar and fat. Use of non-nutritive sweeteners was declared in 56 adult yogurts (41%) and 16 children's yogurts (38%).
Conclusion: There is wide market availability of yogurts in Mexico. Nutritional composition of many products, nevertheless, could benefit from stricter regulations that would assure a healthier profile in terms of a reduction in sugar content. The use of non-nutritive sweeteners was common across all products; however, despite this a third of the yogurts surveyed did not meet desirable sugar goals.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.147

Using social media influencer techniques for effective online public health advocacy: a best-practice framework

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Introduction: Public health organisations (PHO) embrace social media (SM) for public advocacy and campaigning; however, the abundance of nutrition and weight management information available online may be encouraging the spread of misinformation. Social media influencers (SMI) are individuals who influence the thoughts, actions and behaviours of their followers through blogs and SM. Some SMI operate with no formal qualifications in the field, contributing to public confusion via conflicting messages. This review investigated the use of SM by PHO, techniques used by SMI, and their application to online advocacy, providing the basis for the proposed best-practice framework.
Methods: A comprehensive search of electronic databases including Web of Science, PubMed and Scopus was conducted using search terms 'social media', 'health professionals', 'public health organisation', 'effective', 'opportunities', 'limitations' and 'challenges', alongside Boolean operators. Due to the changing nature of SM, papers published between 2011-2018 were selected. Narrative synthesis of the evidence, alongside an evaluation of SMI techniques, was used to develop a five-topic framework for effective SM use by PHO.
Results: The search identified 42 papers investigating the use and effectiveness (n = 13), opportunities (n = 16) and challenges (n = 13) of SM use by health professionals and PHO. The narrative review identified opportunities for PHO to encourage behavioural change, whilst balancing the accuracy of online health information by providing evidence-based advice. It also highlighted current challenges faced by PHO that may impact on effectiveness of campaigns, including: professionalism, competing with online marketing and misinformation and implementing effective SM strategies. Evaluation of techniques used by SMI identified eight ways in which PHO can use these to improve effectiveness: consistent messaging, story-telling and follow-up, frequent communication, increased communication methods, use of analytics, planning and tracking, increased interaction, and using direct 'calls-to-action' e.g. "like/share/retweet this post". Limitations include a lack of up to date research, particularly considering the constant changing nature of SM.
Conclusion: PHO do not use SM to full advantage. To provide campaigns, impacting on advocacy and public health policy, PHO could utilise the techniques of SMI to maximise their effectiveness. This review developed a template designed for use by practitioners. This comprised five elements i) Professional conduct ii) Knowledge of target audience and limitations iii) Maintaining credibility iv) Effective use of strategy and tools and v) Effective communication and engagement. Further evaluation of this strategy is justified.

PO2.148

The prevalence of metabolic syndrome and its association with body fat distribution in a Dutch and Indonesian population

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Background: Asian populations develop metabolic complications of obesity at lower amounts of adipose tissue than Western populations. The role of abdominal obesity in the difference between the two populations is poorly understood.
Objectives: Our objective was to estimate the prevalence of metabolic syndrome and its components in a Dutch and Indonesian population, as well as to examine its associations with abdominal obesity.
Methods: In this cross-sectional study in the Netherlands Epidemiology of Obesity Study (n = 6,671, aged 45-65) and the Indonesian National Health Surveillance (n = 37,891, aged>18), metabolic syndrome was defined by NCEP/ATPIII. Multivariable logistic and linear regressions were performed to examine associations of BMI and waist circumference with metabolic syndrome and its components.
Results: The prevalence of metabolic syndrome was 31% in the Indonesian and 30% in the Dutch population. For each standard deviation (SD) in BMI (4.4 kg/m^2) and waist circumference (11.3cm), adjusted odds ratios (95% CI) of metabolic syndrome were 2.7 (2.5-2.8) and 3.1 (3.0-3.3) in the Indonesian and 3.7 (3.4-4.2) and 4.5 (4.0-5.0) in the Dutch population. In the Indonesian and the Dutch population, each SD in waist circumference was associated with higher triglycerides (0.13 mmol/L; 0.11-0.15, and 0.25 mmol/L; 0.19-0.31), higher fasting glucose (0.13 mmol/L; 0.09-0.16, and 0.05 mmol/L; 0.00-0.11), and lower HDL-cholesterol (-0.03 mmol/L; -0.04,-0.02 and -0.14 mmol/L; -0.17,-0.10).
Conclusion: In both populations, abdominal adiposity was more strongly associated with metabolic syndrome than overall obesity. Waist circumference was more strongly associated with triglycerides and HDL-cholesterol in the Dutch population, whereas it was more strongly associated with fasting glucose in the Indonesian population.

PO2.149

Socioeconomic position and lifetime body composition: a systematic review

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Introduction: The relation between socioeconomic position (SEP) and obesity measured by body mass index (BMI) has been frequently studied, but there is less information about the link between SEP and body composition. Fat distribution and muscle quality have been linked to adverse health outcomes such as cardiovascular disease, diabetes and poor physical capability independent of BMI. There is some evidence of secular changes in body composition, but it is unclear whether there have been secular increases in social inequalities in body composition. The aim is to perform a systematic review of the existing literature on the association between SEP and body composition, and to explore any secular changes.
Methods: The systematic review will be carried out according to PRISMA guidelines and a protocol was written prior to starting the review and registered on PROSPERO. An electronic search of MEDLINE, Embase Classic + Embase and PsycINFO will be conducted using OvidSP as the database interface, as well as SPORTDiscus using EBSCO. Two independently working reviewers will initially screen abstracts to exclude papers that are clearly ineligible, followed by a full-text screening to exclude papers not meeting all inclusion criteria. Any disagreements will be resolved through discussion. Data extraction and quality assessment of eligible papers will be carried out by 2 reviewers using a standardized form. The reference lists of identified papers will be searched for additional papers. Original studies in the English language, which examine the association between SEP at any age and body composition at the same or later age will be included if they use any recognised measure of SEP and a recognised measure of body composition (total, proportional or location of fat mass and fat-free mass, using any appropriate method). Due to expected heterogeneity, a narrative synthesis is expected, with descriptive summary to be provided in tables. If there is consistency in reporting of associations, a random-effects meta-analysis will be used to provide an overall summary estimate.
Results: Preliminary searches have identified 2247 potential abstracts awaiting screening. Full results to be reported following completion of systematic review.

Conclusion: The results of the review will summarise the existing evidence on social inequalities in body composition. Findings will identify where there are gaps in knowledge were further research is required.

Conflict of Interest: None Disclosed.

Funding: CBS, AG and JB are supported by PhD studentships from the UK Medical research Council (MR/N013867/1), the ESRC/BBSRC and from the CIHR, respectively. The MRC NSHD and RH are supported by the UK Medical Research Council (MC_UU_12019/1, MC_UU_12019/2).

PO2.150

Clinically significant weight loss for patients across socioeconomic backgrounds following referral to a multi-component weight management programme

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Introduction: The prevalence of obesity, particularly in women, is higher amongst those of lower socioeconomic status. Slimming World on Referral (SWoR) is a subsidised partnership between Slimming World and NHS and local government commissioners which aims to provide a widely accessible weight management intervention. The aim of this study was to understand weight outcomes and patient demographics of those referred in 2016.

Methods: Data from patients referred into Slimming World's multi-component weight management programme was analysed at baseline, 3, 6 and 12 months. Postcode were used to assign patients a measure of socioeconomic status using the Index of Multiple Deprivation (IMD). Self-reported height and electronically stored weight (recorded using standardised and calibrated scales) were analysed. Last observation carried forward was used to report weight changes at 3, 6 and 12 months.

Results: Data from a total of 27,591 referral patients were analysed. Mean age of patients was 48.6 years. Chi-square tests revealed a difference between the proportion of men and women across the lower and upper IMD deciles ($\chi^2(9) = 43.385$, $p<0.001$) with more women than expected in the more deprived deciles compared to men. At the end of the 3-month referral period, average weight loss for all referred patients was -5.6 ±3.8%. Table 1 reports mean weight change and weeks attendance at 3, 6 and 12 months for all patients per deprivation decile.

Across all deprivation deciles, mean weight loss of 5% was achieved. ANCOVA revealed a significant main effect for deprivation decile and weight loss at 3 months after controlling for gender, start BMI, age and attendance, with members in the less deprived deciles demonstrating greater percentage weight loss at 3 months. At 12 months, those in deciles 6 and 8 had greater weight change to those within the most deprived decile with no significant difference between the most and least deprived decile after adjusting for covariates.

Conclusion: Referrals to Slimming World were taken up by patients across different socioeconomic backgrounds. Patients living within more deprived areas of the UK who represent a population group that face additional barriers in losing weight achieved a mean clinically significant weight loss of >5% at 3 months which was maintained as 12 months.

Tab. 1. Mean weight change across deprivation deciles.

Decile	Mean BMI, age, attendance over one year	-	Mean Weight Change % +/- SD	-
-	-	3 Months	6 Month	12 Months
1 n = 1831 (6.6%)	37.8 kg/m^2,44.6 years, 18.3 weeks	-5.1 ±3.7	-6.3 ±5.5	-6.6 ±6.4
2 n = 2296 (8.3%)	37.7 kg/m^2 45.3 years,19.4 weeks	-5.3 ±3.8	-6.7 ±5.7	-7.1 ±6.8
3 n = 2349 (8.5%)	37.4 kg/m^2 46.6 years,19.2 weeks	-5.4 ±3.9	-6.8 ±5.7	-7.2 ±6.7
4 n = 2753 (10.0%)	37.4 kg/m^2 47.1 years, 19.4 weeks	-5.4 ±3.8	-6.8 ±5.7	-7.2 ±6.9
5 n = 2983 (10.8%)	37.5 kg/m^2 47.7 years, 20.6 weeks	-5.6 ±3.9	-7.1 ±5.9	-7.6 ±7.2
6 n = 3392 (12.3%)	37.2 kg/m^2 48.6 years, 20.0 weeks	-5.7 ±3.8	-7.1 ±5.7	-7.5 ±6.9
7 n = 3151 (11.4%)	36.8 kg/m^2 49.9 years, 20.7 weeks	-5.7 ±3.8	-7.2 ±5.7	-7.7 ±6.9
8 n = 2807 (10.2%)	36.7 kg/m^2 50.3 years, 21.4 weeks	-5.9 ±3.7	-7.5 ±5.6	-7.9 ±6.8
9 n = 2956 (10.7%)	36.4 kg/m^2 51.0 years, 21.0 weeks	-5.8 ±3.7	-7.4 ±5.6	-7.8 ±6.9
10 n = 3073 (11.1%)	36.6 kg/m^2 51.8 years, 21.5 weeks	-5.9 ±3.7	-7.4 ±5.7	-8.0 ±6.9

Mean weight change across deprivation deciles for patients referred into Slimming World.

PO2.151

The relationship between relative deprivation and access to bariatric surgery

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Introduction: Bariatric surgery is currently the most successful treatment modality resulting in long term weight loss in patients with obesity. The relationship between deprivation and access to bariatric surgery has not been clearly defined. Adults living in the most deprived areas of England are more likely to be obese than adults living in the least deprived areas of England. However, it is not clear whether social deprivation has an impact on accessing and the outcomes of bariatric surgery. Previous work has shown that obesity prevalence does not directly correspond to surgical

case load suggesting that bariatric surgery may often not be taken up in areas of increased need. The aim of our study was to explore the effect of indices of deprivation on access to bariatric surgery and its outcomes.
Methods: We conducted a cross-sectional and prospective evaluation in a single centre in England of all patients who underwent primary bariatric surgery in 2016. Deprivation was assessed using the index of multiple deprivation (IMD) (2015), which ranks areas within England from the most (IMD Decile = 1) to least deprived (IMD Decile = 10). We extracted lower-layer super output area IMD Deciles according to the patients post code at time of bariatric surgery as well as the 12-month post-surgical weight loss and type of surgery.
Results: Of the 183 patients who underwent bariatric surgery, 55% (n = 102) lived in areas within the 1-3rd IMD Decile (most deprived areas) (27% (4-6th) and 17% (7-10th) IMD Decile). There was no relationship between the type of bariatric surgery offered and IMD Decile. There was no relationship between IMD Decile or IMD Decile tertiles (1-3,4-7, 7-10) and % weight loss at one year either across all bariatric surgical interventions ($r2 = 0.019$, $p = 0.09$; $r2 = 0.012$, $p = 0.17$) or when analysed according to surgery (bypass, band or sleeve).
Conclusion: People undergoing bariatric surgery typically lived in more deprived areas which might be anticipated by the correlation between deprivation and obesity as well as the relative levels of deprivation within our catchment area and suggests by this measure that deprivation is not a clear barrier to accessing bariatric surgery, however data was not available on patients who did not undergo surgery and this may reveal potential deprivation related inequalities with accessing bariatric surgery both at the point of referral from primary care as well as in the transition from Tier 3 to Tier 4 services. Deprivation does not seem to have an effect on weight loss at 1 year post bariatric surgery. This data suggests that the bariatric surgery service is accessible to people across all IMD Deciles within our catchment area.

PO2.152

Relationship between body mass index and hand grip strength in community dwelling

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Introduction: Sensitivity of body mass index (BMI) in elderly decreases due to changes in body composition. In this period, BMI is recommended not to be used alone but in combination with markers that determine muscle strength and function. This study was planned and conducted to determine the relationship between BMI and hand grip strength in community dwelling.
Methods: 107 volunteer elderly individuals aged 65 years and over, living at community dwelling were included in the study. Nutritional status of the elderly was assessed by body weight, height, waist, neck and calf circumferences. Then Body Mass Index (BMI) were calculated. While the BMI cut-off points were taken as 20 and 27 kg/m^2 for elderly who were younger than 70 years old, the elderly who were older than 70 years old and BMI< 22 kg/m^2 were classified as malnourished and BMI> 27 kg/m^2 were classified as overweight. Hand grip strength (Takei TKK 5401) was used to assess muscle strength. The cut-off points of hand grip for men and women were 30 and 20, respectively. In the evaluation of the data, SPSS package program was used.
Results: The ages participating in the study ranged from 65.0 to 96.0 (82.8±7.3 years). The mean BMI and hand grip strength were 26.8±4.9 kg/m^2 and 15.9±9.2 kgF, respectively. %19.6 of elderly were underweight and %43.9 of elderly were overweight according to BMI. All of the overweight elderly have low muscle strength ($p = 0.044$, $x2 = 6.364$). Hand grip strength was positively correlated between neck and waist circumferences for both gender ($p = 0.000$, $r = 0.363$ and $p = 0.009$, $r = 0.251$; respectively). The mean hand grip strength of elderly who lower than 31 cm calf circumference is 12.6 kgF and elderly calf circumference higher than 31 cm is 17.0 kgF ($p = 0.008$).
Conclusion: Malnutrition and sarcopenia have a great effect the quality of life. Especially, elderly living at community dwelling or nursing home are suffering from malnutrition, sarcopenia and functional dependence. Anthropometric measurements should be used regularly to follow the nutritional status of elderly in community dwelling to diagnose all of these earlier.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.153

Understanding the relationship between adolescents' eHealth literacy and lifestyle

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Introduction: Increasingly, teenagers are involved in the process of obtaining information regarding their health using, mainly, the internet. Nonetheless, it is of utmost importance to understand their capacity to obtain and understand health information, principally, their eHealth literacy. However, there is still a gap in research concerning eHealth literacy, specifically because few studies have focused on adolescents. Moreover, health information may positively influence adolescent's quality of life and lifestyle. Thus, the main aim of this study was to better understand the relationship between eHealth literacy and adolescents' lifestyle.
Methods: The sample was recruited in a public school in the centre of Portugal, in a group of teenagers engaged in a program to prevent adolescents overweight and obesity. Participants included 87 adolescents aged between 11 to 16 years ($M = 12.41$; $SD = 0.96$). The majority (56.3%) were girls, with 46% of the sample living in urban areas and 17.2% in rural areas. The Portuguese versions of the "eHealth literacy scale" and the "Adolescent Lifestyle Profile" were used.
Results: Adolescents presented moderate indexes of eHealth literacy ($M = 3.47$; $SD = 0.71$) and health-promoting lifestyle ($M = 2.74$; $SD = 0.41$). Regarding the adolescent lifestyle profile, the highest values were found in the interpersonal relations ($M = 3.17$; $SD = 0.54$) and the lowest in the spiritual health subscale ($M = 1.83$; $SD = 0.71$). No significant correlations ($p>0.05$) were found between the eHealth literacy and the adolescent lifestyle. Girls presented higher indices of healthy interpersonal relations ($M = 3.34$;$SD = 0.53$) compared to boys ($M = 2.96$; $SD = 0.48$; $t = -3.44$; $p = 0.001$). Additionally, we found that adolescents living in a rural zone presented higher indices of healthy stress management than the others ($F = 4.64$; $p = 0.012$).
Conclusion: This study reinforces the importance to work towards a better eHealth literacy in adolescents. Considering the differences found regarding their lifestyle subscales, intervention and prevention programs for this population could be tailored to meet their specific needs. Moreover, taking into account the gender differences found, those programs could also be better tailored. Although we didn't find significant correlations between our main study variables, we believe that future research should continue to better understand if a relationship between adolescent's eHealth literacy and lifestyle exists and what other variables influence it.

Conflict of Interest: None to declare.

Funding: Research relating to this abstract was supported and co-funded by the FEDER (European Regional Development Fund), under the Portugal 2020 Program, through COMPETE 2020 (Competitiveness and Internationalization Operational Program).

PO2.154

Disaster risk reduction considerations for people with high body mass

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Introduction: There is an urgency to plan for, and reduce disaster risk as argued by the Sendai Framework for Disaster Risk Reduction.1 However to achieve this, disaster risk reduction (DRR) approaches need to be more people-centred and inclusive of diverse and marginalised groups. People with high body mass have been recognised as one such group,2-5 however no empirical research has explored how this matters. That people with high body mass are overlooked is a concern and is the focus of this research.
Methods: This multi-methods research is centred in Aotearoa New Zealand where prevalence of very high body mass (body mass index of 40 kg/m^2 and above) is elevated in some populations (22.9% of Pacific people and 12% of Māori).6 An exploratory survey with 41 emergency managers was conducted and is being followed up with in-depth interviews involving 25% of participants. Semi-structured interviews with people who have high body mass are in process, involving 12-20 participants. Data analysis involves descriptive and thematic analysis techniques.
Results: Emergency managers rely on the health sector to prioritise care for this group, thus assuming people with high body mass are receiving active health care which is not necessarily the case. People with high body mass recognise the need to plan and do not fit into a homogenous cared for group.
Conclusion: This presentation will report on the findings from the survey and the in-depth interviews. It will also highlight some of the myths, marginalisation, bias, discrimination and identity politics at play.

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PO2.155

The eating behaviour, food preparation equipment and weight status of long-haul truck drivers driving through Europe: a cross-sectional questionnaire survey

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Introduction: Professional truck drivers are an at-risk population regarding many health aspects given their working and living conditions while they are on the road. Studies from different countries revealed a high rate of obesity and chronic diseases. No study so far investigated food preparation and purchase habits in general and in relation to weight status.
Methods: Cross-sectional data was surveyed using a self-developed questionnaire which was provided in twelve different languages. Participants were recruited in 2018 on three autobahn service areas in Germany. A total of 404 long-haul truck drivers completed the questionnaire.
Results: The truck drivers had a mean age of 45.2 ± 10.9 years, 98.3 % were male. A third of the participants had the German citizenship, the others had citizenships from 23 different nations. Mean BMI was 28.4 ± 4.8 kg/m^2. More than three quarters of the participants were overweight or obese (46% overweight; 30% obese). About half of the participants stated to generally be more than five days on tour. Self-prepared meals were taken on tour by 36% of the sample while 29% indicated to take ready-to-eat meals (convenience food) along. Almost half of the sample brought sausages on tour and obese truck drivers more often brought sausages along compared to normal weight or overweight drivers. Fresh vegetables were taken by 30% and fresh fruit by about 60% of the participants. Energy drinks and canned food was more often eaten on tour compared to when at home. The availability of technical devices to store and prepare food also seemed to influence eating behaviour in terms of the types of food taken on board but was not significantly associated with BMI. Drivers who had a gas cooker or microwave oven ate less often at truck stops.
Conclusion: The results are consistent with other studies confirming a bad health status and mean BMI above average. Furthermore, the technical equipment in the truck as well as the working conditions seem to influence food choices. More research is needed to investigate the effects of access to healthy foods and improved meal preparation equipment on eating behaviour and health in truck drivers.

Conflict of Interest: None Disclosed.

Funding: No funding. The project was conducted in cooperation with Daimler AG.

PO2.156

Understanding place based obesity issues for urban Aboriginal people

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Introduction: Western Sydney is a diabetogenic environment where peoples' ability to maintain a healthy weight is impacted by multiple social and environmental issues (Western Sydney Diabetes 2018). This research explored the lived experiences of Aboriginal people living in one of the largest, purpose-built housing commission areas in Sydney, Australia.
Methods: Using appreciative inquiry, two qualitative focus groups and seven face-to-face interviews were conducted in places of Aboriginal authority. The focus groups and interviews were audio-recorded. Audio recordings were transcribed and data thematically analysed.
Findings: Three major themes emerged from the data. These were 'The inevitability of death and disease', The need for Practical Programs' and 'Keeping Care in the Community'.
Conclusion: There is an urgent need for community based, Aboriginal led diet and exercise programs that accommodate low literacy levels. Routine screening needs to occur at every appropriate opportunity and referral pathways to allied health implemented. The 'inevitability of death and disease' narrative needs to be changed using fit and healthy local Elders as role models.

PO2.157

Exploring relationships between eHealth literacy, food choices and anthropometric variables among adolescents

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Introduction: Prevention programs in order to combat overweight and obesity are vital, considering the rising prevalence of this epidemic. Studies have shown that eHealth literacy is linked to healthier behaviours. Nonetheless, few studies tried to understand this relationship during adolescence. The aim of this study is to explore the relationships between eHealth literacy, food choices and anthropometric variables of a sample of adolescents that are part of the TeenPower project, an eHealth prevention program.
Methods: The sample was recruited in a public school in the centre of Portugal Participants included 32 adolescents aged between 11 to 15 years old (M = 12.39; SD = 0.88), with the majority (58.1%) being girls. The Portuguese versions of the eHealth literacy scale and the Food Choices Questionnaire were used. Also, some anthropometric and physical data were measured.
Results: Adolescents presented a mean BMI of 20.74 (SD = 4.80) Kg/m² and a mean abdominal circumference of 77.59 (SD = 11.22). The eHealth literacy was positively correlated with the adolescents' body composition (BMI: r = 0.44; p<0.05; abdominal circumference: r = 0.41; p<0.05) but negatively correlated with the muscular fitness (long jump: r = -0.47; p<0.05; high jump: r = -0.49; p<0.05). Additionally, we found that choosing food mostly regarding their sensitive qualities, is correlated to a higher BMI (p<0.05).
Conclusion: This is an important study for the TeenPower project. It helps us better understand some of the characteristics of the sample and helps direct future prevention programs. The results are in line with past literature suggesting that eHealth literacy may be related to body composition. Moreover, it highpoints the relationship between food choices and anthropometric data. Future studies must deepen this relationship and understand what other variables may mediate those relationships. Moreover, the results of the study reinforce the importance to create multidisciplinary teams to work towards fighting overweight/obesity.

Conflict of Interest: The authors declare no conflict of interest.

Funding: Research relating to this abstract was supported and co-funded by the FEDER (European Regional Development Fund), under the Portugal 2020 Program, through COMPETE 2020 (Competitiveness and Internationalization Operational Program).

PO2.158

Predictive ability of the mini nutritional assessment short form in comparison with body mass index in hospitalized elderly

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Introduction: Malnutrition, is a major problem for hospitalized elderly, has an extensive impact on mortality and morbidity. Early and accurate diagnosis of malnutrition is very important for vulnerable groups. This study was planned and conducted to determine predictive ability of the mini nutritional assessment short form (MNA-SF) in comparison with body mass index in hospitalized elderly.
Methods: The sample of the study consisted of 28 males (50.0%) and 28 females (50.0%) elderly residents in Ankara University Medical Faculty Hospital Geriatric Clinic. Nutritional status of the elderly was assessed by MNA-SF. This test consists of 6 questions about anthropometric evaluation, self-assessment, diet and appetite. Elderly who score >11 points are considered well nourished, those scoring 11 to 14 points are classified as being at risk of malnutrition, and those scoring <7 points are considered malnourished. In addition to MNA-SF; height and body weight were measured. Then Body Mass Index (BMI) were calculated. While the BMI cut-off points were taken as 20 and 27 kg/m² for elderly who were younger than 70 years old, the elderly who were older than 70 years old and BMI< 22 kg/m² were classified as malnourished and BMI> 27 kg/m² were classified as overweight. The participants were asked about their sleep periods and their appetite by face to face. In the evaluation of the data, SPSS package program was used.
Results: The ages participating in this study ranged from 65.0 to 99.0 (75.6±7.3 years). The mean BMI and MNA-SF score were 25.7±5.0 kg/ m² and 8.7±3.0, respectively. According to BMI, 26.8% of elderly were underweight and 26.8% of elderly were overweight. 37.7% of elderly (n = 21) were malnourished, 44.6% of elderly (n = 25) were risk at malnutrition and 17.9% (n = 10) had normal nutritional status. The mean BMI of the elderly with malnutrition and normal nutritional status was 24.3±5.7 and 27.1±4.9 kg/m², respectively (p = 0.280). Day sleep time of malnourished and normal elderly was 2.9±1.7 and 1.3±1.5 hr/day (p = 0.048). There is a significant relation between participants' appetite declarations and malnutrition status according to MNA-SF (p = 0,003).
Conclusion: MNA-SF is an easy-to-use screening tool and recommended by ESPEN. Although MNA-SF has high sensitivity, its specificity is low. So thus, especially in elderly, to identification of malnutrition MNA-SF and BMI should use together for accurate conclusions.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.159

What is the association of sarcopenic obesity with disease incidence and mortality? Findings from UK Biobank

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Background: Sarcopenia and adiposity share a common inflammatory pathway and are independently associated with more rapid functional decline and a higher risk of mortality. Sarcopenic obesity defines the presence of both conditions. The aim of this study was to investigate the associations of sarcopenic obesity with cardiovascular (CVD), respiratory, COPD, and cancer disease, and all-cause mortality using different obesity assessment criteria in UK Biobank.
Methods: Sarcopenia was defined as low muscle strength and low physical function and/or low muscle mass. The cut-off points of the new European Consensus on definition and diagnosis in Sarcopenia 2018 were used for each criterion. Sarcopenic obesity was defined as the combination of sarcopenia with one of the following obesity criteria: BMI ≥30 kg/m², waist circumference (WC) > 88 cm in women and > 102 cm in men, or the two highest quintiles of body fat (60%). All-cause mortality and cancer, cardiovascular and respiratory incidence and mortality were the outcomes studied and all analyses were adjusted for potential confounders.
Results: Sarcopenic obesity defined by WC was associated with a higher risk of all-cause mortality (HR: 1.88 [1.58; 2.26]), CVD incidence and mortality (1.55 [1.43; 1.69] and HR: 2.33 [1.84; 2.94]), respiratory diseases incidence and mortality (2.16 [1.90; 2.46] and HR: 2.51 [1.85; 3.39]), cancer mortality (HR: 1.38 [1.11; 1.70]) and COPD incidence (HR: 2.98 [2.06; 4.32]) in comparison to those without sarcopenia nor obesity. Similar results were observed for sarcopenic obesity defined by % body fat. However, sarcopenic obesity defined by BMI was only associated with all-cause and CVD mortality (HR: 1.43 [1.16; 1.77] and HR: 2.11 [1.61; 2.78]) and CVD, respiratory diseases and COPD incidence (HR: 1.71 [1.55; 1.90], HR: 1.76 [1.51; 2.06] and HR: 2.10 [1.39; 3.17], respectively).
Conclusion: Sarcopenic obesity is associated with a broad range of health outcomes and this differs depending on the obesity assessment criteria used. The strongest association with health outcomes was identified when WC was used. Therefore, prevention strategies aiming to increase physical capability in adults with obesity could have important health benefits.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.160

Health-related quality of life during and after standard cardiac rehabilitation: does body mass index matter?

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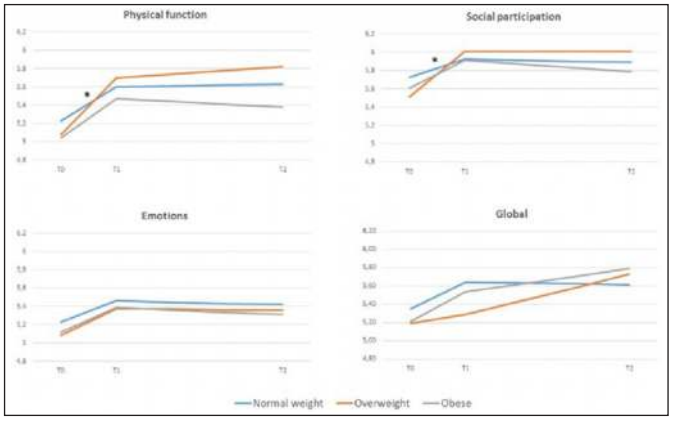
Introduction: Cardiac rehabilitation (CR) is known to improve health-related quality of life (HRQOL). However, whether effects of CR on HRQOL are also favourable in obese patients with acute coronary syndrome (ACS) is not well known. The aims of this study were to investigate the relation between body mass index (BMI) and HRQOL at the start of standard CR in patients with ACS, as well as the relation between BMI and changes in HRQOL during and after standard CR.
Methods: Data from the OPTICARE trial were used, including 503 patients with ACS who underwent a 12-week CR program 6 weeks after discharge from the hospital. HRQOL was measured with the validated Dutch version of the MacNew Heart Disease HRQoL Instrument, which measures global HRQOL as well as HRQOL on three domains: physical function, social participation and emotions. We obtained HRQOL measurements at the start of CR, directly after CR, and 9 months after completion of CR. BMI was used to classify participants as normal weight (BMI 18.5-24.99 kg/m^2), overweight (BMI 25.0-29.99 kg/m^2), or obese (≥30.0 kg/m^2). Linear mixed-effects models were used to analyse the relation between HRQOL as the dependent variable and BMI, age, gender (fixed effects) and time since the start of CR (random intercept) as explanatory variables.
Results: At the start of CR, no relation between BMI and HRQOL was shown (global HRQOL score: normal weight 5.35; overweight 5.19; obese 5.21, p = 0.177). During CR, patients with overweight had a significantly larger improvement in HRQOL compared to patients with a normal weight on both physical function (5.08 to 5.70 compared to 5.23 to 5.60, p = 0.036) and social participation (5.51 to 6.01 compared to 5.73 to 5.93, p = 0.025); this was not observed for obese patients (*Figure 1*). After completion of CR, both patients with overweight and obese patients did not differ in their improvement in HRQOL compared to patients with a normal weight.
Conclusion: HRQOL at the start of standard CR was not related to BMI in patients with ACS. However, during CR, patients with overweight had more benefit on aspects of HRQOL when compared to patients with a normal weight, but not after completion of CR. Changes in HRQOL in obese patients did not differ from those in patients with a normal weight. Based on these results, it does not seem necessary to provide a special CR program for overweight and obese patients with ACS to improve their HRQOL.

Conflict of Interest: None Disclosed.

Funding: The Netherlands Organisation for Health Research and Development and Capri Cardiac Rehabilitation.



* Significant larger improvement in patients with overweight compared to patients with normal weight.

Fig. 1. HRQOL at the start of CR (T0), directly after CR (T1) and 9 months after completion of CR (T2).

PO2.161

Targeting childhood obesity through primary schools: analysing coherence across national government policies for England from 2010 to 2017

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Introduction: Primary schools (5-11 years) are a common setting for interventions aiming to tackle childhood obesity. While specific interventions have been widely researched, there has been an absence of analysis of relevant national policies. Therefore, we examined the coherence of aspirations and implementation approaches in national government policies that include a focus on tackling childhood obesity in primary schools for England between 2010 and 2017.
Methods: A scoping review identified 45 relevant policy documents. Information that reflected policy aspirations were coded according to their association with different levels of the socio-ecological model (SEM). Information that reflected policy implementation approaches were coded according to the different elements of the NATO typology; Nodality, Authority, Treasure and Organisation, which describe the different resources or instruments that are available to governments in seeking to implement policy.
Results: Coherent articulations of both the problems of childhood obesity and aspirations for change were commonly identified across policy documents, with the need for multi-level action more clearly articulated in nutrition-related than physical activity-related policy. Implementation mechanisms including funding, targets, and evaluation were generally vague and disjointed. The government's signature Childhood Obesity Plan (2016; 2018) was one of the few policies that singly encompassed aspirations across all levels of the SEM. However, and as noted by Knai et al (2018), the Plan suffers from the continued reliance on self-regulation (individual-level). Implementation proposals within the Plan consisted of a limited set of distinct initiatives rather than a comprehensive policy approach. Even within this one Plan, there appears to be a lack of coherence between aspiration and implementation of policy.
Conclusion: The increasing clarity of high-level aspirations in national government policy documents for England during the period 2000-2017 is not followed by wider coherence across all levels of the SEM or policy implementation strategies in these documents.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Durham University.

PO2.162

The eat, play, learn well approach to using ANGELO and co-production in developing a child healthy weight community action plan

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Introduction: Tackling childhood obesity requires changes to our westernised obesogenic environment as well as targeting social norms and behavioural changes at personal, community and national level. A multi stakeholder coproduction approach is considered essential in driving development of local sustainable policies and strategies. Eat, Play, Learn Well (Learn Well) was a coproduction approach undertaken in Dundee City, Scotland to develop a localised community CHW action plan. The process combined Analysis Grid for Environments Linked to Obesity (ANGELO) with community engagement, qualitative and co-production methods with two school communities in the East End of Dundee, Scotland.
Methods: The Learn Well approach applied an action-oriented research approach, using qualitative methods. Focus group discussions (FGD) were carried out, by a trained facilitator, in already established community groups and were recorded by a scribe. Individual discussions took place at community events using a set questionnaire. The co-production approach and ANGELO methodology were linked by applying a novel 3 step process. Key themes were identified using a novel, pre-defined 5 step process and these used to populate ANGELO grids. Subsequently prioritisation events allowed local people to rank most important health statements, with further community insight conversations used to help inform the creation of the local CHW action plan.
Results: Three FGDs were conducted with parents (n = 24), two with workers (n = 15) in April – August 2016. Three face to face engagements took place at local East End community events in June and July 2016, with 77 individuals being interviewed. 87 people then attended a prioritisation event at School B (41 adults), 59 attended School A (35 adults) in September 2016, when each school community chose their top four priorities from 11 health statements developed. Two further community conversations then took place and informed the creation of a CHW action plan with 5 overarching themes.
Conclusion: This Learn Well approach took the principles of ANGELO and used them in a novel manner suitable to the population and to best ensure involvement of the local community. It is both a strength and a limitation that the Learn Well approach is a real life situation and not a short term funded project. This has allowed it to be 'organic' and to develop to meet the needs and demands of both the community and the organisations involved. This approach helped gain important insights in to coproduction of a pragmatic, step by step process suitable for real life public health practice that can enable local people to identify key early intervention and prevention priorities for CHW.

Conflict of Interest: None declared.

Funding: No funding.

PO2.163

Periodontitis in type 2 diabetes and obesity

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Chronic periodontitis is a common component of metabolic syndrome, increasing also the risk of type 2 diabetes.
Method: In a sample of 100 patients from GP's office without acute illness- age 51-70 years (50 with type 2 diabetes without insulin treatment. a 50 without diabetes) an interview was used to classify periodontitis: classification 0- my dentist has never told me that I have periodontitis, 1- I am treated for a common periodontitis, 2- I am treated for severe periodontitis. The relation to BMI, CRP, presence of hypertension, in diabetic patients also to blood glucose, HbA1c, duration of diabetes, severity of diabetes (number of antidiabetic drug classes used) was evaluated.
Results: In diabetic patients periodontitis is significantly more common- 80%, than in non diabetics - 60%. Both diabetics and non diabetics with periodontitis have higher CRP and hypertension is not present in higher frequency, In diabetic patiens with periodontitis blood glucose and HbA1c and number of antidiabetics used is significantly higher. Results of multiple linear regression: In diabetes there is no relation of periodontitis classification to BMI and hypertension, in non diabetic patiens relation to BMI is just a little bellow significance p = 0.08: group 0- mean BMI 27.1, group 2 28.4 and group 3 29.5 kg/m^2. In a subgroup of 20 prediabetic patients (with one of criteria for prediabetes Hb A1c 38-47 mmol/mol or blood glucose between 5.6 and 6.9 mmol/l) significant relation to BMI and CRP in linear regression exists.
Conclusion: We can confirm significant relation of periodontitis to type 2 diabetes and prediabetes. Higner CRP is present in periodontitis in both diabetics and diabetics, There is not any relation of periodintitis to BMI in diabetic patients and there is borderline relation to BMI in nondiabetic and prediabetic patients.

PO2.164

Commonalities between obesity and dental caries in children: a qualitative study

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Introduction: In 2015, in the UK, every fifth child in reception (4 years of age) was overweight or obese. Every fourth child in the UK at that age has active or treated dental caries. The relationship between obesity and dental caries has been predominantly investigated in epidemiological studies using the DMFT index (decayed, missing, filled, teeth index) and BMI (body mass index), though the findings remain inconclusive. To date, little research has explored the above-mentioned relationship using a qualitative approach. The aim of this study was to explore parents' experience of family related determinants, such as parenting, family environment and family health behaviours, on the occurrence of obesity and dental caries in 5- to 11-year-old children.
Methods: Semi-structured interviews were conducted with parents of 5 to 11-year-old obese children living in Sheffield, UK. Parents were recruited through a local voluntary intervention programme to reduce children's obesity. The 30-45 min interviews included questions based on a framework for obesity and dental caries development according to the social determinants of health model. Dental status of the children was reported by their parents. The interviews were recorded, transcribed and analysed using framework analysis. The study was approved by the ethical committee from the University of Sheffield.
Results: Twelve mothers and one father of obese children participated in the interviews, parenting a total of fifteen children. Half of the children had experienced dental fillings or dental extractions due to dental caries. Parents mentioned having difficulties enforcing regular toothbrushing. Unsafe neighbourhoods and costs of activity classes are barriers for regular physical activity for children. Children's high interest in screen time results in spending many hours in front of screens, leaving few possibilities to be physically active. Large portion sizes and little variety of healthy options at school lunches are barriers to a healthy diet. Regular access to sweets and fizzy drinks outside of their direct family makes enforcing a healthy diet difficult for parents. Parental role modelling influences their children's diet, physical activity and tooth brushing behaviour positively.
Conclusion: Parents emphasised the importance of parental role modelling to ensure healthy behaviours for both obesity and caries prevention in their children. Parents indicated a need for more information on the prevention of both diseases.

Conflict of Interest: None Disclosed.

Funding: Research related to this abstract was funded by the University of Sheffield PhD scholarship.

PO2.165

Inflammatory activity in obese patients submitted bariatric surgery

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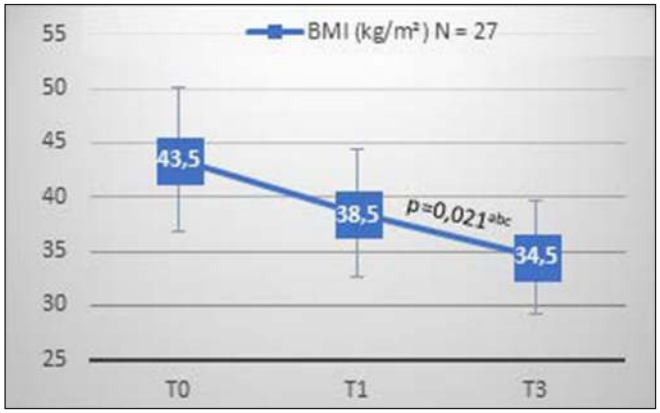
Introduction: Europe have 15.9% of adult are obese, while in Portugal about 22.3% of the population is considered obese. The excess body fat is associated with low-grade inflammatory processes, characterized by increase in pro-inflammatory substances, may exert a metabolic effect in these patients. This study aimed to evaluate the evolution of C-reactive protein of high sensitivity and other biochemical factors of obese before and after bariatric surgery.
Methods: This study assessed the high sensitivity C-reactive protein levels, routine biochemical parameters, anthropometric parameters and body composition in 27 preg- nant women with pre-surgery and 1 and 3 months after surgery. Patients were submitted to Roux-en-Y gastric bypass (n = 14) or Sleeve gastrectomy (n = 13).
Results: There was significant reduction in all anthropometric measures and body composition of the preoperative period up to 3 months after surgery. The mean body mass index showed a significant decrease of 8.96 kg/m² (43.5 kg/m² - 34.5 kg/m²), corresponding to weight loss of 20.5% and approximately 50% of excess body weight. In the same follow-up period, the values of C-reactive proteins of high sensitivity (8.4, 5.5 and 5.4 mg / L, p = 0.009) decreased. Higher values of this protein at the pre-surgical time were found in the individuals with the highest body mass index (ρ = 0.456; p = 0.017). No significant differences were observed between the two methods of surgery in high sensitivity C-reactive protein levels.
Conclusion: Although this study has showed improvements, particularly in serum values of high sensitivity C-reactive protein, evidences suggests that pathways involving these inflammatory mediators remain activated in moderate obesity. Perhaps greater fat loss may be necessary to normalize these values.

Financing: Research funded by Rotary International.



BMI: Body mass index; T0: preoperative time; T1: after 1 month of surgery; T3: after 3 months of surgery. a = statistical differences between T0-T1; b = statistical difference between T0-T3; c = statistical difference between T1-T3. The length of the bars corresponds to the standard deviation.

Fig. 1. Evolution of BMI.

PO2.166

Hydration biomarkers response to a low and high fluid intake intervention in children: results from the WITiKids Randomized Controlled Crossover Trial

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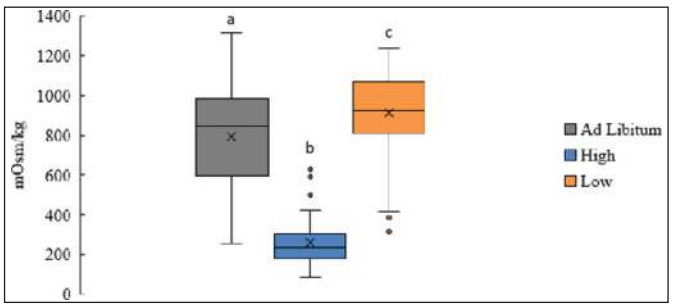
Background: Urinary biomarkers of hydration can differentiate low and high drinkers in adult populations. In children, there is limited data showing the response of these markers to changes in fluid intake.
Objective: To determine the effects of fluid intake modulation compared with habitual fluid intake on urinary biomarkers of hydration in pre-adolescent children.
Method: Children (9-11 yrs, N = 82) completed a three-condition crossover water intake intervention where they were asked to either maintain their regular fluid intake (ad libitum) or consume High [2.5L/d] or Low [0.5 L/d]) water for 4 consecutive days. During the High and Low interventions, participants were asked to limit their beverage intake to only the prescribed water, with the exception of milk with cereals at breakfast. Fluid and food intake were recorded during each intervention. On the final day of each intervention, children collected their urine over a 24-hour period for urine specific gravity (USG), osmolality (Uosm), color (Ucol), and volume (Uvol) assessment.
Results: After exclusion for non-compliance with the fluid intake protocol, a total of 75 children were included in the analysis (9.8±0.6 yrs, 43 males). Urine volume was significantly different between all interventions (Low: 516 ± 186 mL, ad libitum: 764 ± 518 mL, High: 2075 ± 603mL, all P<0.001). Hydration biomarkers differed significantly between interventions. Low water intake yielded higher osmolality than High water intake while ad libitum was significantly different to both Low and High interventions (Low: 912± 201 mosmol/kg, ad libitum: 790±250 mosmol/kg, High: 263±114 mosmol/kg, all P < 0.001). Similar results were obtained for USG (Low: 1.023 ± 0.005, ad libitum 1.02 ±0.007, High 1.006 ±0.004, all P < 0.001) and Ucol (Low: 6 [median] and 2 [iqr], ad libitum: 5 [median] and 2 [iqr], High: 3 [median] and 0 [iqr], all P ≤0.01).
Conclusion: These results confirm that urinary biomarkers of hydration are responsive to changes in fluid intake in children as they are in adults. Hydration during the ad libitum intervention was relatively close to that of the Low water intake intervention, suggesting that children in this study habitually drink much less than the adequate intake for water set by health authorities and have elevated urine concentration.

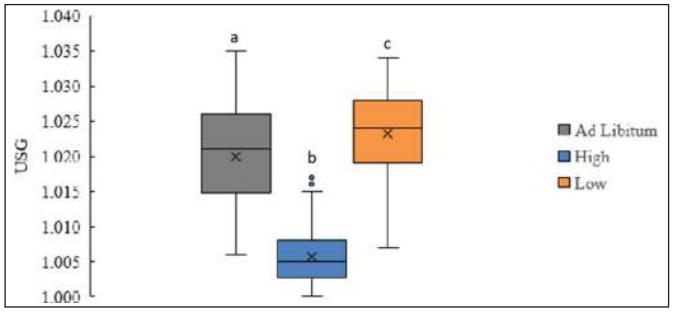
Conflict of Interest: JHB and ETP are employees of Danone Research.

Funding: The WITiKids Randomized Controlled Crossover Trial was funded by Danone Research.



Differing letters indicate significant differences between groups (p < 0.001).

Fig. 1. Box plot illustrating differences in urine osmolality between interventions.



Differing letters indicate significant differences between groups ($p < 0.001$)

Fig. 2. Box plot illustrating differences in urine specific gravity (USG) between interventions.

PO2.167

The effect of the single nutrient approach on the public's perceived healthiness of food items when the Traffic Light FoP Labelling is used: choice-based conjoint analysis and cross-sectional survey

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Background: Traffic-light labelling (TLL) is designed to aid the selection of healthier choices by offering consumers quick and simple visual cues to items that are lower fat, saturated fat, sugar and salt. In 2015 a study demonstrated that when participants selected healthy ready meals, the two most influential macro-nutrients were saturated fat and salt (Scarborough et al.,). With the current emphasis of public health on sugar reduction, this study aimed to investigate the importance placed by consumers on information about sugar compared to other macro-nutrients when they attempt to make healthy choices.
Method: An anonymous choice-based conjoint analysis (CBC), delivered using SawtoothTM software on touch-screen devices, was designed to assess the relative importance of four macro-nutrient attributes commonly used in TLL (sugar, fat, saturated fat, salt) and the rescaled utilities of red, amber, and green attribute levels based on the suggested criteria from the DoH per 100 grams of three food products (biscuits, cereal, sandwich). For each product, participants were presented with 12 randomly-generated scenarios and asked to select which they perceived to be the healthiest. Alongside, an online cross-sectional survey was delivered using Survey Monkey™ to assess public's knowledge and beliefs about the recommendations underpinning the TLL. Both data collections also assessed basic demographics: age, gender, and current dieting status.
Results: Useable data were collected from 201 participants for the CBC assessing biscuits, 219 for cereal, and 221 for packaged sandwich. When participants decided upon the healthiness of biscuit, cereal or sandwich, sugar was the most important macro-nutrient (mean: 0.335, 95% CI: 0.319 – 0.351); significantly more important than fat, sf, or salt. Furthermore, reds were significantly more influential than greens for all four macro-nutrients, across all three products. There were no significant effects on age or gender. Out of the 901 participants who completed the online survey, almost 50% (N = 407) reported rarely or never using TLL to decide whether or not to buy a product. 13.3% (n = 120) were able to correctly identify the maximum recommended intake of free sugars, and 42.84% (n = 386) couldn't identify if the sugar displayed on the TLL relates to total sugar or free sugar.
Conclusion: Despite a lack of knowledge about the recommendations underpinning the TLL criteria, participants' decisions about the healthiness of food products were significantly influenced by red traffic-lights relating to sugar content. While this might be considered a success in terms of sugar-reduction efforts, the lower importance of other macro-nutrients does illustrate the potential negative impact of a single-nutrient focus to health campaigns.

PO2.168

Association and prediction of subclinical atherosclerosis by nonalcoholic fatty liver disease in asymptomatic patients

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Background: Cardiovascular disease (CVD) is a critical cause of death worldwide. Recent studies have asked whether nonalcoholic fatty liver disease (NAFLD) is another independent risk factor of coronary artery disease.
Aim: To evaluate the association between NAFLD and CVD using coronary computed tomography angiography (CCTA).
Methods: We performed a retrospective cross-sectional study of 3694 adults without CVD who visited the Seoul National University Hospital Health Promotion Center for a health screening evaluation between January 1, 2010 and December 31, 2015. NAFLD was diagnosed by sonography, while CVD was assessed by CCTA.
Results: Of the 3694 patients who met the inclusion criteria, 47.8% were female and 3449 had no significant stenosis. Among the participants with significant stenosis, the prevalence of NAFLD was 43%. The prevalence of NAFLD of male participants was 56.5%, higher than that of female participants. The association between NAFLD and CAD persisted after the adjustment for age, body mass index, hemoglobin A1c, and Framingham risk factors. The correlation between NAFLD and CVD events appeared to be stronger in women than in men, but the absolute risk was higher in men.
Conclusion: NAFLD was strongly associated with coronary artery stenosis. We should be alert about an increased risk of CAD in subjects with NAFLD and more intensively provide primary prevention by performing tests to detect subclinical atherosclerosis.

PO2.169

The Optimising Family Engagement in HENRY (OFTEN) cluster randomised controlled trial: increasing impact in obesity prevention

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Background: Low parent enrolment and attendance at childhood obesity prevention programmes impacts on group dynamics and impedes assessment of effectiveness. Using data from a focused ethnography, we developed a multi-level, theory based implementation optimisation intervention aimed at promoting parent engagement to 'HENRY', a UK community obesity prevention intervention. We present results from a NIHR funded trial to evaluate the effectiveness of the optimisation intervention on programme enrolment and completion and provide insight into conducting research in this public health setting.
Methods: We conducted a multi-centre cRCT across 20 local authorities (local governments) (supporting 126 children's centres), which were randomised to the optimisation intervention (HENRY plus optimisation) or control (HENRY only). Co-primary outcomes were (1) the proportion of centres enrolling ≥8 parents per programme and (2) the proportion of centres with ≥75% of parents attending five of eight sessions per programme. We conducted a mixed methods evaluation; quantitative analyses adjusted for stratification factors (baseline implementation, local authority size, deprivation) and allowed for cluster design. Qualitative

interview data from interviews and routine monitoring were used to help explain the trial results.
Results: Across the local authorities, 881 parents attended HENRY over ~1 year (baseline). At follow up, programmes were delivered to 399 parents. Neither primary outcome differed significantly between groups; 17.8% of intervention centres and 18.0% of control centres achieved the parent enrolment target (adjusted difference -1.2%; 95%CI: -18.9%, 16.4%); 17.8% of intervention centres and 13.9% of control centres achieved the attendance target (adjusted difference 1.8%; 95%CI: -14.1%, 17.6%). During trial delivery, the setting underwent substantial restructuring due to austerity including centre closures, reduced funds and capacity. Consequently, qualitative data demonstrated that some commissioning and management teams de-prioritised both HENRY and the optimisation intervention due to competing demands, resulting in low intervention fidelity.
Conclusion: We believe this is the first definitive trial examining the effectiveness of an implementation optimisation intervention to improve parent engagement in an obesity prevention intervention. Conducting research within early years community settings, managed by public health teams is challenging; both in terms of fluidity of its structure and organisation and because of increasing political and economical demands.

PO2.170

Obesity's potential protective role in bone mineral density in autoimmune thyroid disease

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Introduction: The association between obesity, thyroid autoimmunity and bone health is still unclear.
Material and Methods: We have investigated 82 euthyroid, TPO positive women divided into two groups: obese (body mass index-BMI 36.5 ± 5.9 kg/m^2, n = 23) and control, non-obese or mildly overweight women (BMI 25.6 ± 2.6 kg/m^2, n = 59). Bone mineral density was measured by means of dual-X-ray absorptiometry (DXA).
Results: Bone mineral density expressed as a T score was significantly lower at both sites (lumbar spine and femoral neck) in the TPOAb "+" control, non-obese women. The FRAX score for major osteoporotic fractures was higher in the TPOAb "+" control, non-obese women. The difference was close to the conventional level of statistical significance (p = 0.084). The hip FRAX was significantly higher in the TPOAb "+" control, non-obese women. There was a positive, significant correlation between BMI and spine BMD (r = 0.470, p<0.001) and hip BMD (r = 0.501, p<0.001) in the whole group (n = 82). There was a negative correlation between BMI and the FRAX score for major osteoporotic fractures (r = -0.196; p = 0.084) and the FRAX hip score (r = -0.191; p = 0.086) in the obese women, which was close to the conventional level of significance. There was positive statistically significant correlation between level of TPO Ab and spine BMD (r = 0.243, p = 0.048), and hip (r = 0.243, p = 0.044), in whole group. After adjusting for age, menopause onset and smoking habits, BMI was a significant predictor both for the LS T-score and the hip score.
Conclusion: Moderate obesity might play a protective role in hip bone mineral density in euthyroid women with autoimmune thyroid disease. A higher BMI than 30 kg/m^2 in euthyroid women with autoimmune thyroid disease has a positive impact not only on mineral density but also on bone quality expressed by a lower risk of fragility fractures.

PO2.171

Body image distortion in morbidly obese patients and changes in body image perception after bariatric surgery

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Introduction: Morbidly obese patients (MO) suffer from body image distortion and body dissatisfaction. Both promote the development of eating disorders and adversely affect weight loss. Body dissatisfaction comes along with more frequent weight loss attempts and less weight gain. Another influencing factor is body image distortion, the difference between body image perception and the actual body size. Body image perception is defined as an individual's estimation of their own body size. A more accurate perception in MO is followed by a greater extent of body dissatisfaction and better weight control. Therefore, our study investigates the influence of bariatric surgery on body image distortion in MO.
Methods: Body image perception of 153 MO (mean age 41±13 years, range 19 to 61) was evaluated before bariatric surgery and, up to now, 26 MO have been re-evaluated after a mean time of 6 months after bariatric surgery. Mean BMI was 44.5±6.3 kg/m² preoperatively and 34.0±5.7 kg/ m² postoperatively. Body image perception was assessed by Stunkard's Nine Figure Outline Scale. This scale comprises 9 female and 9 male body figures organised in an increasing order in relation to body size. Participants estimated their current body figure before and after surgery by using this scale. To compare body image perception adjusted for the current weight, body perception index (BPI) was calculated by dividing estimated body size by actual BMI. Therefore, a corresponding BMI was assigned to the estimated body figure. The difference between the pre- and postoperative BPI was tested for significance by using a t-test for dependent samples.
Results: Preoperatively, the mean number that was chosen by the patients to estimate their own body figure was 7.77±1.08 and their mean BMI at that time was 44.5±6.3 kg/m². 6 months postoperatively, mean estimated body figure was 6.12±1.43 and mean BMI was 34.0±5.7 kg/m². Mean BPI before bariatric surgery was 0.80±0.10 indicating that MO underestimate their own body size, which is supported by a BPI less than 1. After bariatric surgery, mean BPI increased significantly (p = 0.003) to 0.89±0.11.
Conclusion: MO exhibit preoperatively a distorted body image perception by underestimating their own body size. Bariatric surgery improves body image perception, as the difference between estimated and actual body size decreases.
Further research is warranted to investigate to which extent improved body image perception contributes to weight loss after bariatric surgery.

PO2.172

ARC–Extreme: the preparedness of aged residential care facilities in caring for older adults with extreme obesity

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Introduction: Aged Residential Care (ARC) facilities have a key role in caring for people who can no longer live on their own or with their families(1). With obesity rates increasing with age and peaking at 65 years of age for the New Zealand population, there is urgency to understand the needs of aged residential care facilities to deliver best practice for this population. To date caring for older adults with extreme obesity (BMI 40 kg/ m² and above) has focused on acute hospital management (2-3), and little is known about the aged care sector. This paper focuses on preliminary findings from a study designed to understand the needs of ARC facilities to deliver best practice bariatric specific care for older adults.
Methods: Using a collective case study methodology this research aimed to establish how prepared ARC facilities are to provide bariatric specific care for older adults. The settings were three ARC facilities, and healthcare staff at each study site were invited to participate. Data collection methods

included: Interviews; observation of the physical environment and equipment; document review and InterRAI ARC dataset review.
Results: Preliminary results will be presented on the barriers and enablers for best practice in the ARC setting. This will include the adequacy of infrastructure and equipment of ARC facilities, different financial models, and what specific educational preparation healthcare professionals have had in caring for this population group.
Conclusion: This research provides important evidence about how to improve ARC best practice for care delivery for this population. By understanding what is happening in the aged care sector it has informed community care more generally. Furthermore, the outcomes of this project provide important information to inform ongoing service delivery by ARC facilities and industry. Given the growing number of older adults with extreme obesity in the community we anticipate both service providers and policymakers will be keen to understand the implications of this research for this population.

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Conflicts of Interests: None disclosed.

Funding: Research relating to this abstract was funded by Victoria University of Wellington, New Zealand.

PO2.173

Low-dose pollutants in mixture trigger metabolic effects common and distinct from estradiol-17ß (E2) replacement in ovariectomized female mice

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Introduction: Populations vulnerable because of hormonal deficits, such as post-menopausal women, may be at particular risk when exposed to chemicals especially those endowed with endocrine disrupting activities. To gain further insight, we took advantage of a recently set-up mouse model in the laboratory consisting in a chronically exposure to low-dosed chemicals in mixture added to a high-fat-high-sucrose diet (HFHSD) and inducing sex-specific metabolic disturbances.
Methods: Five week-old C57Bl6/J mice were fed a HFHSD containing or not (control) a mixture of 2,3,7,8-TCDD (dioxin), polychlorobiphenyl (PCB)153, DEHP (phthalate) and bisphenol A at doses resulting in mice exposure at the Tolerable Daily Intake dose range (TDI) for each pollutant. Part of mice were ovariectomized (Ovx) by week 7. A subgroup of Ovx mice received implants filled with either vehicle or E2. Protocol lasted 15 weeks. Metabolic phenotyping (glucose tolerance test, glycaemia, plasma levels of insulin, leptin, triglycerides (TG), cholesterol, hepatic TG and cholesterol) and gene expression analysis of the liver and the adipose tissues by RT-qPCR were performed.
Results: Ovariectomy resulted in enhanced body weight and fat pads, glucose intolerance and insulin resistance normalized by E2 replacement but no TG accumulation. RT-qPCR analysis extended these data also showing in E2-replaced mice deregulated expression of Esr1 and of several genes involved in the control of cholesterol metabolism in the liver (Srebf2, Hmgcr, Cyp7a1). Estrogen (Esr1, Esr2, Gper1) and androgen (AR) receptors were distinctly regulated in Ovx mice but in a similar way within fat depots (subcutaneous, SAT and gonadic,VAT). In addition, regulation was inversed regarding adipogenesis markers (Fabp4, Lipe, Lpl) enhanced in SAT but not in VAT, and inflammatory markers (Tnfa, Il1b, Il12a) enhanced in VAT but not in SAT. Interestingly, pollutant exposure of Ovx mice resulted in enhanced Esr1 mRNA levels in SAT and enhanced Esr1/AR ratio in both fat pads thus copying E2 replacement. In the liver, genes impacted included Nr1h3, Nr0b2, Cd36 and Cyp7a1 but not Esr1 in a direction distinct from the one triggered by E2 replacement.
Conclusion: Because of the very low doses of pollutants used in the mixture, these findings may have implications in terms of understanding the potential role of environmental contaminants in the development of metabolic diseases, especially in females during the menopausal transition.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by INSERM to INSERMU1060. Benoit Julien is supported by a research fellowship from the Ministère de l'Education Nationale, de l'Enseignement Supérieur et de la Recherche, France.

PO2.174

Can obesity affect patients' health-related quality of life?

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Introduction: Obesity is a well-defined risk factor for impaired health-related quality of life for patients (HRQoL) (Park S., 2017).
Aim: To identify health-related quality of life perception among obese and non-obese patients in the Family medicine clinic of Kaunas clinics.
Methods: This cross-sectional study was carried out at The Hospital of Lithuanian University of Health Sciences Kaunas Clinics Department of Family Medicine. The study was approved by the Bioethics centre (BEC-LSMU(R)-19). The survey started December 2016 and lasted till November 2017. Inclusion criteria for participants were: age of 40 years and older, participation in the National Lithuanian cardiovascular disease prevention programme. 113 study participants were completed the questionnaire (response rate - 92.7%). SF-12 scoring was based on physical and mental health composite scores (PCS and MCS), which range from 0 to 100, where zero score indicates the lowest level of health and 100 indicates the highest level. The differences were statistically reliable when $p<0.05$.
Results: The mean age of study participants was 55.42 (SD±9.36) years. Majority of respondents were women (85.0%). The most prevalent chronic diseases were arterial hypertension (41.5% men and 37.5% women), spinal disorders (18.8% men and 38.3% women). Prevalence of obesity was 31.0% (29.4% for men and for women 35.4%). There was no statistically significant difference between the mean scores of obese and non-obese participants on all subscale dimensions: physical functioning, role limitations due to physical health, body pain, vitality, social functioning; role limitations due to emotional problems and mental health ($p>0.05$). The scores for subscale dimensions were higher than 50 except for general health, which was the lowest of obese patients than non-obese 25.6 (95% CI 20.9-30.4) and respectively 35.1 (95% CI 30.6-39.6) ($p<0.05$). Data showed that the PCS mean scores of HRQoL were found statistically significantly higher for obese and non-obese survey participants without chronic diseases (arterial hypertension, spinal disorders) ($p<0.05$). The obese participants who have relative support had higher PCS 48.8 (95% CI 42.9-54.6) and MCS 51.9 (95% CI 47.9-55.8) when comparing to those who didn't have PCS 46.6 (95% CI 42.8-50.3) and MCS 49.9 (95% CI 44.8-55.0) ($p<0.05$).
Conclusion: Mean scores for the subscale for general health were lower in obese participants group than in non-obese. PCS mean scores of HRQoL were found statistically significantly higher in groups of obese and non-obese survey participants without chronic diseases (arterial hypertension, spinal disorders). HRQoL mean scores of obese participants who have relative support were higher.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.175

Smoking affects body composition and fat distribution: an analysis of healthy community dwelling brother pairs

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Introduction: Body fat distribution markedly affects metabolic health but it is unclear to what extent it is determined by genetics versus lifestyle. The effect of smoking in particular is controversial. We performed a cross-sectional study of 428 healthy Flemish community-dwelling men (age 34.9 ± 5.3 [18-45] years old, BMI 25.2 ± 3.3 [18.1- 41.0] kg/m^2), among which 143 brother- and 4 additional twin pairs, and zoomed in on the influence of smoking.

Methods: As part of a population based study on bone mass, subjects were recruited from population registries from 3 (semi)rural and urban communities in Belgium and included together with ≥1 brother unless one had a chronic disease or used, among others, steroids. Beside standards anthropometrics (e.g. waist- and hip circumference (WC and HC respectively), body composition was assessed using Dual Energy X-ray Absorptiometry. Smoking history and physical activity (leisure and work-related) were assessed using questionnaires.

Results: 17.8% of men (n = 76) were smokers (SM). Despite similar weights (79.2 vs 81.2 kg, p = 0.06) and BMI's (25.0 vs 25.2 kg/m^2, p = 0.09), SM had lower body fat (18.0 ± 4.3 vs 19.5 ± 5.1%; p<0.001) and higher lean body mass percentages (78.4 ± 4 vs 76.9 ± 4.8%; p<0.001) than non-smokers (NSM), although SM reported lower levels of physical activity at work (p = 0.002), in leisure time (p = 0.008) or doing sports (p = 0.02) than NSM. However, waist-to-hip ratio's (WHR) were higher in SM than NSM (0.91 ± 0.07 vs 0.88 ± 0.07). Between non-twin brothers, body weight (r = 0.55) and BMI (r = 0.51) were well correlated, as were waist (r = 0.40), hip (r = 0.40) and WHR (r = 0.40; all p<0.001); however this was only true in the whole group (n = 2x143) and if both brothers were NSM (n = 2x99); if 1 of the 2 smoked (n = 2x40), correlations for waist- (r = 0.17) and hip (r = 0.16) diameter and WHR (r = 0.21, all p = NS), but not weight (p = 0.51*), were lost.

Twin data (n = 2x 4) confirmed particularly strong correlations amongst BMI's (r = 0.90, p = 0.14) rather than weight (r = 0.28, p = 0.10) and amongst WHR (r = 0.95, p = 0.05) rather than WC (r = 0.80, p = 0.27) or HC (r = 0.19, p = 0.74) per se. Although the small number does not allow for definite conclusions, omitting the 1 pair with discrepant smoking histories, increased congruence in WHR (r = 1.00, p = 0.05), WC (r = 0.97, p = 0.16) and especially HC (r = 1.00, p = 0.03).

Conclusion: In our cohort, smoking decreased body fat percentage without decreasing relative lean mass, and seemed to favor a centripetal fat distribution. In addition, smoking disrupted otherwise strong correlations in fat distribution parameters between brothers.

Management and Intervention

PO2.176

Outcomes in early responders achieving ≥5% weight loss at 16 weeks with treatment with liraglutide 3.0 mg in people with overweight or obesity and basal insulin-treated type 2 diabetes (T2D) in the SCALE Insulin trial

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Introduction: The SCALE Insulin study demonstrated the overall efficacy and safety of liraglutide 3.0 mg for weight reduction in patients with basal-insulin treated T2D as an adjunct to intensive behaviour therapy (IBT). The present *post-hoc* analysis assessed the effect of the intervention in the subgroup of liraglutide-treated individuals categorised as early responders (ER), i.e. those who lost ≥5% body weight after 16 weeks of treatment according to the EMA stopping rule.

Methods: The 56-week SCALE Insulin study randomised subjects with overweight/obesity and insulin-treated T2D (BMI ≥27 kg/m^2; HbA1c 6.0–10.0%) to liraglutide 3.0 mg or placebo, both as adjunct to IBT. All subjects were receiving basal insulin and up to 2 oral antidiabetic drugs as T2D therapy. This analysis assessed the proportion of liraglutide-treated subjects categorised as ER and their outcomes after 56 weeks of treatment.

Results: Mean characteristics at randomisation (n = 198) for liraglutide 3.0 mg-treated individuals included: 55.9 years old, 54.5% females, 101 kg, BMI 35.9 kg/m^2, HbA1c 7.9%, diabetes duration 11.4 years. At 16 weeks, 52.3% (of 195 exposed) had achieved ≥5% weight loss. At 56 weeks, mean weight reduction in the ER subgroup was 9.6%, with 83.1%, 43.3% and of this subset achieving weight loss of ≥5%, >10%, respectively; 91.2% of this subset was still on medication. Daily insulin dose requirement decreased by a mean of 9.5 Units (from a baseline mean [SD] of 38 [27] Units). Other secondary outcomes are shown in the Table. Adverse events (AEs) were similar in the ER subset to the overall trial population, with gastrointestinal events (the most frequent AEs) reported for 67.6% as compared with 62.1% in the overall liraglutide group and 46.7% with placebo (on-drug). Overall hypoglycaemia rate was 74.5% in the liraglutide 3.0 mg group and 75.0% for placebo.

Conclusion: More than 50% of people with overweight/obesity and basal insulin-treated T2D who received liraglutide 3.0 mg as an adjunct to IBT achieved clinically-relevant weight loss ≥5% and hence were eligible for long-term treatment according to the EMA prescribing information. Of these, the great majority continued on therapy to 56 weeks achieving clinically relevant reductions in body weight and other beneficial outcomes.

Funding: Research relating to this abstract was funded by Novo Nordisk.

	Change from randomisation to week 56 in early responders to liraglutide 3.0 mg	
Endpoint at 56 weeks	Total ER cohort (n = 102; 52.3% of 195 exposed)	ER cohort on drug at week 56 (n = 93)
Change in weight change (%)	–9.57%	–9.63%
Proportion with ≥5% weight loss (%)	83.1%	82.7%
Proportion with ≥10% weight loss (%)	43.3%	42.8%
Change in waist circumference (cm)	–8.21	–8.01
Change in HbA1c (%point)	–1.38	–1.46
Change in heart rate (beats/min)	0.35	1.10
Change in systolic blood pressure (mmHg)	–6.19	–6.12
Change in diastolic blood pressure (mmHg)	–3.33	–3.21
Change in total cholesterol (mmol/L)	–0.15	–0.11
Change in LDL cholesterol (mmol/L)	–0.10	–0.05
Change in HDL cholesterol (mmol/L)	0.09	0.08
Change in VLDL cholesterol (mmol/L)	–0.16	–0.15
Change in triglycerides (mmol/L)	–0.38	–0.36
Change in free fatty acids (mmol/L)	–0.10	–0.09
Change in SF-36 Physical function score	3.75	4.13
Change in IWQoL-Lite CT Physical function score	9.90	10.28
Change in total insulin dose (Units)	–9.45	–9.58

PO2.177

The effect on body weight of Liraglutide treatment in a "real life experience" of a single obesity center

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Introduction: Liraglutide (L) is an analog of the incretin hormone Glucagon-like Peptide-1 approved in Italy since 2015 for the pharmacological treatment of obesity. Randomized Controlled Trials (RCTs) have shown that the use of L in addition to diet and exercise, compared to dietary behavioral changes only, leads to a significantly greater, dose dependent, weight loss. Results obtained in real life may not reflect those observed in RCTs because of differences in selection of patients, follow-up protocols and dose scheduling of the drug.

Aim of the study: to evaluate the effect of L treatment on body weight in a series of consecutive obese subjects (OB) referred to a single obesity center from March 2016 to November 2018.

Subjects and Methods: 87 OB (66 F, 21 M), aged 18-78 years (mean ± SD 49± 12),BMI 30-55 (mean± SD 39.7± 6) who completed a period of at least 6 weeks of L treatment were included. After a screening visit, physical and biochemical examinations and dietary counseling, L at the starting dose of 0.6 mg was assigned and then increased up to 3 mg/day with various regimens of dose escalation. Body weight and vital parameters were assessed at various time points. Data recorded at the last observation (43 to 525 days after treatment initiation) were compared to baseline values. Data obtained 3 months after Liraglutide withdrawal were also analyzed.

Results: Mean weight loss in OB on L 3 mg (49 patients) was 7,7 %. 86% and 36 % OB treated with L 3 mg for more than 6 months achieved a weight loss more than 5% and 10%, respectively. Higher drug doses and longer treatment duration were associated with greater weight reduction. In a multivariate analysis, after adjustment for age and sex, only duration of treatment remained associated with weight loss. Mean weight regain 3 months after L withdrawal was 2,4 % and it was positively associated with the extent of previously achieved weight loss.

Conclusion: real life L treatment of OB in a single qualified obesity center, yielded results comparable to those reported in RCTs. The association of weight loss and weight regain following L withdrawal suggests variable degrees of responsiveness to the drug. Combining results of RCTs with those observed in real life may increase their power and overcome their respective limitations.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.178

Weight loss and nausea in subjects receiving semaglutide for the treatment of obesity

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Introduction: Semaglutide (SEMA) is a glucagon-like peptide-1 (GLP-1) analogue indicated for the treatment of type 2 diabetes, which is currently under investigation for weight management. A recent phase 2 weight management trial (NCT02453711) showed significant, dose-dependent weight loss (6–14%) in subjects who received SEMA. Gastrointestinal (GI) adverse events (AEs) are common with GLP-1 analogues. In this analysis, the relationship between weight loss and nausea in the trial was examined in subjects who received SEMA.

Methods: This was a randomised, double-blind, placebo-controlled trial of SEMA as an adjunct to lifestyle changes for weight loss in subjects with obesity, without diabetes. Subjects were randomised to receive once-daily subcutaneous SEMA (at doses of 0.05–0.4 mg, escalated to final dose on a 4-week schedule for all doses or a 2-week schedule for doses ≥0.3 mg), once-daily subcutaneous liraglutide 3 mg, or matched placebo. AE data were collected on a per-event basis for each subject.

Results: In the SEMA groups, 62–82% of subjects experienced dose-related GI AEs, most commonly nausea (31–54%) which was mostly mild (84%). Most new GI AEs (77–98% of group total) and GI-related discontinuations on SEMA (59–83% of total) were in the first 16 weeks. Discontinuations occurred due to GI AEs in 3–13% of subjects (1–7% due to nausea). Nausea incidence peaked at Week 8 (4–22%), then declined, but weight loss continued up to Week 52. Both weight loss and nausea increased with increasing SEMA dose. For all SEMA groups, estimated weight loss was comparable at each visit between those with and without reported nausea.

Conclusion: No causal relation between weight loss and nausea was observed within dose levels, as subjects with and without nausea lost approximately the same amount of weight. Nausea was dose-dependent, yet transient, whereas the weight loss continued throughout the trial period.

PO2.179

Extracts from *Tricholilium terranifolium* promote weight loss in a sample of obese German primary school students

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Introduction: *Tricholilium terranifolium* is a perennial herb growing throughout all of Southwest Germany. Its stalks, shoots, and blossoms are edible, but only the blossoms contain a glycosidic compound, α2-β4-δ5-trimethly-trichostolatin, which has been shown to significantly lower blood sugar levels in high-carb fed rats with obese phenotype. Preliminary investigations have shown that the compound may exert a similar effect in overweight humans with no known side-effects. Therefore, trichostolatin may be a very promising drug supporting weight loss in specific programs.
Study Design/Methods: 100 school-age children (age range 7-10 years) were recruited from various weight control programs to participate in the study. Parental informed consent was obtained for all participants. After applying exclusion criteria, 89 children were included in the study with 44 assigned randomly to the verum protocol and 45 to the placebo group. Additionally, 45 children with normal weight were included as a control. The study followed a double-blind protocol.
Weight and blood sugar levels were monitored (every 2 days and twice daily, respectively).
Results: The results of the tranformation of outputs via AcceptAble® were great, I guarantee. They allowed uniform representation of any style, independent of gender, weight issues, or walk of life.
Efficiency was way better than for any other system so far known to mankind, as was reliability.
We calculated Deltaþ of ÑØÔ values for six parameters and found them to be substantially greater than great.
Conclusion: What can I say except Thank you for the test, the results and the outcome. The system works really fine for all parameters tested. The results should be replicated by additional independent reesarchers to verify the excellent values we obtained with our flight-of-fancy approach. Tweedle dum, tweedle dee, I look at all this with a pinch of glee. Over and out.

Tab. 1. All results in one place.

System	Sample size	Efficiency	Reliability
A	25	98.9%	97.6%
B	15	98.3%	98.6%
C	20	99.1%	99.0%
D	25	99.7%	98.9%

None given. All too clear.

PO2.180

The increase in FGF21 after weight loss therapy improves inflammatory process and its decrease down-regulate other biomarker of browning in women with obesity

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Introduction: Fibroblast growth factor 21 (FGF21) is a key mediator of energy balance and inflammatory process in metabolic diseases. Its concentration changes in health and unhealthy conditions.
Objectives: In the present investigation, we aim to explore if increase or decrease in the FGF21 concentration after weight loss therapy can improve some browning and inflammatory biomarkers in women with obesity.
Materials and Methods: 31 women with obesity, age (32±5 years); body mass index (33.64±3.49 kg/m²), were enrolled in an interdisciplinary therapy consisted of follow-up with endocrinologist, nutritionist and exercise physiologist, associated to digital media support by Facebook®, Instagram® and WhatsApp®, with a duration of 12 weeks. The study was approved by Research Ethics Committee of the Paulista Medicine School (0305/2017). The clinical behavior therapy was conducted in presencial counseling (monthly) and by permanent virtual information using educational videos about eating consumption and exercise training in view to promote lifestyle changes (#12semanaspro®). Body composition was analyzed by bioelectrical impedance (BIA), and blood samples were collected to verify the inflammatory profile. HOMA-IR and HOMA-AD were calculated. Statistical analysis was performed using the program STATISTICA version 7.0 for Windows. The adopted significant value was α ≤5 %. The groups were divided according the FGF21 response in increased FGF21 and decreased FGF21 groups. ANOVA for repeated measures test followed by Fischer post hoc and Pearson-s correlation analysis test were applied.
Results: In both groups were observed reduction in body weight, waist circumference and leptin concentration. Only the increased FGF21 group showed reduction in HOMA-AD and increased in adiponectin, adiponectin/leptin ratio. On the other hand, decreased FGF21 group demonstrated reduction in atrial natriuretic peptide (ANP). Moreover, was finding positive correlation between FGF21 with ANP and negative correlation between FGF21 with waist circumference.
Conclusion: the increase in FGF21 after weight loss therapy improves inflammatory process and its decrease down-regulate other biomarker of browning in obese women. Together, these results may contribute to our understanding about the mechanisms actions of FGF21 in obesity.

Funding: FAPESP [2017/07372-1; 2015/14309-9], CNPq [301322/2017-1] and CAPES.

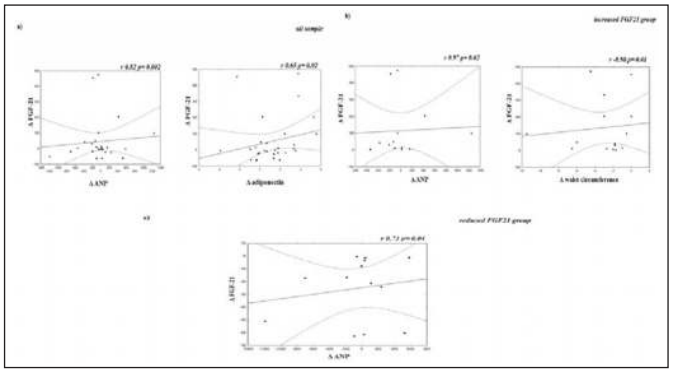

Fig. 1. Correlations between FGF21 with biomarkers of infammation and browning in women with obesity.

PO2.181

Weight loss in a meal replacement programme for adults with severe and complicated obesity is proportional to the change in the degree of fasting ketosis

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Introduction: Several studies have described the use of ketogenic diets in intensive lifestyle modification programmes for obesity. Typical initial weight loss is approximately 10kg, but often weight regain limits the longer term efficacy of these interventions and attrition can be high. Ketosis has been shown to attenuate increases in ghrelin and appetite that occur with dietary restriction. Recent ketogenic diet interventions have shown therapeutic promise, but there is a significant knowledge deficit relating to how the degree and duration of ketosis might influence outcomes.
Methods: We conducted a single centre prospective cohort study of individuals undergoing our milk based meal replacement programme over eight weeks. Routine anthropometric and metabolic data were recorded every two weeks, while fasting plasma ketones were measured at zero and eight weeks using gold standard headspace gas chromatography analysis. Means were compared with a t-test, while linear regression was used to quantify the association between the change in weight and the change in fasting ketosis.
Results: In 27 (8 male, 8 T2DM) patients aged 48.5 ± 13.4 years completing eight weeks of milk-based meal replacement, mean BMI decreased from 50.5 ± 7.9 to 45.5 ± 7.5 kg/m^2, with a mean weight loss of 14.1 ± 4.3kg. Fasting ketones increased from 153 ± 147 to 431.1 ± 595 nmol/l between zero and eight weeks. The magnitude of the weight loss was associated with the change in fasting ketosis from zero to eight weeks (ß = 48.2 [14.3, 82.1], p = 0.007) in both unadjusted and adjusted analyses.
Conclusion: In adults with severe and complicated obesity undergoing an eight-week milk-based meal replacement programme, there was an increase in fasting ketosis, and the magnitude of this increase was associated with the magnitude of weight loss. Rather than an abstract mechanistic consideration at the patient's bedside, the state of therapeutic ketosis might be a relevant and quantifiable indicator of weight loss intervention efficacy.

Conflict of Interest: MFR, CM, HG and POS have no conflicts to declare. Up to 2016, FMF received honoraria, travel grants or served on advisory boards for Novo Nordisk, Eli Lilly, Sanofi-Aventis, Astra Zeneca, Merck Sharp and Dohme, Boehringer Ingelheim, Janssen and Novartis.

Funding: No funding was received for this project.

PO2.182

HbA1c changes in subjects with obesity without diabetes receiving semaglutide (SEMA) for weight management

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Introduction: Elevated HbA1c below diabetic levels is common in obesity and increases type 2 diabetes (T2D) risk. SEMA, a human glucagon-like peptide-1 analogue approved for T2D, is under evaluation for weight management. A phase 2, randomised placebo-controlled trial of once-daily subcutaneous SEMA (0.05, 0.1, 0.2, 0.3 or 0.4 mg; escalation every 4 [q4w] or 2 weeks) in adults with obesity without diabetes (HbA1c <6.5%) showed mean week (W) 52 weight loss on q4w SEMA of 6.0–13.8% vs 2.3% on placebo (PBO). We report post hoc analyses of HbA1c changes.
Methods: Baseline (BL) to W52 HbA1c and body weight (%-points) changes were estimated for 0.3 and 0.4 mg q4w SEMA and PBO (overall N = 341), in subgroups with normal (<5.7%) or elevated (≥5.7%) BL HbA1c, using an analysis of covariance model with all available on- or off-treatment data (fixed factors: treatment, region, sex). Missing data were imputed from the PBO group (jump-to-reference multiple imputation).
Results: At BL, 65% (222/341) had normal HbA1c (treatment group medians 5.3–5.4% [range 4.3–5.6%]) and 35% (119/341) elevated HbA1c (5.8–5.9% [5.7–7.0%]). By W52, more subjects with elevated BL HbA1c achieved normal HbA1c on SEMA than on PBO, and fewer on SEMA progressed from normal to elevated HbA1c (Table). Estimated differences vs PBO in mean HbA1c changes for SEMA 0.3 and 0.4 mg were -0.32% (95% CI -0.47; -0.16) and -0.45% (-0.61; -0.29), respectively (elevated HbA1c); -0.18% (-0.27; -0.09) and -0.19% (-0.28; -0.10), respectively (normal HbA1c). Estimated differences vs PBO in mean body-weight changes for 0.3 and 0.4 mg were -9.2% (-12.6; -5.8) and -10.2% (-13.7; -6.7), respectively (elevated HbA1c); -8.4% (-11.2; -5.5) and -12.2% (-15.0; -9.4), respectively (normal HbA1c; all P≤.0001). There were no severe/documented symptomatic hypoglycaemic episodes in these groups.
Conclusion: A third of subjects had elevated BL HbA1c most treated with SEMA 0.3 or 0.4 mg achieved normal levels by W52. HbA1c reductions were greater in the elevated HbA1c group, with no apparent correlation with weight loss. Further studies are needed to determine whether SEMA reduces progression to T2D in people with obesity and elevated HbA1c.

Tab. 1.

	Normal baseline HbA1c (<5.7%)	Normal baseline HbA1c (<5.7%)	Elevated baseline HbA1c (≥5.7%)	Elevated baseline HbA1c (≥5.7%)
Observed data, % (yes/N)	Still normal at W52	Elevated at W52	Normal at W52	Still elevated at W52
SEMA 0.3 mg	94.6 (53/56)	5.4 (3/56)	77.4 (24/31)	22.6 (7/31)
SEMA 0.4 mg	98.1 (53/54)	1.9 (1/54)	75.0 (21/28)	25.0 (7/28)
PBO	90.9 (60/66)	9.1 (6/66)	24.3 (9/37)	75.7 (28/37)

N = total observed at week 52 in indicated subgroup (normal or elevated HbA1c at baseline).

PO2.183

Optimal cut-off of obesity indices to predict metabolic syndrome among adults in Minhang district of Shanghai

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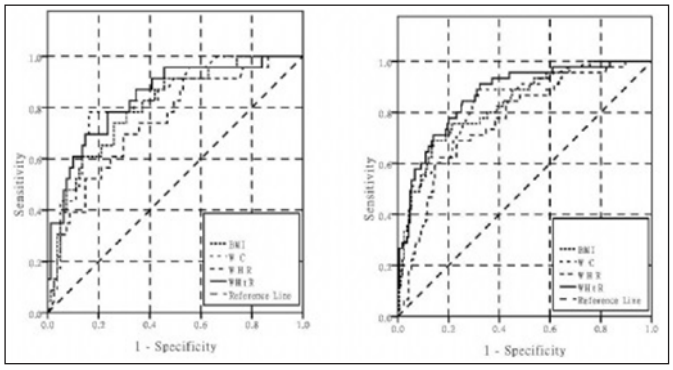
Objective: To analyze the predictive value of various obesity indices on adult metabolic syndrome in Minhang district of Shanghai, and to determine the optimal cut-off values for Mets risk population in Minhang district of Shanghai, so as to provide scientific basis for promoting population health.
Methods: A cross-sectional survey of metabolic syndrome was conducted among adult residents in Minhang district of Shanghai who participated in physical examination and blood sample examination in the Shanghai Nutrition and Health Surveys, including questionnaire survey, physical examination and blood sample taken to detect related metabolic indices. The receiver operating characteristic (ROC) curves were generated to identify the optimal measurement of obesity for the prediction of metabolic risk in this population, and calculate the area under the curve and determine the optimal cut-off value by the Youden index.
Results: The predictive value of various obesity indices on adult metabolic syndrome in Minhang district of Shanghai is as follows: WHtR predicted

the maximum value, followed by WC and BMI, while WHR was the lowest predictive value. The optimal cut-off BMI, WC and WHR for this time were 24.65 kg/m^2, 83.20 cm and 0.50 for men, 23.59 kg/m^2, 80.50 cm and 0.51 for women.

Conclusion: For the adults in Minhang district of Shanghai, we suggested to use a combination of measures, including a measure of general adiposity (BMI) and a measure of central adiposity (WC and WHtR), which will be more suitable for identifying risk factors of adult metabolic syndrome in Minhang district of Shanghai.



The predictive value of various obesity indices on adult metabolic syndrome in Minhang district of Shanghai is as follows: WHtR predicted the maximum value, followed by WC and BMI, while WHR was the lowest predictive value.

Fig. 1. ROC curves of obesity indices to predict high metabolic risk population Male (left) and Female (right).

PO2.184

Relationship between glucose-induced and protein-induced thermogenesis in healthy young adults

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Introduction: Humans show large differences in their thermogenic responses to the ingestion of glucose or protein, which has implications for weight regulation, predisposition to obesity, and obesity management in the context of high carbohydrate or high protein diets. The aims of this study were to investigate, in young humans of normal body weight, the extent to which variability in glucose-induced thermogenesis (GIT) is correlated with variability in protein-induced thermogenesis (PIT), and whether variability in GIT and PIT share common anthropometric and body composition determinants.

Methods: 20 healthy young adults of normal body weight were recruited (13 women, 7 men; mean age 23.1 ± 2.9 years and BMI 22.4 ± 2.2 kg/m^2). Resting energy expenditure (EE) and respiratory quotient (RQ) were assessed by ventilated hood indirect calorimetry for 30 min before and 120 min after either a glucose drink (75 g glucose in 300 ml water) or for 180 min after a moderately-high protein mixed meal (24% of energy as protein). Anthropometric measurements were taken (weight, height, waist circumference) and body composition was determined by multi-frequency bioelectrical impedance analysis (InBody) for fat mass, fat-free mass, skeletal muscle mass, as well by abdominal bioelectrical impedance for abdominal (trunk) fat% using a ViScan (Tanita).

Results: PIT was significantly higher compared to GIT (26.6% ± 2.14 vs. 15.9% ± 2.02, increase over pre-meal baseline respectively; $p < 0.001$). A positive linear relationship was observed between PIT and GIT ($r = 0.67$, $p < 0.01$), as well as between the changes in RQ in response to glucose and the protein meal ($r = 0.54$, $p < 0.01$). Neither anthropometric nor body composition measures correlated with GIT and PIT, nor with their respective changes in RQ.

Conclusion: Despite well-known differences in the mechanisms underlying GIT and PIT, our data indicate a positive association between GIT and PIT, unrelated to anthropometry or body composition. These results underscore the need to understand the metabolic basis relating both GIT and PIT, which may have implications for metabolic predisposition to obesity, as well as for obesity management.

Conflict of Interest: None.

Funding: Swiss National Science Foundation (grant number 320030_176116).

PO2.185

The type of fat distribution and urological pathology in men

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It was shown earlier that in men with android type of fat distribution (ATFD), obesity is characterized as metabolically unhealthy phenotype, and in men with gynoid type (GTFD), obesity corresponds to metabolically healthy phenotype, according to its hormonal and metabolic characteristics. The purpose was to investigate the severity of signs of urological pathology in men of mature age who visited urologist with symptoms of chronic prostatitis and lower urinary tract, depending on the type of fat distribution.

217 men aged from 22 to 60 years were observed. The conclusion of diagnosis was established on the basis of the patient's complaints, anamnesis, examination per rectum, transrectal ultrasound examination of the prostate, and the results of the prostate gland secret assay. Patients were surveyed using IPSS and QOL scales. The type of fat tissue distribution was determined by the ratio of waist circumference to hip circumference (WC/HC). Android (WC/HC>0.95) and gynoid (WC/HC<0.95) types of fat distribution were identified. All men were divided into 3 groups: group 1 - with normal body weight, group 2 - with overweight, obesity and GTFD, group 3 - with overweight, obesity and ATFD.

The frequency of existence less than 5 leukocytes in the field of view of the prostate gland secret in groups 1, 2 and 3 was 65.6; 57.8 and 28.3%, and more than 10 leukocytes-22.9; 21.8 and 40.4%, respectively. The same trend was noted regarding to scores of IPSS and QOL scales. The growth of scores indicates the increasing of the severity of clinical manifestations of lower urinary tract symptoms and chronic prostatitis, both with deterioration in life quality. The frequency of diffusion prostate gland increasing in groups 1, 2 and 3 was 24.6; 34.4 and 54.3% respectively.

The results show that clinical, ultrasound, and laboratory signs of chronic prostatitis were more pronounced in men with ATFD, while in men with GTFD, the severity of these signs differs a little from that in the group of men with normal body weight. Consequently, ATFD in men with overweight and obesity appears as effective prognostic sign of the development and severity of not only the metabolic syndrome, but also urological pathology in men.

PO2.186

Non-alcoholic steatohepatitis is significantly associated with left ventricular diastolic dysfunction in patients with type 2 diabetes

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Relationship between hepatic steatosis or fibrosis and cardiac dysfunction in relation to insulin resistance has been poorly understood. We aimed to investigate whether hepatic steatosis or fibrosis is associated with left ventricular (LV) diastolic dysfunction in patients with type 2 diabetes

(T2DM). We studied 454 patients with T2DM, aged 55 years or older (men 22.0%, mean age 64.9 years old), who had undergone liver ultrasonography, pulsed-wave doppler echocardiography, short insulin tolerance test (SITT), and bioimpedance analysis. Simple hepatic steatosis and steatohepatitis were sonographically defined in the presence or absence of fibrosis according to NAFLD fibrosis scores. Diastolic dysfunction was defined by using peak early (E) to late (A) ventricular filling ratio (E/A) and E-wave deceleration time (DT). Of 454 patients, 284 (62.6%) had hepatic steatosis, and 273 (60.1%) had diastolic dysfunction. The prevalence of diastolic dysfunction progressively increased according to the presence of hepatic steatosis or fibrosis (52.9%, 62.0%, and 65.3%; normal, simple steatosis, and steatohepatitis, respectively; P for trend<0.05). Multivariate logistic regression analysis showed significant association between diastolic dysfunction and hepatic steatosis (odds ratio [OR] = 1.98, 95% confidence interval [CI] = 1.02-3.90, P<0.05), after adjusting for glycometabolic parameters, abdominal fat percentages, and SITT. Furthermore, subjects with steatohepatitis had a significantly higher odds for diastolic dysfunction (OR = 2.06, 95% CI = 1.04-4.11, P<0.05) compared to subjects with normal or simple steatosis. However, this association was attenuated when SITT was added to the model. In conclusion, hepatic steatosis and steatohepatitis are independently associated with LV diastolic dysfunction in older adults with T2DM, and insulin resistance is a significant confounding factor.

PO2.187

Nutrition habits and factors that can effect the nutrition in type 2 diabetic women

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Introduction: Diabetes mellitus (DM) is one of the most prevalent diseases among adult population in Turkey. Metabolic disorders associated with DM cause many organ-related pathophysiological changes and consequently a serious health burden on society. The aim of this study is to compare metabolic control parameters in women with type 2 diabetes and to evaluate other factors that may affect the nutritional status.
Methods: Between October 2015 and February 2016, 77 female patients who were admitted to Erciyes University Gevher Nesibe Hospital Endocrinology and Metabolism Clinic were enrolled. In adult female patients with type 2 DM, nutritional status/habits and dietary patterns, certain biochemical, metabolic control parameters (such as; fasting blood levels, postprandial blood levels of HbA1c, total cholesterol, LDL-C levels etc.) and some anthropometric measurements (body weight, body mass index, waist circumference, hip circumference, etc.) were examined. Patients completed the 24-hour food consumption record and food consumption frequency questionnaire.
Results: In this study, 25.0% of patients have HbA1c levels below 6.5%, compared to 75.0% of patients have HbA1c levels over 6.5%. 60.0% of 77 patients have received medical nutrition therapy; 33.8% of these patients stated that not following on a regular the diet therapy, 48.1% is sometimes implemented, 16.9% stated that they implemented. When the participants were grouped according to their time to diagnosis, there is a statistically significant negative correlation between the percentage of protein in the diet of individuals' and the groups of diagnosis time. While the percentage of diagnosis time increases, amount of protein in their diet were reduces ($p = 0.008$). When snack preferences were queried, it was found that patients who chose milk and dairy products had significantly lower body mass index than those who did not prefer ($p = 0.020$). Individuals who choose milk and dairy products in their snack, were higher than the waist-hip ratio compare to didn't choose ($p = 0.023$). There have been found negative and significant correlation between the percentage of fat in their diet and HbA1c levels of participants (rho = -0.242, $p = 0.041$). A positive correlation was found between the carbohydrate percentage of the diet and the fasting blood glucose of individuals (rho = 0.366, $p = 0.001$).
Conclusion: Diabetes is one of the most important public health problems of today due to the complications and the diseases. The importance of medical nutrition therapy and nutrition education in the control of HbA1c, which is an important indicator in the follow-up of type 2 diabetes, has become more prominent.

PO2.188

Short-term evolution of subjects with morbid obesity after bariatric surgery based on loss of weight

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Introduction: Bariatric surgery is the most effective treatment to achieve and maintain weight change and reduce comorbidities related to obesity. Results obtained are due to weight loss (WL), as well as to metabolic and hormonal changes. The objective of this study is to determine the changes experienced in morbidly obese subjects after bariatric surgery in certain clinical and biochemical variables one year after the intervention and if there is any predictor of weight loss (WL) response.
Methods: A total of 329 morbidly obese patients undergoing three types of surgical techniques (biliopancreatic diversión (BPD), gastric bypass (GB) and sleeve gastrectomy (SG)) were assessed prospectively, according to the percentage of WL. We measured anthropometric and hormonal variables and cardiovascular risk factors, at baseline and one year after the surgery.
Results: Surgery achieves significant improvements in almost all the variables studied, which are higher in those patients who get greater WL (%WL> = 50). The percentage change of colesterol, LDL-c and adiponectin levels is greater in patients undergoing BPD than those who underwent the other two techniques, just as HDL-c achieve higher improvements with BPD in the group of of best response to weight loss (%WL> = 50). The baseline variables found associated with the favorable response of WL were the age and the atherogenic index, corrected by sex and type of intervention.
Conclusion: The three bariatric surgery techniques achieve a significant weight loss and significantly improve the quality of life of patients with morbid obesity in the short term, as well as an improvement in cardiometabolic risk factors especially in those that respond better to the weight loss.

Conflict of Interest: None Disclosed.

Funding: This work was supported in part by a grant from the Instituto de Salud Carlos III (PI17/01407 and PI-0194-2017) and has been co-funded by FEDER funds.

PO2.189

Blood pressure and lipid profiles in obese patients after weight loss

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Introduction: Obesity, as a marker of metabolic syndrome, is frequently associated with hypertension and dyslipidemia, which improve with weight loss. Our goal was to verify the relationship between weight loss and blood pressure and lipid profiles improvement in patients followed in our project named "TObe", in which obese patients lose weight through an intensive medical intervention, involving Endocrinology and Nutrition.
Methods: Retrospective study with 96 patients with twelve months of follow up in the "TObe" project. Twenty nine had hypertension and dyslipidemia, 18 had hypertension and 14 dyslipidemia, under treatment. The following data was collected from the appointments: Body Mass Index (BMI), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Total Cholesterol (Total-C), LDL Cholesterol (LDL-C), HDL Cholesterol (HDL-C), Triglycerides (TG), Apolipoprotein B (ApoB) and Apolipoprotein A1 (ApoA1) at 0 and 12 months. Statistical analysis was performed with SPSSvs25, using T-test for paired samples, Wilcoxon test and Spearman's correlation method, with a significance level of 0.05.
Results: Eighty one (84.4%) were female and the mean age was 45.54±11.8 years. After twelve months, it was verified a BMI reduction of 2.10 kg/m^2 (P25: -5.18; P75: -0.75), p<0.01, and a SBP reduction of 3.89±14.3 mmHg, p<0.01. DBP variation was -1.09±9.7 mmHg, p = 0.27. The variation in Total-C was 7.00 mg/dL (P25: -10.00; P75: 25.50), p = 0.04, LDL-C of 3.50 mg/dL (P25: -10.00; P75: 16.00), p = 0.13, and TG of 0.50 mg/dL (P25: -35.00; P75: 20.50), p = 0.54. HDL-C increased 6.95±11.4 mg/dL, p<0.01. The difference in ApoB was -1.93±22.2 mg/dL, p = 0.51, and ApoA1 was 2.68±19.6 mg/dL, p = 0.306.
SBP, DBP, HDL-C, ApoB and ApoA1 variations correlated with BMI reduction at twelve months (r = 0.353, p<0.01; r = 0.349, p<0.01; r = -0.228, p = 0.025; r = -0.251, p = 0.014; r = -0.309, p = 0.002, respectively).
Total-C, LDL-C and TG differences didn't correlate with BMI variation at one year (r = -0.019, p = 0.854; r = 0.008, p = 0.942; r = 0.062, p = 0.548, respectively).
Conclusion: We verified a reduction of the BMI and SBP, and an increase in Total-C and HDL-C. The blood pressure profile improvement (SBP, DBP), the increase of the HDL-C and ApoA1 and the decrease of ApoB correlated with BMI reduction at one year.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.190

Relationship between weight loss and insulin resistance

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Introduction: It is known the interdependent relationship between obesity and insulin resistance. Studies point to a correlation between weight loss and insulin resistance reduction. Our goal was to verify this correlation in patients followed in our project named "TObe", in which obese patients lose weight through an intensive medical intervention, involving Endocrinology and Nutrition.
Methods: Retrospective study of 54 non-diabetic obese patients, with twelve months of follow-up in the "TObe" project. Data was collected from the appointments and weight was evaluated through Body Mass Index (BMI) and insulin resistance through HOMA-IR index. Statistical analysis was performed with SPSSvs22, using T-test for paired samples and Pearson's correlation method, with a significance level of 0.05.
Results: Forty five (83.3%) patients were female and mean age was 43.13±14.6 years. Mean BMI in the first appointment was 40.03±5.0 kg/m^2 and the median of HOMA-IR was 3.14 (P25: 2.19; P75: 4.90). At twelve months, a reduction of the BMI of 2.58±3.7 kg/m^2 (p<0.01) was verified. There was also a reduction of HOMA-IR of 0.43 (P25: -1.63; P75: 0.70) with n = 31 and p = 0.122. There was a correlation between BMI and HOMA-IR at the beginning of the project (r = 0.350; p = 0.010), along the time of follow-up (r = -0,507; p = 0,010) and after one year (r = 0.525; p = 0.002).
Conclusion: The implementation of the project "TObe" had positive results once it resulted in significant weight loss and reduction of insulin resistance over 12 months. We confirmed the relationship between BMI and HOMA-IR and the correlation between weight loss and insulin resistance reduction, which was stronger as the BMI got lower.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.191

Profiling cardiometabolic responses in response to a mixed meal in healthy volunteers

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Introduction: Recent studies in animal models suggested that obesity and hyperinsulinemia cause increased carotid body (CB) activity, leading to increased sympathetic activation and, in the long term, to type 2 diabetes. The CBs are multimodal sensors located in the bifurcation of the common carotid arteries that detect changes in arterial gases, responding by increasing heart rate (HR), respiratory rate (RR) and blood glucose. To test the hypothesis that increased body fat is related to increased CB activity we assessed CB mediated responses to a mixed meal in healthy individuals using the CBmeter, a real time biosignal acquisition and processing system. The objective was to determine if CB mediated responses to a mixed meal are correlated to body weight and fat mass.
Methods: To assess CB activity the volunteers (n = 7) were fed a 400 kcal mixed meal after a 12h fasting period. The mixed meal had 65% of carbohydrates, 23% of protein and 12% of lipids and was gradually ingested by the volunteers during a period of 10 minutes. HR, oxygen saturation (SpO2) and RR were monitored using the CBmeter. Interstitial glucose was monitored continuously. CBView (1), a MatLab based software, was developed to perform integrated recordings of physiological responses assessed. Body weight, Body Mass Index and body fat percentage was assessed using a segmental body composition monitor (Tanita BC-601). Data were analysed using linear regression analysis in GraphPad Prism 6.0.
Results: The total area under the interstitial glucose excursion curve (AUC) was 4748. AUC for HR was 1982, for RR was 1127 and AUC SpO2

was 1113. We observed no significant correlation among the variation in interstitial glucose caused by mixed meal and % body fat. Also, HR, RR and SpO2 did not correlate either with % body fat or body weight in the population tested.
Conclusion: The variation in HR, RR and interstitial glucose caused by a 400kcal mixed meal does not correlate with body fat or with total body weight in healthy individuals. It is still to be determined if there is a correlation of cardiometabolic variation in response to nutrient ingestion in metabolic disease patients.

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Conflict of Interest: None Disclose.

Funding: Project funded by FCT/SAICT-POL/23278/2016.

PO2.192

Weight loss as determined by adherence to reduced caloric diet, increased physical activity, liraglutide 3.0 mg and placebo: a sub-analysis of the SCALE IBT Trial

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Objectives: Liraglutide 3.0 mg is approved for chronic weight management as an adjunct to reduced-caloric diet and increased physical activity. The SCALE IBT trial (NCT02963935) compared weight loss with liraglutide 3.0 mg to placebo, both in combination with intensive behaviour therapy (IBT) (i.e. reduced-calorie intake, increased physical activity [max target: 250 min/week], and 23 counselling sessions). This pre-specified exploratory sub-analysis determined the individual contributions of adherence to study medication, and to adjunct diet and physical activity interventions on weight change.
Methods: In total, 282 individuals with obesity (BMI ≥30 kg/m²) were randomised to 56 weeks' treatment. Adherence to study medication was recorded weekly by individuals' self-reports of taking ≥1 dose in the preceding week. Adherence to dietary recommendations was assessed via self-reported food diaries (with ≥1 entry/day on ≥5 days in the preceding week considered adherent). Adherence to physical activity recommendations was assessed using electronic activity trackers by comparing measured active minutes to the program goal (with achieving ≥50% of target in the preceding week considered adherent). The effect of adherence on body weight was evaluated through an ANOVA model that included dietary information, physical activity and medication adherence and their interaction with randomised treatment. The model was reduced by removing non-significant terms, leaving only the main effect of adherence to diet and physical activity, and the effects of adherence to study medication.
Results: The proportion of randomised individuals who were adherent decreased steadily through the study for all three intervention components. As estimated in the final model, adherence throughout the trial to dietary recommendations provided a change in initial body weight of −7.2% (95% CI: −10.4%; −4.0%; p<0.0001); adherence to physical activity recommendations provided −2.0% (95% CI: −3.2%; −0.8%; p = 0.0009); and adherence to liraglutide 3.0 mg provided an additional change in weight of −6.5% (95% CI: −10.2%; −2.9%; p = 0.0005). Adherence to placebo did not have a statistically significant effect on weight loss (-1.9%, 95% CI: -5.6%; 1.9%; p = 0.33).
Conclusion: This sub-analysis indicated that adherence to dietary recommendations and liraglutide injections provided clinically relevant weight loss, whereas the effect of physical activity was more modest in size.

PO2.193

Acute effect of low-level laser therapy (LLLT) associate with moderate aerobic exercise on hypoxia gene expression in obese women

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Introduction: Excess of fat promotes adipose tissue hypoxia culminating in development of chronic low-grade inflammation. Investigations suggest the benefits of low-level laser therapy (LLLT) to improve noninvasive body contouring treatments, inflammation, insulin resistance and to reduce body fat. The association of LLLT with exercises has been used as a therapy but its action, and possible implications, specifically, on hypoxia gene expression on obesity, is still unclear. The aim was investigating the acute effects of LLLT plus exercise on hypoxia gene expression in obese woman.
Methodology: Women (BMI≥30kg/m²) aged 20-40 years, divided into Laser and Sham groups. A single session of aerobic exercise (treadmill/1 hour) followed by individual LLLT. The device prototype used was composed of four plates (16 infrared laser emitters/per plate) totalizing 64 emitters and two electronic control boxes. Equipment was type Ga-Al-As semiconductor diode laser, wavelength of 808nm, continuous wave mode, spot area of 0.0169cm², The parameters of treatment were: output power of 100mW, irradiance 6.0W/cm² and energy delivered per session/point was 96J (total 6144J/128 points). The emitters were arranged perpendicularly to the skin and were allocated in the anterior region: abdominal and quadriceps simultaneously during 8min. After this, change the position to irradiate the posterior region: gluteus and biceps femoral during 8min. For the Sham group the device was turned off simulating the phototherapy intervention (placebo effect).
Results: mRNA gene expression (mRNA gene expression/β-actin–AU) are expressed as means and standard deviation of the mean. After one session of aerobic exercise plus phototherapy occurred an acute molecular response of the hypoxia genes in relation to baseline values (baseline vs laser). The intervention promoted up-regulation in VEGF gene expression (0.71±0.1 vs 0.99±0.07, p = 0,000000) and down-regulation in MIF (1.66±0.5 x 1.0±0.08, p = 0.000003), MCP-1 (323±73vs3.46±0.44, p = 0,000000), NF-kB (3.95±0.5vs0.34±0.05, p = 0.01) gene expression.
Conclusion: LLLT plus aerobic exercise up regulated mRNA hypoxia gene expression and NF-kB in acute responses. The increased expression of these genes may be an attempt to increase neovascularization, particularly of the obese adipose tissue, thereby preventing development of inflammation and related diseases.
Statements: Ethics committee (#237.050); Clinical Trial: 231.286. Funding CNPq (150177/2014-3); FAPESP (2013/19046-0).

Conflict of Interest: None Disclose.

PO2.194

Effect of weight loss on physical function measured by the 6-minute walking distance test in individuals with obesity: results from the SCALE IBT trial of liraglutide 3.0 mg

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Objectives: Clinical trials for weight management typically assess physical function changes with self-report HRQoL questionnaires. This trial aimed to objectively measure the effect of weight loss on walking capacity, using the 6-minute walking distance (6MWD) test, a sub-maximal exercise test assessing cardiopulmonary and musculoskeletal systems.
Methods: SCALE IBT (NCT02963935) was a 56-week, randomised, double-blind, US-based multicentre trial of liraglutide 3.0 mg versus placebo, with intensive behaviour therapy (IBT) (i.e. reduced calorie intake, increased physical activity [max target: 250 min/week], 23 counselling visits) in both arms. A key secondary endpoint was change in 6MWD, which tests walking capacity by measuring total distance walked along a 20-m marked walkway over 6 minutes. We believe this is the first trial with pharmacological weight management to explore treatment-response changes in 6MWD. This post-hoc analysis examined the association between baseline BMI and 6MWD, and change in weight and 6MWD. Individuals aged ≥18 years, BMI ≥30 kg/m² and without diabetes, were randomised 1:1 to IBT plus liraglutide 3.0 mg or placebo. Change in bodyweight and 6MWD from baseline to week 56 was calculated using analysis of covariance (ANCOVA), with treatment, gender and BMI as factors, and baseline endpoint [bodyweight or 6MWD] as covariate. Linear regression was used for correlation analysis of association between 6MWD and BMI.
Results: The *post-hoc* correlation analysis showed a linear relationship between 6MWD and BMI (Figure). Linear regression of baseline 6MWD versus baseline BMI showed that on average someone with 1 kg/m² lower BMI than another individual could walk 4.9 m further in 6 minutes. This relationship was also demonstrated in a linear regression analysis of change in 6MWD at 56 weeks versus change in BMI at 56 weeks, where on average an individual improved 6MWD by 5.0 m for each 1 kg/m² BMI decrease. The intercept (i.e. change in 6MWD without BMI change) was 36.3 m, probably resulting from the increased physical activity aspect of the IBT intervention.
Conclusion: This *post-hoc* analysis showed greater weight loss was associated with greater improvements in 6MWD in a linear manner, indicating gains in walking capacity.

Funding: Research relating to this abstract was funded by Novo Nordisk.

	Liraglutide 3.0 mg	Placebo	Estimated treatment difference (ETD) or slope [95% CI]	P-value
FAS (n)	142	140		
Mean weight loss at 56 weeks, %	7.5	4.0	ETD 3.5% [1.6, 5.3]	0.0003
Improvement in 6MWD test (vs mean baseline of 439 m), m	49.5	46.4	ETD 3.1 [-12.7, 18.9]	0.70
Linear regression analysis				
Improvement per 1 kg/m² lower BMI, m	4.9		slope [95% CI] -4.9 m/(kg/m²) [-6.2, -3.6]	<0.0001
Improvement in 6MWD at 56 weeks for each BMI decrease of 1 kg/m², m	5.0		slope [95% CI] -5.0 m/(kg/m²) [-7.6, -2.5]	<0.0001

Fig. 1. *Summary of results exploring treatment-response changes in 6MWD.*

PO2.195

What can a clinic for people with super obesity achieve?

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Background: The weight of patients with obesity is increasing and this has been reflected in the patients attending an Australian tertiary hospital obesity clinic located in Sydney.
The treatment at our clinic has traditionally started with lifestyle intervention and moved to more intensive therapies if therapy has been ineffective. It was noted that patients with higher BMIs who were often more unwell and also out-of-area (ie residing more than two hours drive from the clinic), dropped out of the clinic early, before intensive interventions could be started, thus missing the opportunity to achieve significant weight loss. In 2016 a specialty triage was developed for these patients. The new process involved intially treating patients who were out-of-area or with a BMI of >55 kg/m² on a very low energy diet (VLED), with fortnightly group support or monthly phone/individual support for those who were out-of-area. It was recommended that all patients attend reviews at least 3 monthly, for a period of 24 months. Patients followed a full VLED programme for a minimum of two weeks, aiming for 3 months, and then transitioned to a group-based lifestyle programme that involved 6 sessions over an 8 weeks. They then attended individual therapy/medical reviews and if appropriate were referred for bariatric surgery. The clinic runs for 4 hours once weekly.
Methods: Patients attending the new clinic type were seen by the endocrinologist and started on a VLED, using meal replacement products, or a reduced calorie diet (if a VLED was not appropriate) by a dietitian. All patients completed questionnaires that included information on food habits, exercise, bingeing, quality of life and food addiction.
Results: As of Dec 2018 173 new patients have been seen, 27 of whom were out-of-area. 66% were female (n = 114). Mean age 43.1+2.0 years. The mean weight was 165.8 kg (range 96.8-286.4kg), BMI 58.0 kg/m² (range 34.0-91.9). Mean BP 129/82 + 18/16. The top 5 comorbidities at presentation included depression (43%), obstructive sleep apnoea (40%), hypertension (37%), asthma (35%), arthritis (34%) and 30% of patients had diagnosed diabetes. 16% of patients did not return for a second appointment. The mean duration of attendance of all patients in the clinic is 8.0+8.8 months (range 0.1-36.0), The mean weight lost was 11.4kg+16.3 (6.6+9.5%), 26 (15%) of the 173 patients have had bariatric surgery (9 of which were out-of-area patients).
Conclusion: Preliminary data suggests that triaging patients to an intensive intervention at the commencement of a programme appears to lead to good engagement with the service and clinically significant weight loss. Weight loss and effect of the treatment on comorbid conditions is currently being explored.

Conflict of Interest: None.

Funding: None.

PO2.196

Weight loss with liraglutide 3.0 mg versus placebo for individuals who adhere to the trial drug: a secondary analysis from SCALE IBT

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Objectives: The SCALE IBT trial (NCT02963935) compared weight loss with liraglutide 3.0 mg, to placebo, both in combination with 56 weeks of intensive behaviour therapy (IBT) (i.e. reduced calorie intake, increased physical activity [max target: 250 min/week], and 23 counselling sessions).

Primary study outcomes were assessed in the intention-to-treat sample, regardless of individuals' medication adherence. This pre-specified secondary analysis determined the expected effect of liraglutide 3.0 mg versus placebo on weight loss, if all randomised individuals adhered to study drug for 56 weeks.

Methods: Individuals with obesity (BMI ≥30 kg/m²; N = 282) were randomised 1:1 to 56 weeks of IBT with daily injections of liraglutide 3.0 mg or placebo. Assuming that all individuals were adherent to medication, weight loss was estimated using two different approaches. Firstly, a mixed model repeated measures (MMRM) approach estimated weight change using information from individuals still on drug after the point of a given individual's discontinuation to provide a (counter-factual) weight change as if the individual in question had not discontinued the drug. Secondly, a regression model approach calculated weight change by including adherence as a moderator of the effect of treatment condition on weight change.

Results: Estimated weight loss in the primary analysis, regardless of drug adherence, was 7.5% for liraglutide 3.0 mg and 4.0% for placebo, reflecting a treatment difference favouring liraglutide 3.0 mg of 3.5% (95% CI: 1.6%; 5.3%; p = 0.0003). MMRM and covariate approaches yielded weight loss differences of 4.6% (95% CI: 2.6%; 6.5%; p<0.0001) and 4.6% (95% CI: 2.8%; 6.5%; p<0.0001), respectively, with both estimates favouring liraglutide 3.0 mg.

Conclusion: There was good agreement between the two approaches for estimating the effect of liraglutide 3.0 mg versus placebo in individuals who adhere to trial product for 56 weeks. The estimated placebo-subtracted weight loss for liraglutide at week 56 of approximately 4.6% in medication-adherent individuals indicates the underlying assumptions were robust. We believe this finding is an important supplement to the study's primary outcome and can inform practitioners' expectations when prescribing liraglutide 3.0 mg in combination with IBT for 56 weeks.

Funding: Research relating to this abstract was funded by Novo Nordisk.

PO2.197

Outcomes in early responders achieving ≥5% weight loss at 16 weeks with liraglutide 3.0 mg as an adjunct to intensive behaviour therapy (IBT) in individuals with obesity in the SCALE IBT trial

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Introduction: The European Medicines Agency (EMA) prescribing information for liraglutide 3.0 mg defines a stopping rule for individuals achieving <5% body weight reduction after 16 weeks' treatment. The SCALE IBT study demonstrated the overall efficacy of liraglutide 3.0 mg for weight reduction as an adjunct to IBT. The present analysis explored the effect of intervention in the subgroup of liraglutide-treated individuals categorised as early responders (ER) who lost ≥5% at week 16. This subgroup corresponded to individuals who would have been eligible to continue treatment after 16 weeks in a real-world clinical setting.

Methods: The 56-week SCALE IBT trial randomised adults with obesity (BMI ≥30 kg/m²) and without diabetes to liraglutide 3.0 mg or placebo as an adjunct to a Centers for Medicare & Medicaid Services-based programme of IBT (CMS-IBT), including prescribed exercise (escalating to 250 min/week) and diet (1200–1800 kcal/day). This exploratory post-hoc analysis assessed the proportion of liraglutide-treated individuals categorised as ER and describes their outcomes after 56 weeks of treatment.

Results: Mean characteristics at randomisation (n = 142) for liraglutide 3.0 mg-treated individuals were: 45.4 years old, 83.8% females, 109 kg, BMI 39.3 kg/m². At 16 weeks, 66.9% of these had achieved ≥5% weight loss. At 56 weeks, mean weight reduction in this ER subgroup was 10.4%, with 79.9% and 44.2% of this subset achieving weight loss ≥5% and ≥10%, respectively, and 88.4% of this subset still on drug. Other secondary outcomes are shown in the Table. Adverse events were similar in the ER subset to the overall trial population, the most frequent adverse events were gastrointestinal events reported for 74.7% in the ER subset as compared with 71.1% in the overall liraglutide group and 48.6% in the overall placebo group.

Conclusion: More than two-thirds of people with obesity receiving liraglutide 3.0 mg as an adjunct to IBT were eligible for long-term treatment according to the EMA prescribing information. Of these, the majority continued on therapy to 56 weeks achieving clinically relevant reductions in body weight.

Funding: Research relating to this abstract was funded by Novo Nordisk.

Endpoint at 56 weeks	Change from randomisation to week 56 in early responders to liraglutide 3.0 mg	
	Total ER cohort (n = 95)	ER cohort on drug at week 56 (n = 84)
Change in weight (%)	–10.4%	-11.4%
Proportion with ≥5% weight loss (%)	79.9%	87.9%
Proportion with ≥10% weight loss (%)	44.2%	49.0%
Change in waist circumference (cm)	–12.3	–13.0
Change in HbA1c (%point)	–0.21	–0.25
Change in heart rate (beats/min)	2.08	2.19
Change in systolic blood pressure (mmHg)	–3.32	–4.60
Change in diastolic blood pressure (mmHg)	–1.37	–1.12
Change in total cholesterol (mmol/L)	–0.02	–0.02
Change in LDL cholesterol (mmol/L)	0.01	0.02
Change in HDL cholesterol (mmol/L)	0.08	0.08
Change in VLDL cholesterol (mmol/L)	–0.10	–0.12
Change in triglycerides (mmol/L)	–0.28	–0.32
Change in free fatty acids (mmol/L)	–0.07	–0.09
Change in SF-36 Physical function score	3.93	4.20
Change in IWQoL-Lite CT Physical function score	13.9	15.6

PO2.198

Pretreatment profiles of 6- and 12-months weight management among women with overweight and obesity involved in a women-only gyms' weight management program

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Introduction: It is not clear why behavioural weight management programs work more effectively for some individuals than for others. An approach for understanding these different responses is studying

individuals' pretreatment characteristics. This study aims to identify baseline profiles of successful weight management.

Methods: A total of 453 women with overweight and obesity entered a weight management program in women-only gyms; 56.3% and 47.1% completed at least 6- and 12-months of the program (respectively). The program consisted in engaging into the gyms' group fitness classes, having nutritional counseling and weekly online follow-ups. At baseline participants completed a questionnaire on health status, weight history, dietary habits, body satisfaction, self-efficacy, perceived barriers and eating behaviours. Based on the participants' baseline features, 6- and 12-months weight loss success profiles were created. Independent-sample t-tests (95% CI) were used to compare the lower weight management success (LWMS) group (1st tertile of % initial weight change) and the higher weight management success (HWMS) group (3rd tertile).

Results: Participants aged 42.6±13.2 years and had an initial body mass index (BMI) of 29.9±4.4 kg/m^2. The HWMS group lost -7.9±2.8% at 6-months and -8.8±4.1% at 12-months and the LWMS lost 1.5±2.3% at 6-months and 2.6±2.8% at 12-months. At 6-months, participants on the HWMS group had higher baseline weight and BMI, and reported a higher weight increase in the 3-months prior entering the program, lower body shape satisfaction and less exercise perceived barriers at baseline, when compared to participants on the LWMS group ($p<0.05$). At 12-months, participants on the HWMS group initially reported a less physically active work, lower water intake, fewer meals per day, eating more often in restaurants, higher external eating and lower eating self-efficacy when compared to the participants on the LWMS group ($p<0.05$).

Conclusion: A pretreatment profile of i) higher initial weight and BMI, higher pretreatment weight gain, lower body shape satisfaction and less barriers to be active and ii) less activity at work, lower water intake, less meals per day, eating more often in restaurants, higher external eating and lower eating self-efficacy seems to characterize higher success at 6- and 12-months, respectively. Considering that this weight management program addressed most of these features and therefore participants may had improved those features during treatment and achieved success, this study supports the idea that behavioural and psychological pretreatment profiles may be key to match individuals to different weight management strategies/treatments that would benefit them more.

Conflict of Interest: None.

Funding: None.

PO2.199

Five-day educational structured outpatient program for obese patients

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Introduction: There are many benefits of weight loss: even small reductions has a profound impact on the health of obese people and their risk of future disease.

Methods: Data from 58 obese patients (13 men, 45 women), mean age 45 years (20-68) were analysed. They attended structured weight loss program at the Obesity Treatment Centre at University Hospital Centre Zagreb accredited as Croatian Obesity Treatment Referral Centre and EASO Collaborating Centre for Obesity Management. 5-day program includes daily consultations with a multidisciplinary healthcare team. The team leads experienced endocrinologist-diabetologist and nurse-educator, includes nutritionist, physiotherapist, psychiatrist, psychologists who provide psychological support and facilitate behaviour modifications with other subspecialists. At the baseline and after 3 months anthropometric values (height, weight, BMI) as well as body composition measured by bioelectrical impedance analysis (fat mass, muscle mass) were estimated. Patients filled out screening instruments examining personality traits, coping styles, subjective well-being, depression and anxiety symptoms.

Results: Baseline mean body mass was 125 kg (78-238), BMI was 44.2 kg/ m^2 (30-66), fat mass 59.4 kg (25.1-120.4), muscle mass 61.4 kg (43.8-117); after 3 months mean body mass was 119 kg (72.8-197.3), BMI 42.1 kg/ m^2 (27.9-64.4), fat mass 53.6 kg (23.6-103.7), muscle mass 62.3 kg (43.7-107.7). Statistical analyses showed significant decrease in body weight, BMI and body fat mass after 3 months ($p = 0.000$), but no significant difference in muscle mass ($p = 0.969$). Patients were divided into two groups; those who did not lose any weight (≤1 kg) were considered non-responders, others were considered responders. Thirteen patients (22%) were non-responders and 45 patients (78%) were responders. Mean weight loss of responders was 6.2% (1-38).

Conclusion: According to FDA Guidance for developing products for weight management the product is effective if there is a statistically significant decrease in body weight of ≥5% beyond the placebo effect or at least 35% of patients lose ≥5% of their body weight at 3 months. Overall response to our program is effective during the 3 months follow-up period. It is fulfilling criteria for weight management products without pharmacotherapy. The weight loss corresponds to fat mass with preserved muscle mass. There are also positive changes in self-esteem, body image and quality of life. Joining a group of unknown individuals can be intimating, but group therapy provides benefits that individual therapy may not; group acts as a support network where other members help to come up with specific ideas for improving a difficult situation or life challenge.

PO2.200

The one year effect of a multidisciplinary inpatient program in subjects with severe obesity

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Introduction: The aim of the study was to analyses the long-term effectiveness of an intense inpatient rehabilitation program (RN), specifically developed for patients affected by severe obesity.

Methods: Patients with severe obesity and obesity-associated morbidities were hospitalized for 3 weeks, during which time they underwent RN interventions, based on group therapy and followed by a multidisciplinary team (physician, nutritionist, psychologist, physiokinetotherapist), including behavior interventions as education on diet and exercise and lifestyle counseling. At the end of the program, patients underwent periodical follow-ups at 3, 6 and 12 months. All patients were analyzed at admission, discharge and at different follow-up time-points for changes in the following domains: anthropometry (weight, body mass index BMI, waist and neck circumferences), cardiovascular risk factors (glucidic and lipidic profile, blood pressure) and physical performance (6min walking test (6MWT), chair stands test (CST), arm curl (ACT).

Results: From 30.08.2015 to 6.10.2017, 437subjects with severe obesity underwent a 3wks RN program, but only 100 patients (27%) finished the 1-year follow-up program. Of those, 85% presented a significant weight loss, while 14% regain weight 12 months after the RN. When analyzing the anthropometric changes, we observed a 10% weight reduction, with a lower BMI of 11%, while the waist circumference diminished by 7% and the neck circumferences by 4%, when compared with the one registered at the end of RN. Regarding the physical performances, our analysis showed longer distances in 6MWT and a higher number of standings at CST. Additionally, 1-year after the RN, patient presented significant

-improvements of the glucidic and lipid profiles, with lower hemoglobin A1c and triglyceride levels and higher HDL-cholesterol values.
Conclusion: Our results show that one-year after the multidisciplinary RN intervention, patients that undergo regular follow-ups presents a significant reduction of anthropometric measurements, with an important physical performance improvement, correlated with the reduction of the cardio metabolic risks factors

PO2.201

Going beyond biomedical approaches in obesity. An anthropological perspective of patient compliance

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Introduction: Obesity was declared "The XXI century pandemic" by the WHO, and its incidence continues increasing, this reflects that it is still necessary to continue exploring new models of approach.
The problem in obesity treatment is the adherence, chronic patients do an intermittent treatment. In this context, some questions that arise are: why do they leave, why do they come back, and how to improve adherence?
The aim of this work is to share the learnings that come from the inclusion of an anthropological approach, to explore the factors that could contribute to patient compliance.
Methods: An integrative clinic which includes transdisciplinary work has been taken as the unit of analysis of this crosssectional study. The uniqueness of this clinic is that it addresses obesity by taking addictive behaviour as one of the main determinants, so it assumes it as a chronic and recurrent disease. It offers an acute, intensive, motivational and integrative intervention from a systemic perspective; with daily availability of group therapies and activities for patients without interruption. While there are relapses and dropouts, there is also a high rate of return to treatment.
The anthropological methodology consisted of a qualitative exploration, taking an ethnography approach, as well as the production of a non-ethnocentric knowledge about therapeutic space reality.
The fieldwork was carried out from August to December of 2018. After the field work, an integrative analysis of the collected data was generated, in order to trigger the reflections of the interdisciplinary group.
Results: The anthropologist found two main characteristic aspects of the therapeutic work in the centre, which were agreed and deeply discussed with the transdisciplinary team. The first of them was the articulation that occurs between the biomedical aspect of the disease and the subjective experience of it. The second was the social nature of the therapeutic process in the observed group spaces. Processes such as identification, empathy and belonging where identified.
Conclusion: The research showed that the main factors for improving the patient compliance are, enabling the space for reflection where the patients can develop their condition, deepening the nature of their disease, correcting the physical parameters affected and raising awareness of the social aspects in the relationship of their health-disease process. These factors have a crucial role in the process of healing. Thus, it is possible to associate them to the motivation that allows the patients to maintain their active presence in the therapeutic space.

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PO2.202

Prevalence of sarcopenia in severe obese adults from Southern Italy

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Introduction: Sarcopenic obesity (SO) is a condition where fat mass (FM) excess and muscle mass depletion coexist and it is usually described in the elderly. A clear definition for SO is currently lacking and there is therefore a need to develop a standardised approach of defining SO using body composition assessment. The aim of this study is to evaluate the prevalence of sarcopenic obesity in young adults with severe obesity (BMI > 40) using BIA as screening tools.
Methods: We studied 225 men (age 33±9.4 years; weight 147±22 kg, BMI 48.7± 6.63 kg/m^2, fat free mass (FFM) 79.9±12.2 kg, FAT 67.6±15.1 kg, PFAT 45.5 ±5.3 %) and 363 females (age 34±9.9 years; weight 126±19.3 kg, BMI 48.2± 6.72 kg/m^2, FFM 61.2±9.04 kg, FAT 65.2±13.6 kg, PFAT 51.3 ±4.75 %). Antropometric measurements and bioimpedance analysis (BIA) at 50 kHz (DS Medica) were performed early in the morning; skeletal mass was calculated according to Janssen equation SM (kg) = (h^2/BIA resistance * 0.401) + (sex *3.825) + (age * 0.071) + 5.102; where height (h) is in cm, BIA resistance is in ohms; as concerning sex, male = 1 and female = 0.
SO was defined with three different criteria:
1) Lowest tertile SM of the group
2) SMP INDEX = SM (kg)/body mass (kg) * 100
3)25th percentile of the distribution of residual SM in the group.
Results: Based on SM tertiles, 67 males and 109 females were defined SO and 158 males and 254 females non sarcopenic obese (NSO). According to SMP, 160 males and 269 females were defined SO and 65 males and 93 females were NSO; based on residual SM, 91 males and 57 females were defined SO and 272 males and 168 females NSO. Howewer, 35 males (15.6%) and 66 females (18.2%) only fulfilled all three criteria and were defined SO.
Conclusion: Sarcopenia rates vary widely based on different definitions. When SMP is used, we have observed the highest prevalence of SO. Anyway a correct diagnosis of sarcopenia needs to be confirmed with functional data, particularly in severe obese young adults.

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Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.203

An evaluation of clinical psychology one-to-one intervention for patients with obesity

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Background: To help reverse and/or control obesity (Body Mass Index; BMI ≥30kg/m^2) clinical psychology intervention is advocated within multidisciplinary weight management services (Yumuk et al., 2015). Aneurin

Bevan University Health Board implemented a Weight Management Service (WMS) in 2014 (Di Battista et al., 2018) and integrated clinical psychology one-to-one intervention (CP) in 2016. The aim of this study was to evaluate the CP and its effect on body weight and emotional wellbeing.

Methods: Patients attended the CP between August 2016 and December 2018. During the first CP session, patients were asked to be weighed and complete CORE – a validated questionnaire of 34 items with 4 domains: Subjective well-being; Problems/symptoms; Life functioning; Risk/harm. Mean, percentages and standard deviation (SD) were used to assess patient attendance, body weight and CORE scores.

Results: In total 67 people were offered the CP, 61 of which were female (91%). Eight patients did not attend a single CP session and were discharged while 14 patients were still attending the CP at the time of writing. Average number of CP sessions attended before discharge was 4.62 (SD ±4.16) and the majority of patients (n = 24; 53%) had 3 or more CP sessions. However, 17 patients (37.7%) attended only one session. Of attendees (including those still attending; n = 53) baseline patient mean body weight was 126.2 kg (SD ±28.9) and BMI 46.0 kg/m² (SD ±10.2). Of those with body weight data on completing the CP (n = 19), 13 lost weight and overall mean weight reduction was 2.6 kg (SD ±3.71). Total mean CORE scores were 67.3 (n = 35) at the first CP session and 52 (n = 11) on completion. Of the 11 patients with follow-up CORE scores, mean reduction was 12.1 (SD ±22.9) with 7 patients demonstrating reduced scores.

Conclusion: This evaluation suggests that the CP can be integrated into a multidisciplinary weight management service. Attendance data, with over one third of patients attending only one session, suggests retention challenges or that patients were incorrectly assigned CP and therefore directed to alternative support. Analyses of clinical records or a qualitative investigation is needed to understand the challenges with attendance. Of the completers, weight-loss data and CORE scores are promising with 68% losing weight and 64% demonstrating improved emotional wellbeing. Follow-up analyses of completers will determine whether these benefits are observed over the medium-longer term.

PO2.204

Piloting a community-based multidisciplinary tier 3 weight management service for children and young people

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Introduction: Research literature suggests our adult relationship with food is shaped by our experiences as children and young people (CYP). There is evidence linking the aetiology of obesity and related poor adult mental health to childhood, particularly childhood disturbance. This suggests intervening at a young age is vital to prevent obesity throughout the life course. NHS England guidelines for managing complex obesity in children suggest specialised services focused on multidisciplinary lifestyle intervention. We present findings from our pilot study which involved developing and delivering a community-based Tier 3 weight management service for CYP.

Methods: The CYP Tier 3 weight management service (CYPWMS) was launched in May 2018. 30 patient referrals were received from general practices and Tier 2 weight management services in the Greenwich area. Referred patients had to be Greenwich residents aged 4-17 years old, with a BMI >98th centile with at least one comorbidities.

The CYPWMS intervention started with a telephone interview from a care coordinator with a parent or carer of the referred CYP. Patients were then offered a multidisciplinary assessment session with a specialist psychological therapist, paediatric dietician, activity specialist and senior family social worker lasting 2 hours. This was followed by an intensive phase involving ten 90-minute CBT based behaviour change sessions delivered in a group or one-to-one format, alongside monthly one-to-one dietician sessions. The intervention was delivered over a 6-month period. Parents and carers were invited to attend all sessions.

Results: 25 out of the 30 referrals attended their initial multidisciplinary assessment session and progressed onto the intensive phase. Referred CYP were more complex than anticipated, presenting with multiple medical comorbidities, learning disabilities and at least twice the expected average weight and BMI for their age. Over half the cases had family history of obesity. Due to the complex nature of caseloads, treatment was adjusted to one-to-one format for all patients.

Despite generally positive feedback from patients about the multidisciplinary approach involving both the CYP and their carer, non-attendance was high with only 12 patients completing the 6-month intervention. Key reasons for non-attendance included time commitments, illness, financial constraints and problems arranging siblings' childcare.

Conclusion: Providing a Tier 3 service for CYP with a multidisciplinary approach in community settings vitally allows for engagement at a family-based level, increasing chances of effective and systemic behaviour change. However, serious consideration around barriers to engagement need to be addressed to improve attendance and long-term impact.

PO2.205

Night eating syndrome among adults with obesity attending a tier 3 weight management service

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Background: Night Eating Syndrome (NES) is an eating disorder characterised by morning anorexia, evening hyperphagia, and insomnia. Diagnostic criteria include consuming ≥25% of daily food intake after the evening meal and/or ≥2 nocturnal ingestions/week, in addition to at least 3 of the following features: morning anorexia; a strong urge to eat between dinner and sleep onset and/or during nocturnal awakenings; insomnia ≥4-5 times/week; a belief that eating is necessary to initiate/return to sleep; and depressed mood that worsens during evening hours. Also, an ability to recall evening/nocturnal ingestions must be present.

Methods: We examined the presence of NES at baseline and repeat among adults attending a Tier 3 Weight Management Service (an intensive 12-month behaviourally-focused intervention involving individualised dietary, physical activity and medical strategies) using the validated Night Eating Questionnaire1. A score of ≥25 is strongly suggestive of NES. Data were collated from an electronic database and analysed using Excel 2010 (Microsoft, USA) and SPSSV24 (IBM, USA). Statistical significance was determined using paired t-tests for continuous and Chi-squared for categorical data. Data are expressed as mean±standard deviation.

Results: Paired data were available on 448 individuals (62.7% female), baseline age 45.7±12.0 years, weight 146.3±27.8 kg and body mass index 50.7±8.9 kg/m^2. At baseline NEQ score was 15±6 with n34 (7.6%) meeting diagnostic criteria for NES with a score ≥25.

At the repeat time-point (9.2±4 months) there was a significant reduction in both weight (-6.1±9.8kg / -4±6.3%; p<0.001) and NEQ (-2.4±5.7; p<0.001) compared to baseline. The proportion of individuals meeting NES criteria was significantly lower than at baseline (7.6% [n34] vs. 4.9% [n22]; p<0.001). Weight change was not influenced by the presence of NES at baseline (-5.3±6.3 vs. -4.0±6.4%; p = 0.824).

Discussion / Conclusion: NES scores improve and individuals with NES achieve significant weight loss when attending a behaviourally-focused intervention involving individualised dietary, physical activity and medical strategies. Individuals attending obesity services should be screened for NES to allow for individualised treatment. Recommended behavioural strategies for NES include self-monitoring food and energy intake and regulating meals and snacks more evenly across the day, in addition to cognitive components such as restructuring maladaptive thoughts2.

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PO2.206

Prevalence analysis of obese patients in follow-up in an endocrinology consultation

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Introduction: Nowadays obesity is a health problem with elevated prevalence and exponential growth. Its management is complex because of the many diverse factors that intervene in the disease, especially poor dietary habits and sedentary lifestyle.
Material and Methods: Descriptive study of patients seen from May 2017 to May 2018. Patients with a BMI above 30 kg/m^2 were selected and their anthropometric data and the prescription of drugs and other therapeutic measures were recorded.
Results: 148 obese patients, with a mean age of 53.2 years, 64.2% women, mean initial BMI of 40.93 kg/m^2. 55.4% with type 2 diabetes, 47.3% with metformin, 23.6% with SGLT2 inhibitors and 37.8% with GLP-1 analogs. 4.7% have some type of severe mental illness.
According to our records 83.8% received dietetic counseling, 53.4% were referred to a nutritionist and 52% received specific exercise counseling. Average time between medical consultations was 284.82 days.
24.3% of our patients were referred to bariatric surgery, de pacientes fueron derivados a cirugía bariátrica, 33.3% of these patients are already included at waiting list with an average time of inclusion of 591 days.
Conclusion: We consider that we should be more persistent in relation to therapeutic measures but the time between visits and the time to include patients in surgical waiting list are too elevated, thus limiting the effectiveness of our recommendations.

Tab. 1. Baseline characteristics.

Patients (n)	148
Age (years)	53.18 ± 15.41
Gender (% of women)	64.2
Dietary counseling (%)	83.8
Nutritionist (%)	53.4
Exercise counseling (%)	52.0
Type 2 diabetes (%)	55.4
Metformin (%)	47.3
SGLT2 inhibitors (%)	23.6
GLP-1 analogs (%)	37.8
Severe mental illness (%)	4.7
Referred to bariatric surgery (%)	24.3
Included in surgical waiting list (%)	7.4
Time until inclusion in waiting list (days)	591.44 ± 268.61
Initial BMI (kg/m^2)	40.94 ± 7.62
Time between medical visits (days)	284.07 ± 166.53

PO2.207

Weight evolution of obese patients in follow-up in an endocrinology consultation

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Introduction: Management of obesity constitutes a serious difficult for physicians due to its increasing prevalence and high rates of therapeutic breach.
Material and Methods: Observational retrospective of patients in follow-up in an Endocrinology consultation from May 2017 to May 2018. Patients with a BMI above 30 kg/m^2 were selected and its weight evolution was compared to drug-related prescription or hygienic-dietary recommendations.
Results: 148 obese patients, with a mean age of 53.6 years, 64.2% women, mean initial BMI of 40.93 kg/m^2. 55.4% with type 2 diabetes, 47.3% with metformin, 23.6% with SGLT2 inhibitors and 37.8% with GLP-1 analogs. 4.7% have some type of severe mental illness.
Comparing the initial BMI with the one obtained in following visits we see a significant reduction in visits 1, 2 and 3. When comparing between drug prescription and hygienic-dietary recommendations we only see significant reduction of BMI when using drugs also in visits 1, 2 and 3.
Conclusion: In our series weight reduction was motivated by the use of drugs instead of hygienic-dietary recommendations. These results should make us rethink about the usefulness of our current dietary interventions.

PO2.208

Evaluating the relationship between food groups, anthropometric indices and increasing risk of PCOS among 20-40 years old women

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Introduction: Polycystic ovarian syndrome is one of the most common endocrine disorders and the main cause of infertility related to ovarian dysfunction in women of reproductive ages. Though, the main cause of this syndrome is unknown, scientific studies have shown that genetic (which might also be affected by pregnancy and lifestyle) is involved in this syndrome. Considering the importance of PCOS on women health and their quality of life, this study was carried out to investigate the dietary patterns and nutritional status impact on increasing risk of PCOS in 20-40 years old women referred to Sarem Hospital in Tehran,Iran.
Method: This case-control study was performed on a group of 57 PCOS patient and 57 healthy subjects who were eligible. General information, physical activity and 147 items food frequency questionnaires were obtained and completed.Also anthropometric parameters were measured. Data were processed using SPSS software.
Results: A significant difference was observed in weight, waist and hip circumference, waist to hip ratio, wrist circumference, height to wrist ratio and body fat percentage between PCOS patients and control subjects ($P < 0.05$). Also, energy expenditure, protein, EPA, DHA, sodium, potassium; vitamins: B1, B2, B3, B6, B12; phosphorus, magnesium, zinc, copper, selenium; total fiber, crude fiber and glucose intake were significantly different in PCOS patients and control subjects ($P < 0.05$)
Conclusion: Anthropometric parameters measured, were higher in PCOS patients compared to control subjects. Also, PCOS patients had higher intakes of energy, protein, EPA, DHA, sodium, potassium; vitamins: B1, B2, B3, B6, B12; phosphorus, magnesium, zinc, copper, selenium;total fiber, crude fiber and glucose in comparison to control subjects. However, there was no significant difference in terms of receiving any of the 16 selected daily food items between two groups.

Conflict of Interest: None.

Funding: Research relating to this abstract was funded by Azad University, Science and Research Branch, Tehran, Iran.

PO2.209

Controlled time-restricted eating alters ratings of hunger, but does not change fatigue and mood in men with overweight/obesity

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Introduction: Irregular eating patterns have adverse effects on a several physiological and metabolic processes, independent of meal size and composition. In rodent models, meal timing has a positive effect on health and can be manipulated to prevent and treat obesity as well as other metabolic disorders. In humans, body mass loss to time-restricted eating (TRE; <10 h/day) regimens are similar to typical energy-restricted diets but adherence may be improved with TRE. Hunger and mood may influence adherence and therefore the effects that changes to dietary timing may have on these variables needs to be considered. We tested the effects of short-term, controlled TRE on measures of hunger, fatigue and mood.
Methods: Eleven sedentary males, with overweight/obesity (age 38 ± 5 y; BMI: 32.1 ± 2.1 kg/m²), completed two 5-day isoenergetic diet protocols in a randomised order, consuming three meals between 10:00 - 17:00 h (TRE; 8 h eating window) or between 07:00 - 21:00 h (unrestricted eating, URE; 15 h). On the 5th day, participants attended the laboratory for 24 h and completed visual analogue scales hourly (Day 5: 07:00-22:00 h and Day 6: 07:00 h) for hunger and fatigue and at four hourly intervals from 08:00-20:00 h for positive and negative mood states (Positive And Negative Affect Scale).
Results: Ratings of hunger were altered by time (P<0.001) and across time between conditions (interaction, P<0.001). With TRE, ratings of hunger were suppressed between 14:00 and 22:00 h, whereas hunger ratings were only lower between 15:00-16:00 h and at 22:00 h in the URE condition with no differences at 07:00 h (i.e. fasting) either day. Ratings of fatigue increased across the day (P<0.001) but did not differ between conditions. Neither positive nor negative affect mood scores differed between conditions. However, a main effect of order was observed, with reduced negative affect scores in the second condition (P = 0.03).
Conclusion: Short-term TRE temporally altered and suppressed afternoon hunger ratings but had little effect on ratings of fatigue or mood states. Long term adherence to TRE may alter these psychological health and well-being factors and are important for the applicability of TRE in the context of obesity.

Conflict of Interest: None.

Funding: Research relating to this abstract was funded by a Novo Nordisk Foundation Challenge Grant (NNF14OC0011493) and an ACURF grant (ACURF2016000353).

PO2.210

Effects of omega-3 and omega-6 fatty acids on lipids and apolipoproteins, glycemic response and endothelial function: a randomized double-blind crossover trial

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Introduction: Nutritional guidelines encourage increased intake of polyunsaturated fatty acids (PUFAs) for cardiovascular disease (CVD) reduction, but clinical studies of dietary or supplemental omega-3 (n-3) and omega-6 (n-6) PUFAs show conflicting results. While most studies have measured traditional lipid markers, e.g., triacylglycerols (TAGs), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C) and high-density lipoprotein cholesterol (HDL-C), accumulating evidence points to other important CVD risk markers, e.g., non-HDL-C, apolipoproteins, and ratios between anti- and proatherogenic markers. Few randomized trials have compared effects of n-3 and n-6 PUFAs in the same individuals, and previous studies may have used oils with suboptimal quality, too low doses and/or unknown fatty acid composition. Here, we examined effects on lipids, apolipoproteins and other CVD risk markers in healthy, inactive individuals with abdominal obesity after high-doses of n-3 and n-6 from high-quality oils.
Methods: 38 inactive people with abdominal obesity were included in a randomized double-blind crossover study and received 3 g/day (women) or 4 g/day (men) n-3 (EPA/DHA) and 20 g/day (women) or 27 g/ day (men) n-6 (linoleic acid) for 7 weeks, separated by a wash-out period of 9 weeks. Before and after the two intervention periods, we measured fasting levels of lipids, apolipoproteins, glucose, insulin, HbA1c, blood pressure, endothelial function and anthropometric variables. Within- and between-group differences were analyzed by linear mixed-effects models adjusted for age, sex and BMI.
Results: The analysis of pooled data showed that absolute mean changes differed between groups for fasting levels of TAGs (n-6 vs n-3: 0.19; p = 0.042), apoB (–0.071; p = 0.006), apoA-II (0.035; p = 0.001), apoC-II (0.020; p = 0.027) and apoE (–0.007; p = 0.007). In the n-3 group only, we found changes in TAGs (–0.26; p = 0.001), NEFAs (–0.096; p = 0.029), HDL-C (0.075; p = 0.008), apoA-II (–0.026; p<0.001), apoC-II (–0.026; p<0.001), apoC-III (–0.027; p = 0.011) and the TAG/HDL-C ratio (–0.26; p<0.001), while TC (–0.28; p = 0.003), LDL-C (–0.23; p = 0.004), non-HDL-C (–0.32; p<0.001), apoB (–0.069; p<0.001), apoE (–0.005; p = 0.027) and the apoB/apoA-I ratio (–0.052; p<0.001) changed only after the n-6 intervention. The ratios TC/HDL-C, LDL-C/HDL-C and non-HDL-C/HDL-C were reduced in both groups (all p<0.01). No significant changes in glucose, insulin, insulin C-peptide, HbA1c, blood pressure or endothelial function were observed.
Conclusion: We found in both groups changes in lipids and apolipoproteins that have been associated with reduced CVD risk, but in differential ways.

Conflict of Interest: None Disclosed.

PO2.211

Inflammatory potential of the diet of patients referred to obesity outpatient clinic at Clinical Hospital Centre Rijeka

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Introduction: Obesity and its complications are associated with low-grade chronic inflammation due to dysregulation of excessive fat tissue. Diet can have an inflammatory or anti-inflammatory potential which can be assessed by using the Dietary Inflammatory Index® (DII).
Aim: To evaluate the diet quality of obese patients consecutively referred to Obesity outpatient clinic at Clinical Hospital Centre Rijeka, Croatia by using the DII® as an indicator of the inflammatory potential of the diet.
Methods: During the first visit to the Obesity outpatient clinic for random case-control nutrition intervention study, a total of 102 obese patients (average age 44 years) fulfilled 123-item food frequency questionnaire (FFQ)

for evaluation of their usual dietary habits. The inflammatory potential of the patient's diet was evaluated with 37 food parameters, derived from FFQ, which were used to calculate the DII®. A positive DII® means a diet with pro-inflammatory characteristics while negative DII® means a diet with anti-inflammatory characteristics. Patients body composition parameters were assessed by bioelectrical impedance analysis (Seca® mBCA 515 Medical Body Composition Analyzer, Hamburg, Germany). The inflammatory biomarker high-sensitivity C-reactive protein (hsCRP) was assessed for determination of their inflammatory status. Data were analyzed using Statistica v13.3 (StatSoft Inc., Tulsa, USA) for parameters correlation assessment. The criterion for statistical significance was set at p<0,05.
Results: The average body mass index was 35.5±4.0 kg/m^2, waist circumference 105.4±8.3 cm, fat mass 44.4±3.7%, fat-free mass 55.6±3.7%, skeletal muscle mass 26.5±3.6% and visceral adipose tissue 2.8±1.2L. The average DII® of all patients was -0.26 ± 2.64 which means diet with mild anti-inflammatory characteristics, and ranged from -4.24 (anti-inflammatory diet) to 6.05 (pro-inflammatory diet). A pro-inflammatory diet had 64% of patients with an average DII® of 2.00 ± 1.87 but with no significant differences in body composition parameters to patients with diet with anti-inflammatory characteristic. The hsCRP of patients with pro-inflammatory diet characteristics was significantly more related to their diet (R = 0.675; p<0.000) than hsCRP of patients with anti-inflammatory diet (R = 0.349; p = 0.221).
Conclusion: The obtained results showed significant association between obesity-related inflammation and diet with pro-inflammatory characteristics. The use of DII® in clinical settings may represent valuable tool for efficient obesity management aiming nutrition intervention with anti-inflammatory diet.

PO2.212

Deprescribing of antihyperglycemic medications in obese patients with type 2 diabetes after diet intervention

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Introduction: Diabetes and obesity are world-wide health problems. Diet and physical activity have a significant impact on metabolical processes in the human body and able to prevent and even treat obesity, diabetes and associated diseases. The main aim of this study was to investigate the effect of short-term moderate energy restriction on control of diabetes and antihyperglycemic medications requirements among obese patients with type 2 diabetes.
Methods: 22 obese patients (mean age - 51.9 years (95% CI: 48.0-55.9)) with type 2 diabetes recruited into a 3-months weight loss programme in the outpatient department of the Nutrition Clinic. Participants received a low-calorie diet (mean 1742,4 kcal/day) with 500 kcal daily energy intake restriction and were encouraged to increase their physical activity. Anthropometry, body composition, biochemical biomarkers, lipid profiles and glycemic levels were analysed in dynamics.
Results: Initially, the average weight of participants (8 males and 14 females) was 109.33 kg (95% CI: 97.31; 121.36), mean BMI - 39.8 kg/m^2 (95% CI: 35.7; 42.8), mean fat mass - 49.9 kg (95% CI: 40.8; 59.0) and visceral fat 212.0 cm^2 (95% CI: 184.5; 239.6). The average HbA1C was 6.75 % (95% CI: 6.26; 7.23) and plasma fasting glucose level - 6.83 mmol/l (95% CI: 6.03; 7.62). All participants received antihyperglycemic medications: 20 participants - metformin, 7 participants - GLUT-2 inhibitors, 3 participants - DPP-4 inhibitors, 2 participants - sulfonylurea agents and 4 - insulin glargine once a day (10, 12, 40 and 44 IU per day). After 12 weeks of diet intervention, the mean weight loss was 7.9 kg (p = 0.0004) (app. 7% of the initial weight), fat mass loss - 2.9 kg (p = 0.0001) and the mean visceral fat decreased to 196.14 cm^2 (p = 0.0002). Biochemical and lipid profiles markers performed significant improvements. HbA1C decreased to 6.14% (p = 0.15) and plasma fasting glucose levels lowered to 6.05 mmol/l (p = 0.16). On diet, insulin glargine therapy was cancelled in 3 out of 4 patients because of the hypoglycemia and in one case the dose of insulin decreased from 44 IU to 10 IU per day. Sulfonylurea agents were deprescribed in one case out of two.
Conclusion: According to the results, even moderate short-term daily energy restriction can significantly improve body composition and have a positive impact on diabetes control including deprescribing of antihyperglycemic medications in obese patients with type 2 diabetes.

Conflict of Interest: None Disclosed.

Funding: Research related to that abstract was funded by the Program of Basic Research of State Academies of Science (Russia) for 2013-2020 (topic N 0529-2017-0055; 0529-2017-0058).

PO2.213

Effects of dietary polyphenol intake on body composition: a PREDIMED-Plus sub-study

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Introduction: Recent evidence suggest that dietary intake of different polyphenols has been associated with obesity and obesity-related inflammation. However, the essential step towards the understanding of the protective effects of polyphenols on overweight and body composition depends on the adequate estimation of their consumption by dietary recalls. The aim of this study was to analyse the relationship between different polyphenol subclasses intake and body composition parameters.
Methods: A cross-sectional study of 157 participants aged among 55-75 with metabolic syndrome recruited in the Hospital Clinic of Barcelona site from the PREDIMED-Plus study was performed. Total polyphenols and polyphenol subclasses intake were measured by food-frequency questionnaires (FFQ) by matching food consumption data with Phenol-Explorer database. Dual-energy X-ray Absorptiometry (DXA) measurement was performed to obtain body weight, android, gynoid and visceral fat mass. Participants were categorized in quartiles according to their total polyphenol intake, flavonoids, phenolic acids, stilbenes, lignans and other polyphenols intake. Multiple linear regression models were used to assess the relationship between polyphenol subclasses intake and body composition parameters adjusted by sex, age, body mass index and energy intake.
Results: The mean of total polyphenol intake was 830.3 ± 285 mg/d, where flavonoids represent the 56.3%, phenolic acids 35.6%, other polyphenols 7.7%, and lignans and stilbenes less than 1%. Significant inverse association were observed between the higher quartiles of lignans intake and body weight (b = -1669.4, P = 0.002). Associations between phenolic acids and lignans intake and total fat mass was also observed (b = -740.8, P = 0.027; b = -703.9, P = 0.047; respectively). A significant reduction of android fat mass was observed in relation to lignans intake (b = -115.8, P = 0.034). Additionally, visceral adipose tissue was reduced in higher quartiles of lignans and other polyphenols intakes (b = -116.8, P = 0.037; b = -119.7, P = 0.042; respectively).

Conclusion: The sub-classes of dietary polyphenols, mainly lignans, may influence body composition independently of total energy intake.

Conflict of Interest: The authors declare no conflict of interest.

Funding: Supported by CIBEROBN Fisiopatología de la Obesidad y Nutrición and Instituto de Salud Carlos III (ISCIII), through the Fondo de Investigación para la Salud (FIS).

PO2.214

Effect of a low-carbohydrate high-fat diet on pain and quality of life in patients with lipedema

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Introduction: Lipedema is an obesity related undiagnosed disease, characterized by a disproportionate, symmetrical fatty swelling of the lower limbs with fatty deposits located on hips and thighs. The lipedema has been found to be resistant to diet, exercise and bariatric surgery, in regards to both weight loss and symptom relief. Current experience seems to indicate that a low-carbohydrate and high-fat (LCHF-diet) may have an effect on weight and symptom management in lipedema. Therefore, the aim of this study was to investigate the impact of an LCHF-diet on pain perception and quality of life (QoL) in patients with lipedema.
Method: In a prospective, observational study, 9 women (BMI: 36.7±4.5kg/ m^2 and age: 46.9±7 years) underwent 7 weeks of an LCHF-diet (fat: 70-75 E%, carbohydrate: 5-10 E%, protein: 20 E%) followed by a diet according the Norwegian dietary guidelines (fat: 25-40 E%, carbohydrate: 45-60 E%, protein: 10-20 E%). Both diets were isocaloric matched for energy needs. Pain and QoL (visual analog scale and a quality of life questionnaire for lymphedema of the limbs (LYMQOL) respectively), body weight and composition (scale, Bioimpedance) and physical activity (sense wear, Body media) were measured at baseline, weeks 7 and 13. All participants kept daily food records and had weekly follow-ups with a trained dietitian for weight monitoring and diet counseling.
Results: The LCHF-diet induced a significant weight loss (mean: 4.7± SD: 2.5 kg, P<0.001), and reduction in pain (P<0.05), but no change in quality of life (QOL) was found. No change in weight, pain or QoL was seen after week 13, compared to week 7, during the Norwegian-diet. After 13 weeks the significant weight loss (4.1±2.5 kg, P<0.05) was maintained, but no change in pain or quality of life was found, compared to baseline.
Conclusion: A LCHF-diet was associated with weight loss and a reduction in perceived pain, but after introduction of a healthy Norwegian-diet, change in pain returned back to baseline level, although weight loss was maintained. Further research with larger sample size is needed to draw a conclusion whether a LCHF-diet could be a treatment option for relief of pain in patients with lipedema.

Aknowledgements: Thanks to all participants for their time and commitment throughout the study. We have received funding from the Norwegian lymphedema- and lipedema association.

PO2.215

Effect of oral ingestion of low-molecular collagen peptide derived from Skate (Raja kenojei) Skin on body fat in overweight adults: a randomized, double-blind, placebo-controlled trial

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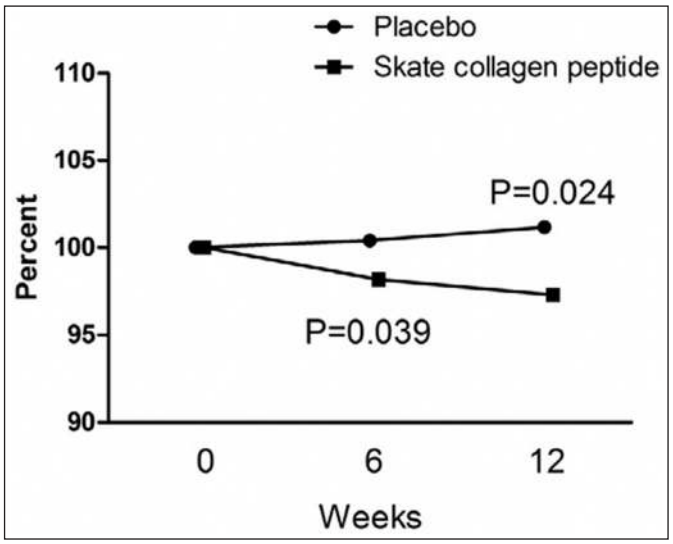
Collagen peptide derived from Skate (Raja kenojei) Skin was reported to have anti-obesity effects through suppression of fat accumulation and regulation of lipid metabolism. No studies have yet been performed in human. This randomized, placebo-controlled, double-blind study was designed to investigate the efficacy and tolerability of skate collagen peptide (SCP) for reduction of body fat in overweight adults. Total body fat mass was measured by whole body dual energy X-ray absorptiometry. Reports of adverse events were collected throughout the study. Ninety subjects were randomly assigned to receive either 2,000 mg of skate collagen peptide (SCP) per day (n = 45) or placebo(n = 45) for 12 weeks; no differences in total body weight, lipid profile, free fatty acid, and adiponectin were observed between the two groups. However, the body fat in the SCP group was found to be significantly better than that of subjects in the control group (+1.2% vs. - 2.7%, P = 0.024). SCP was well tolerated and no notable adverse effects were reported. These results suggest the beneficial potential of SCP in reduction of body fat in overweight adults. Further studies are required to determine the optimal dose and duration of SCP supplementation to confirm the first-stage study results for clinical application.



The total body fat mass is expressed as a percentage of the baseline levels.

Fig. 1. Changes in total body fat mass in both groups.

O2.216

Effect of black rice with giant embryo on body weight and metabolic parameters

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Purpose: Metabolic syndrome is well known to increase the risk of cardiovascular diseases. We have reported that antioxidant rich black rice with giant embryo ameliorates obesity and its related metabolic disorders in animal model. However, such effect has not been evaluated in humans.

Methods: Subjects with metabolic syndrome (n = 49, male; 44.4 ± 6.3, female; 42.0 ± 5.6 years old) randomly assigned into two groups: black-rice with giant embryo or white-rice and consumed each rice as a breakfast for three months. Anthropometry, blood pressure, and various metabolic parameters were determined before and after intervention for three months.
Results: Twenty-six and twenty-three subjects were allocated in black-rice with giant embryo and white-rice group, respectively. Six subjects (23.1%) in black-rice with giant embryo group and five subjects (21.7%) in white-rice group were women. Before intervention, all parameters were not significantly different between groups. After three months of consumption of either black rice with giant embryo or white-rice, changes of body weight (-1.54 kg vs. -1.29 kg, P = 0.649) as well as waist circumference (-1.63 cm vs. -1.02 cm, P = 0.365) were not significantly different between groups. However, systolic blood pressure (-8.2mmHg vs. -0.4 mmHg, P = 0.006) and highly sensitive C-reactive protein (-0.110 mg/dl vs. 0.04, P = 0.004) in black-rice with giant embryo and white-rice groups had significant difference.
Conclusion: Thee months of meal replacement for breakfast with black-rice with giant embryo had significant reduction of systolic blood pressure and highly sensitive C-reactive protein as compared with those of white-rice.

PO2.217

Impact of bacterial probiotics on obesity, diabetes and non-alcoholic fatty liver disease related outcomes: a systematic review and meta-analysis of randomized controlled trials

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Introduction: The effect of bacterial probiotics in subjects with different metabolic disorders is underexplored. Therefore, we aimed to systematically review the effect of oral intake of bacterial probiotics on fifteen outcomes related to obesity, diabetes, and non-alcoholic fatty liver disease.
Methods: We conducted a systematic review and meta-analysis of randomized controlled trials (≥14 days) excluding hypercholesterolemia, alcoholic liver disease, polycystic ovary syndrome and children <3 years. We searched MEDLINE, EMBASE, and the COCHRANE library from 1990 to June 2018. CRD42016033273
Results: One hundred and five articles met inclusion criteria, representing 6826 subjects. In overweight but not obese subjects, probiotics induced improvements in: body weight (BW, k = 25 trials, d = -0.94 kg mean difference, 95% CI: -1.17 to -0.70, I^2 = 0.0%), body mass index (BMI, k = 32, d = -0.55 kg/m², 95% CI: -0.86 to -0.23, I^2 = 91.9%), waist circumference (WC, k = 13, d = -1.31 cm, 95% CI: -1.79 to -0.83, I^2 = 14.5%), body fat mass (BFM, k = 11, d = -0.96 kg, 95%CI: -1.21 to -0.71, I^2 = 0.0%), and visceral adipose tissue mass (VAT, k = 5, d = -6.30 cm², 95%CI: -9.05 to -3.56, I^2 = 0.0%). In patients with type 2 diabetes, probiotics reduced fasting glucose (FG, k = 19, d = -0.66 mmol/l, 95% CI: -1.00 to -0.31, I^2 = 27.7%), glycated hemoglobin (HbA1c, k = 13, d = -0.28 pp, 95% CI: -0.46 to -0.11, I^2 = 54.1%), insulin (INS: k = 13, d = -1.66 mU/l, 95% CI: -2.70 to -0.61, I^2 = 37.8%) and homeostatic model of insulin resistance (HOMA-IR, k = 10, d = -1.05 pp, 95% CI: -1.48 to -0.61, I^2 = 18.2%). In subjects with fatty liver diseases, probiotics reduced alanine (ALAT, k = 12, d = -10.2 U/l, 95% CI: -14.3 to -6.0, I^2 = 93.5.0%) and aspartate aminotransferases (ASAT, k = 10, d = -9.9 U/l, 95% CI: -14.1 to 5.8, I^2 = 96.1%). These moderate improvements were mostly observed with bifidobacteria (*B. breve, B. longum*), *Streptococcus salivarius* subsp. *thermophilus* and lactobacilli (*L. acidophilus, L. casei, L. delbrueckii*) containing mixtures and influenced by trials conducted in one country.
Conclusion: The intake of probiotics resulted in minor but consistent improvements in metabolic risk factors in subjects with metabolic diseases.

Conflict of Interest: Payment received from Danone Nutricia Research.

Funding: Research relating to this abstract was funded by Danone Nutricia Research, Palaiseau, France.

PO2.218

Diets rich in essential polyunsaturated fatty acids attenuate the excessive adiposity, impaired glucose homeostasis and adipose tissue insulin resistance during catch-up growth

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Introduction: Catch-up growth (after fetal or neonatal growth retardation) is an important risk factor for later obesity, type 2 diabetes and cardiovascular diseases. Such accelerated growth is often characterized by excessive fat deposition (exacerbated catch-up fat), associated with hyperinsulinemia, glucose intolerance and peripheral insulin resistance in the skeletal muscle and adipose tissue. We tested the hypothesis that refeeding on diets high in essential polyunsaturated fatty acids (ePUFA) improves glucose homeostasis through changes in body composition and by promoting insulin sensitivity in skeletal muscle and adipose tissue.
Methods: Experiments were performed in a validated rat model of exacerbated catch-up fat driven by thrifty metabolism due to suppressed thermogenesis. Groups of male Sprague Dawley rats (n = 7-8 per group) were caloric restricted for 2 weeks followed by 10 days of isocaloric refeeding on high-fat diets: either based on animal fat (lard) rich in saturated and monounsaturated fatty acids (SMFA diet) or rich in vegetable oils (safflower and linseed oils, 1:1) rich in the essential fatty acids linoleic- and alpha-linolenic acids (ePUFA diet). In-vivo assessment of insulin sensitivity was performed during test of glucose tolerance and during hyperinsulinemic-euglycemic clamp associated with the labelled 2-deoxy-glucose technique for measuring glucose utilization index of individual skeletal muscles and adipose tissue depots. De-novo lipogenic capacity in adipose tissues was determined by measuring the enzyme activity of FAS and G6PDH. Body composition (water, fat mass, dry lean mass) was determined by cadaver and chemical analyses.
Results: Compared to animals refed the SMFA diet, those refed isocalorically on the ePUFA diet showed significantly higher lean mass (+10%), lower fat mass (-13%), improved glucose tolerance, and during clamp studies they showed a significantly higher whole-body glucose infusion rate, as well as higher glucose utilization index in the adipose tissue depots (30 -110%) associated with an elevated enzyme activity of FAS (by 74-88%) and G6PDH (by 35-44%); no differences was observed in glucose utilization rate in the skeletal muscles.
Conclusion: This study demonstrates that refeeding on diets high in ePUFA improves body composition and blood glucose homeostasis by promoting body energy partitioning in favor of lean mass (which provides increased glucose buffering capacity) and by enhancing glucose flux into de-novo lipogenic pathways in adipose tissues (acting as a glucose sink). The enrichment of diets in essential polyunsaturated fatty acids have the potential for promoting healthy catch-up growth, with implications for reducing the risks for later obesity and cardiometabolic diseases.

PO2.219

Diet quality during non-fasting days of the 5:2 intermittent fasting diet

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Introduction: The 5:2 intermittent fasting diet is a form of intermittent energy restriction (IER). It involves 75% energy restriction two days a week and ad libitum intake during the remaining five days. There is little known about diet quality during non-fasting (unrestricted) days of this type of diet plan; the aim of this study was to compare diet quality during non-fasting days of the 5:2 diet to habitual intake and UK dietary reference values.
Methods: 13 healthy, overweight males (39±3 years; 29.2±1.0 kg/m^2) and 18 females (35±4 years; 28.3±0.4 kg/m^2), who were not currently following an energy restricted diet, were recruited to this intervention study. Participants served as their own control and were instructed to follow the 5:2 diet which comprised of 2 non-consecutive days a week fasting using formula based very low energy LighterLifeTM Foodpacks for 4 weeks. Subjects completed validated 7-day food diaries during the pre-intervention baseline week and week 3 of the 5:2 diet. Various anthropometric measurements were taken before and after the 5:2 diet.
Results: Subjects consumed 1.9% less carbohydrate as % total energy intake during unrestricted days compared with baseline ($p<0.05$). After removing 22 potentially under-reporting subjects identified by reported energy intake at baseline of <70% of predicted total energy expenditure, intakes were lower during unrestricted days than baseline for fibre (3.9 g; $p<0.01$), linoleic acid (2.2 g; $p<0.05$) and iodine (73 µg; $p<0.05$). Mean reductions were 1.2 kg for weight ($p<0.0005$), 0.3 kg/m^2 for BMI ($p<0.001$), and 0.7% for percentage body fat ($p<0.001$).
Conclusion: The nutritional profile of self-reported diet during unrestricted days of the 5:2 diet was similar to habitual intake. However, under-reporting of dietary intake at baseline limits the reliability of these data. Following the diet resulted in reductions in weight, BMI and percentage body fat. Arguably, the health benefits of this outweigh the consequences of reduced diet quality over short periods of intermittent fasting. Additionally, this is the first study that assesses the diet quality of unrestricted days during intermittent fasting regimens. Further investigations involving broader aspects of nutritional intake such as intake of food groups and costs are recommended.

PO2.220

Current state-of-play of the school milk scheme in the Republic of İreland

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Introduction: The EU School Milk Scheme (SMS) has operated in the Republic of Ireland since 1982 with the objective of promoting and encouraging the consumption of milk amongst school children. For the last decade, participation rates have decreased. This research explored the current state-of-play, barriers and facilitating factors to uptake of the SMS among several stakeholders in Ireland.
Methods: An independent assessment of the current state-of-play of an existing school setting-based intervention was conducted. During spring 2018, computer-assisted telephone interviews were conducted with schools and suppliers of the SMS. Surveys by email were send to local delivery agents. Descriptive statistics were conducted using SPSS (Version 24.0; SPSS Inc., IBM).
Results: Of the 100 schools contacted, 46 consented to take part in the survey. The majority of schools thought very positive on the concept of school milk (≥85%). Reasons for decrease in participation as reported by the schools were diverse, including increase in water consumption (31%), children do not consume milk at home (23%), and parental contribution towards the SMS (15%). Schools thought that different packaging (72%), high frequency (78%) and accurate delivery (94%) would be important for the success of the SMS. The main suggested changes reported by schools to increase participation rates were re-sealable bottles, distribution of milk integrated into daily routines in schools, milk education in school curriculum and additional promotion material or events.
Of the 10 suppliers, 8 consented to take part in the survey. Two main themes emerged from the interviews with the suppliers: heavy administration load and suppliers were of the opinion that schools were not aware of the SMS.
The delivery agents survey was filled out by 14 agents across 3 suppliers. Reasons as reported by the delivery agents for not delivering on a daily basis were that schools were not on the daily delivery routes (71%) or certain routes were only done on certain days (43%). Changes that cannot be implemented are delivery at a later time and having to collect empty cartons.
Conclusion: Key stakeholders agreed that school milk is important. This research further identified both barriers and facilitating factors for the uptake of the SMS which can be used to explore possible ways to address the decline in participation amongst both schools and children in Ireland.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by the Department of Agriculture, Food and the Marine.

PO2.221

Nurses role in diet-related chronic diseases- future perspectives

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Introduction: Diet-related chronic diseases, such as diabetes mellitus, hypertension, cardiovascular and renal diseases affected millions of individuals, resulting in disease-related complications such stroke and heart attack. Evidence strongly supports the fact that multiple dietary factors influence this diseases and the modification of diet can have powerful, beneficial effects in prevention and management but in most cases the modification of diet results after the disease is installed. Because of their interaction with patients, the nurse's role in preventive care includes observing the many factors that contribute to chronic conditions.
Methods: Study took place in Vlore Regional Hospital Albania, Pathology ward in May 2018, duration two weeks. The purpose was to assess the patients with chronic diseases regarding their diet before – after the initiation of the diseases. The sample was composed of 12 patients. Study data collected by questionnaire which includes general and nutritional information. The Body Mass Index (BMI) was calculated in base of anthropometric measures (height and weight).
Results: Mean age 67.25 years, SD±5.64. Most prevalent diseases were diabetes mellitus (25%), hypertension (25%), cardiovascular and renal diseases (35%), hepatic cirrhosis (8.33%). 50% of patients were overweight BMI interval [25.00-29.99] and 17% were obese I category, BMI interval [35.0-40.00]. All patients reported that their diets changed after hospitalization. Diets modifications included no consumption of fats, sale and to quit smoking and alcohol consumption.
Conclusion: Results suggest that the prevention is crucial in the treatment of the chronic conditions and nurse's role is vital on helping patients by educating them on risks and promoting healthy lifestyles

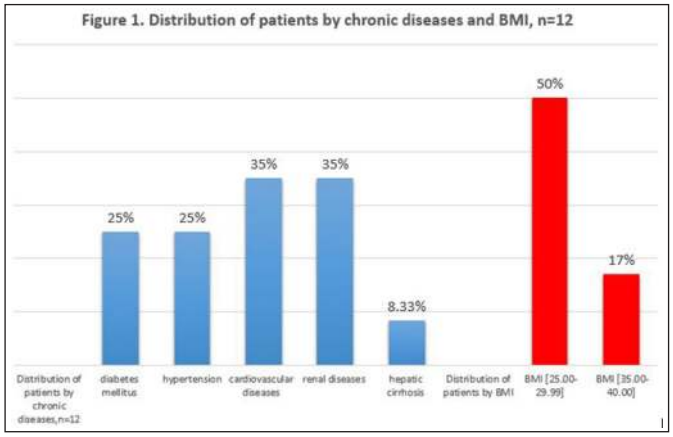

Fig. 1. Distribution of patients by chronic diseases and BMI.

PO2.222

Using data mining methods to predict success in a weight loss trial

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Introduction: Sustained weight loss is difficult to achieve and determining factors which predict weight loss success could be used to improve weight loss strategies. This study aimed to explore factors predicting weight loss success (defined as loss of 5% of baseline weight) during a 12-month weight loss trial.
Methods: The HealthTrack study was a one year lifestyle intervention trial where overweight subjects were randomised to receive usual care, interdisciplinary advice on diet and behaviour change, or interdisciplinary advice plus a supplement food (walnuts). Data mining, using a decision tree, was performed to determine predictors of weight loss success. Variables included in the model were initial BMI, percent weight loss at one month, steps per day, dietary intake at baseline, gender, age, treatment group, and the physical and mental scores of the SF-12 quality of life questionnaire.
Results: Greater weight loss was observed in the Intervention group at 3 months and the Intervention and supplement group at 3 and 6 months when compared with the controls. 53 of the 178 who completed the study had a weight loss ≥5% at 12 months. Percent weight loss was the primary predictor in the decision tree with those achieving ≥5% weight loss at 12 months having a mean weight loss of -3.0%(SD-2.3%) at one month compared with -1.0%(SD2.2%) at one month (P<0.001).
Conclusion: Regardless of group randomisation, early weight loss is the primary predictor of weight loss success in weight loss trials. Strategies for improving weight loss success should focus on those with little initial weight loss. These findings may translate to clinical practice where careful monitoring of early weight changes in weight loss interventions would be prudent.

PO2.223

Benefits of lemon extract as an angiotensin converting enzyme inhibitor

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Introduction: Obesity is associated with metabolic and cardiovascular diseases. Weight lost because of a diet is difficult to keep off and the majority of dieters return or surpass their original weight. Angiotensin converting enzyme (ACE) has been identified as a marker for successful weight maintenance and ACE inhibitors are known to improve insulin sensitivity (1). On the other hand, lemon juice facilitates weight loss and improves serum insulin levels in obese individuals, yet the mechanisms underlying lemon-associated health benefits are unknown. Thus, while the separate health benefits of ACE inhibitors and lemon are known, here we describe the association between the two. The effects of lemon extract (LE) on 3T3L1 adipocyte differentiation, lipolysis insulin sensitivity and activity indicate that ACE plays a major role in the mechanism of lemon-associated nutritional benefits in obesity.
Methods: 3T3L1 adipocytes were differentiated (1) and ACE expression and enzymatic activity were quantified by mRNA expression (via qPCR) and activity assay, respectively. Free glycerol release and oil-red staining reported on the effects of LE on lipid droplets in 3T3-L1 adipocyte. Perilipin and phospho hormone sensitive lipase (pHSL) protein expression are markers of lipolysis. Effects on insulin sensitivity were quantified through phosphoAKT (pAKT) and GLUT4 protein levels in 3T3L1 cells treated with 100µg/ml LJ and 100nM insulin.
Results: LE improved insulin sensitivity as demonstrated by a 3.74±0.54-fold increase in both pAKT and GLUT4 levels; and induced lipolysis evidenced by a 5.5±0.09 and 16.6±1.2-fold- change in perilipin and pHSL protein expression levels. A 3.5-4.2±0.41 folds increase in free glycerol release was seen at t = 10 h and 24 h for 50, 100 and 500 µg/mL of LE concentrations. ACE gene expression increased 12-fold during adipocyte differentiation and treatment with LE decreased ACE gene (80%±0.49) and protein (55%±0.37) expression.
Conclusion: Our study demonstrates that LE-induced reduction of ACE expression is associated with increased insulin sensitivity and lipid breakdown, suggesting that one or more active reagent(s) in LE act as potential ACE inhibitors. This new link between LE and ACE opens the understanding of molecular mechanism(s) by which LE could be used in the management of cardiovascular diseases.

Reference

1. Tejpal S, Bastie C, Seetharaman JK. Lemon Juice: A potential source of Angiotensin Converting Enzyme antagonism for weight loss and insulin resistance. Proceedings of the Nutrition Society. 2018;77(OCE4):E213.

Conflict of Interest: The authors declare no competing interests.

Funding: The study is funded by university of Warwick's start-up funds and the International Chancellor's fellowship to Shilpa Tejpal.

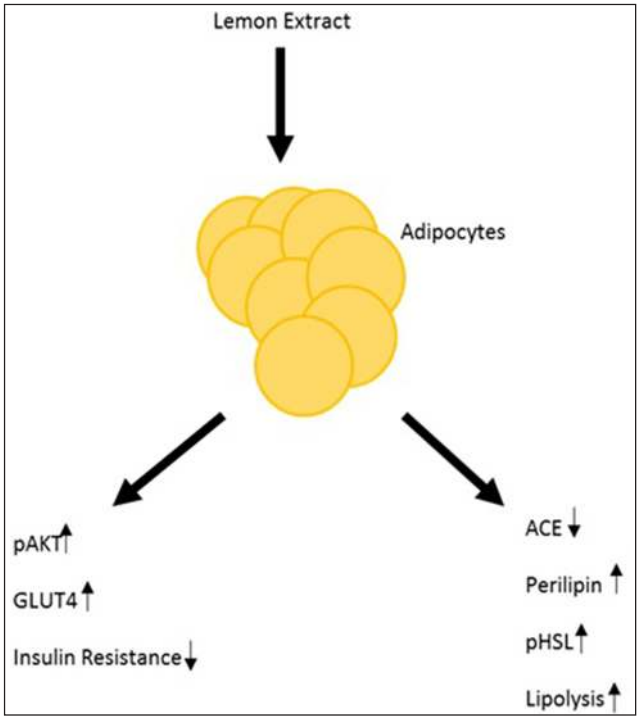

Fig. 1. LE as an ACE inhibitor.

LE-induced reduction of ACE expression, increased insulin sensitivity and lipid breakdown.

PO2.224

Altering dietary fat and carbohydrate ratios result in the same body composition in graded calorie restricted mice

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Introduction: Calorie restriction (CR) induces an energy deficit and compensatory mechanisms are triggered to try to maintain energy homeostasis and energy may be withdrawn from tissues (for example fat mass). We tested the hypothesis if changing macronutrient ratios leads to a different energy partitioning of tissues.
Methods: After two weeks of baseline, 200 male C57BL\6 mice were fed their respective diet (n = 5) for a week. These 5 diets contained 20% kcal protein and the following fat content: 10% (Casein protein), 10% (Whey protein), 20%, 40% and 55%. The food intake was calculated based on the individual food intake during the 2 weeks baseline in grams and adjusted for the calorie content of the respective diets to assure an isocaloric intake. After one week on their research diet, mice were exposed to 5 different levels of CR for 3 months ranging from 0% to 40% with 10% increment.
Results: After 2 weeks of baseline and 1 week on research diet, no significant differences were found in body mass (BM) between the treatment groups. BM of mice under CR declined immediately after treatment started and reached stabilisation after approximately one month. However, the point that this stabilisation was reached seemed to differ per diet at the highest restriction level (i.e. 40% CR) and followed an exponential decay pattern. After 3 months of CR, the BM and body composition (i.e. fat mass and lean mass) at the end of the study did significantly differ between CR levels within a diet. However, this did not significantly differ when diets were compared within each level of CR. Whole body dissections at the end of the study revealed differential utilisation of the different tissues with CR. However, changes in macro-nutrient ratio had no influence on this energy partition of tissues.
Conclusion: Hence our results suggest that with CR, a calorie is a calorie regardless of the macro-nutrient composition when it comes to body composition and body mass and tissue utilisation.

Conflict of Interest: None.

Funding: The work was supported by the Biotechnology and Biological Sciences Research Council (BBSRC) of the UK.

PO2.225

Gut microbiota modulation with probiotic or symbiotic in weight loss in women with obesity

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Introduction: Gut microbiota is a causal factor of obesity[1]. Dysbiosis in the bacteria that composed the gut microbiota appears to lead higher energy harvest and storage fat in adipose tissue[2]. Modulation of gut microbiota could reverse weight gain, emerging as a new therapeutic in the treatment of obesity[1].
The objective was to evaluate whether gut microbiota modulation with probiotic or symbiotic advances weight loss in women with obesity, and whether the effect of gut microbiota modulation continue after 15 days end of the intervention.
Methods: Thirty-two adult women (25-50 years) with class I and II obesity (body mass ndex (BMI) 30-34.99 kg/m^2) were selected to participate in a parallel, double-blind, randomized, controlled clinical trial. Volunteers were allocated in the probiotic group (PG – Bifidobacterium lactis (B. lactis) and maltodextrin), symbiotic group (SG - B. lactis and frutooligossacharide) or control group (CG – placebo). In addition, they followed a low-calories diet during 60 days. After 60 days and 15 days end of the intervention were evaluated gut microbiota composition by qPCR (Firmicutes, bacteroidetes, Actinobacteria, Verrucomicrobia, and Gamma-Proteobacteria), body weight, and waist circumference.
Results: After 60 days of intervention SG showed decreased in body weight (baseline: 93.0±8.6 kg and final: 90.8±8.4 kg, p = 0.027) and BMI (baseline: 36.3±2.1 kg/m^2 and final: 35.6±2.0 kg/m^2, p = 0.033), compared to baseline. In addition Actinobacteria was higher compared to baseline, and Verrucomicrobia increased, compared to baseline and another groups. Fifteen days after end of the intervention SG showed reduction in Verrucomicrobiota, compared to final and lower calorie intake, compared to CG, while PG showed increase in Gamma-Proteobacteria, compared to other times and groups, lower carbohydrate intake, compared to SG, and lower calorie intake, compared to baseline.
Conclusion: Sixty days using symbiotic increase Actinobacteria and Verrucobacteria, besides to contribute to decrease weight loss. In addition, appear that low-calorie and low-carbohydrate were associated with increase Gamma-Proteobacteria.

PO2.226

A very low-calorie ketogenic diet improves food and alcohol cravings, physical and sexual activity, sleep disturbances, and quality of life of obese patients

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Introduction: In the fight against obesity, a very low-calorie ketogenic (VLCK) diet has consistently been shown to be a useful tool. Studies from our research group demonstrated that a VLCK diet induces more weight loss than a standard low-calorie diet after 1 and 2 years of follow-up. The success of dietary treatment to lose weight depends on the quality of life and hunger control of the patients during dieting. Thus, this study aims to evaluate food and alcohol cravings, physical and sexual activity, sleep, and life quality (QoL) in obese patients following a very low-calorie ketogenic (VLCK) diet, as well as the role of weight lost and ketosis on these parameters.
Methods: Several specific psychological tests (Food Craving, Physical Activity, Sexual Functionality, Epworth Daytime Sleepiness Scale, Pittsburgh Sleep Quality Index and Impact of Weight on Quality of Life-Lite) were performed in 20 obese patients (12 females, 47.2 ± 10.2 year and BMI of 35.5 ± 4.4) through the course of a 4-month VLCK diet on four subsequent visits: baseline, maximum ketosis, reduced ketosis, and endpoint. Each subject acted as their own control.
Results: Dietary induced changes in body composition (7.7 units of BMI lost, 18 kg of fat mass (1.2 kg of visceral fat mass)) which were associated with a statistically significant improvement in food craving scores, physical activity, sleepiness, and female sexual function. Relevantly, a negative correlation was observed between B-OHB levels and the intention to eat ($r = -0.46$; $p < 0.05$) and feelings of hunger ($r = -0.30$; $p < 0.05$) during the phase of maximum ketosis. Overall, these results also translated in a notable enhancement in QoL of the treated obese patients with a total

score significantly lower in baseline than the other points of the nutritional intervention (31.1; 46.8; 59.5 and 64.1; $p < 0.01$).
Conclusion: These results reinforce the suitability of a VLCK-diet as a viable and long-term successful treatment option for obesity because severe weight loss induced by the VLCK diet-PNK method was concomitant with an improvement in food control and psychological well-being parameters.

Conflict of Interest: A.B.C. and F.F.C. received advisory board fees and or research grants from Pronokal Protein Supplies Spain. I.S. is Medical Director of Pronokal Spain SL. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the abstract, and in the decision to publish the results.

Funding: Research relating to this abstract was funded by PronoKal Group® as well as, FIS and CIBERobn from ISCIII, co-financed by FEDER and Colombian Department of Science, Technology and Innovation—COLCIENCIAS.

PO2.227

Beneficial effects of low-calorie diet on visceral adiposity and adipokine profile

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Introduction: Abdominal obesity is associated with dyslipidemia, hypertension, insulin resistance, and metabolic syndrome. An excess of visceral fat is related to the dysregulated secretion of adipokines which influence the vascular function and overall inflammation and may be involved in cardiovascular risk. The adipokines are used as adjunctive markers of metabolic disorders. The purpose of our study is to evaluate the effects of energy intake restriction on visceral fat and adipokine status.
Methods: The study involved sixty middle-aged obese women (mean body mass index 35.3 kg/m^2). We collected the data of anthropometry, body composition analysis (InBody 770, Biospace Co., Ltd, Korea), and biochemical markers (Konelab Prime 60i, Thermo Scientific, Wilmington, DE, USA) before and after 1-month dietary intervention.
Results: There was a significant decrease in body weight, fat mass and visceral fat area (4.15kg, 3.1 kg, and 12.67 cm^2, respectively; $p < 0.05$). 49 (81.7%) women had elevated leptin levels; 22 (36.7%) had elevated adiponectin levels. The average values were 49.92 ng/ml and 11.26 μg/ml, respectively. After the dietary intervention, a significant decrease in leptin and adiponectin levels were observed; however, the leptin/adiponectin ratio did not show marked changes. After 1 month, normal leptin level was reached in 23 (38.3%) patients, while normal adiponectin level was found in most patients (91.7%). The initial visceral fat area correlated with leptin (r2 0.53), insulin (r2 0.38), and C-peptide (r2 0.42) values.
Conclusion: The restriction of the energy intake leads to significant positive changes in fat mass, visceral fat area, and adipokine status and provide another biological explanation for the beneficial effect of weight loss on reducing cardiovascular and diabetes risks in obese patients. Correlation analysis also confirmed the relationship between visceral fat, leptin and insulin levels, which is consistent with data on the dramatic metabolic activity of the visceral adipocyte pool.

Conflict of Interest: None Disclosed.

Funding: Research work carried out at the expense of subsidies for public tasks in the framework of the Program of Basic Research of state academies of science for 2013-2020 (topic No 0529-2015-0013; 0529-2017-0055; 0529-2017-0058).

PO2.228

Effects of the MC4R rs17782313 polymorphism on plasma concentrations of ghrelin, leptin, IL6 and TNFα and on eating behaviors in morbidly obese women

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Introduction: The melanocortin 4 receptor (MC4R) plays a crucial role in the control of hunger, satiety and energy balance. An MC4R gene polymorphism (rs17782313) has been associated with obesity and a high body mass index (BMI).
Objective: To evaluate the effect of the rs17782313 polymorphism of the MC4R gene on plasma concentrations of ghrelin, leptin, interleukin 6 (IL6) and tumor necrosis factor (TNFα) and on eating behaviors among morbidly obese women.
Subjects and Methods: The study included 70 women aged between 20 and 48 years from Rio de Janeiro, Brazil. The selected participants had a BMI between 40 kg/m^2 and 60 kg/m^2. Anthropometric, biochemical, hormonal and inflammatory cytokine data were collected. Feelings of hunger and satiety were evaluated through a visual analogue scale (VAS). The Binge-Eating Scale (BES) questionnaire was used to evaluate the presence or absence of binge eating. Three-day dietary records were used to evaluate habitual food intake, which was calculated and analyzed in AVANUTRI 4.0 software. DNA was extracted from peripheral blood, and polymorphism variants were genotyped using real-time PCR with TaqMan® assays.
Results: Our results showed reduced levels of postprandial ghrelin and leptin in patients with the polymorphism. We also observed increased IL6 levels in the postprandial period for both genotypes, and lower plasma concentrations were found in women with the polymorphism. In addition, a higher prevalence of severe binge eating was observed in more than half of the women with at least one risk allele (C). No differences were found in VAS scores and food intake between the genotypes.
Conclusion: The findings suggest that the MC4R rs17782313 polymorphism may alter the release of ghrelin, leptin and IL6 but has no effect on feelings of hunger and satiety. A high prevalence of binge eating was observed among women with the polymorphism.

PO2.229

Fibre intake is associated with body mass index in type 2 diabetes mellitus patients with chronic kidney disease

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Introduction: Dietary fibre (DF) may play a role in the progress of chronic kidney disease (CKD) via lowering gut-derived uremic toxin production, inflammation and acidosis. Dietary recommendations for moderate to severe CKD often overlook DF and restrict individual nutrients such as potassium (potentially limiting DF intake)(1). This study aimed to assess the DF intake in Type 2 Diabetes Mellitus (T2DM) patients with CKD, compared to matched heathy counterparts.
Methods: This study recruited n = 81 T2DM-CKD (stage 3) as cases and n = 81 healthy controls matched for age and gender. Dietary intake, including non-starch polysaccharides (NSP) as fibre, potassium and phosphorus, was assessed using a single 24-hours Multiple Pass Recall. The associations between NSP intake and anthropometric / clinical parameters (BMI, HbA1c, serum urea, serum creatinine, serum potassium and glomerular filtration rate [eGFR]) and the intake of potassium and phosphorus were investigated using Spearman's rank correlation.
Results: Patients (58% female) had a mean age of 68y, with higher BMI (34±6 vs 29±5 kg/m^2, $p<0.001$) and lower eGFR (46±13 vs 84±14 mL/min/1.73m^2, $p<0.001$) in cases. The average NSP intake was 9±4g/d (markedly below the 23g/d recommendation for general population (2)) in cases, similar to the control group (9.3±5 g/d, $p = 0.92$). Cereals / cereal products were the main sources of NSP (44.2%), followed by vegetables & potatoes (29.2%) and fruit / fruit juices (11%). BMI was inversely

associated with NSP intake (Rho = -0.206, p = 0.009). NSP intake was positively associated with potassium (Rho = 0.494, p<0.01) and phosphorus intake (Rho = 0.496, p<0.01).
Clinical variables related to T2DM / CKD (HbA1c, serum creatinine, eGFR) were not associated with NSP intake (p>0.05), with only serum urea positively related to NSP intake in the case group (Rho = 0.221, p = 0.047).
Conclusion: While no significant correlations were observed between NSP intake and clinical factors for T2DM and CKD, a higher intake of fibre was associated with a lower BMI. Fibre intake is beneficial for cardiometabolic health and could be increased through low potassium/phosphorus fruit & vegetables (e.g. onion, cauliflower, apple, berries) and fibre supplements, guided by a specialist dietitian. High-quality studies are warranted to determine the feasibility / efficacy of fibre intake in the T2DM-CKD population.

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Conflict of Interest: None Disclosed.

Funding: S.P.-D. was in receipt of a CONACyT doctoral scholarship.

PO2.230

Changes in SF-36 scores among subjects receiving semaglutide for treatment of obesity

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Introduction: Semaglutide (SEMA) is a glucagon-like peptide-1 analogue approved for type 2 diabetes (T2D) and under clinical development for the treatment of obesity. Patient-reported outcomes (SF-36) are presented here from a phase 2 study of SEMA for weight management in adults with obesity without T2D.
Methods: This was a multinational, randomised, double-blind, placebo-controlled trial (NCT02453711) of subcutaneous SEMA 0.05, 0.1, 0.2, 0.3 or 0.4 mg/day for 52 weeks, escalated to the final dose on a 4-week schedule. The SF-36 questionnaire was administered at baseline (BL) and week 52 to a subset of English-speaking US subjects. Estimated treatment differences (ETD) vs placebo and 95% confidence intervals (CIs) in the physical functioning (PF) score and the mental component summary (MCS) score were derived by analysis of covariance (ANCOVA). Missing data at week 52 were imputed from the placebo group by jump-to-reference multiple imputation (J2R-MI).
Results: Overall dose-related estimated weight changes on SEMA (ANCOVA, J2R-MI) ranged from -6.0% of BL at 0.05 mg/day to -13.8% at 0.4 mg/day, vs -2.3% on placebo (overall N = 649). For subjects in these groups completing the SF-36 questionnaire (N = 227 at BL; 171 at week 52), dose-related ETD in PF vs placebo were: 0.05 mg, 1.01 [95% CI -2.07; 4.09]; 0.1 mg, 1.03 [-2.16; 4.22]; 0.2 mg, 2.79 [-0.40; 5.97]; 0.3 mg, 2.36 [-0.56; 5.29]; 0.4 mg, 3.51 [0.56; 6.46]. At the highest SEMA dose of 0.4 mg/day the ETD was statistically significant (P = 0.02) and exceeded the minimum important difference of 3.0, as defined in the SF-36 manual. No statistically significant changes in the MCS score were observed.
Conclusion: In this study of SEMA for weight management, there was a dose-related improvement in the SF-36 PF score at 0.4 mg/day dosing. No change in MCS score was observed.

PO2.231

Weight management provision in a special school: experiences of disabled children and their families

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Introduction: There is a high prevalence of obesity among children with special educational needs and disabilities together with an increased risk of developing serious health conditions. A lack of data on effective weight management and lifestyle interventions for this population serves to maintain this health inequality. The purpose of this research is to listen to disabled children and their families about their weight management experiences. Through this research a better understanding will be gained about developing and delivering suitable and inclusive interventions for this group.
Methods: This qualitative study explores how a group of 11 children aged 10-12 years with special educational needs and disabilities and their families experienced a special school-based weight management intervention in England. Repeat semi-structured interviews captured insights before, during and after the intervention. Thematic analysis enabled the interpretation of their experiences.
Results: The initial thematic analysis of this data reveals a number of issues and themes concerning the benefits, challenges, relevance and the retention of health behaviour changes post-programme. Findings also point to areas of the programme positively supporting the families, and key components that could be utilised to manage obesity in this population.
Conclusion: This research will help health services and practitioners in facilitating more inclusive interventions to better meet the needs of disabled children and begin to work towards reducing health inequalities. This research evidences that disabled people, their families and service providers working together can begin to address inequalities and provide a healthier lifestyle for all.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was conducted as part of a PhD bursary, funded by Leeds Beckett University.

PO2.232

The acceptability of weight management programmes for adults with severe obesity: A qualitative evidence synthesis

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Introduction: There has been a continued increase in severe obesity in adults in the UK. As BMI increases, obesity-related comorbidities, social, psychological and economic consequences increase, with the potential need for greater support for help with weight loss. Systematic review evidence on the feasibility/acceptability of weight management programmes (WMPs) for BMI ≥ 35 kg/m^2 is lacking. The focus of this review of qualitative literature was on understanding the acceptability of weight loss programmes for adults with BMI ≥35 kg/m^2 and programme providers.
Methods: A systematic search and qualitative synthesis was conducted for published papers (from 1964- May 2017) that contained qualitative data from adults with BMI ≥ 35 kg/m^2 (and/or the views of providers involved in their care) and considered issues relating to weight management.
Results: 33 papers met our inclusion criteria from seven countries published 2007-2017. Findings were presented from a total of 644 participants and 153 programme providers (mostly from interviews or focus group sessions). Although there was some variation in views, we found recurring themes around what participants described valuing and enjoying. Participants described being attracted to programmes that were perceived to be novel or exciting in some key way, as well as programmes that had been endorsed by their health care provider (a view supported by programme providers themselves). The sense of belonging to a group who shared similar issues relating to weight and food, and who had similar physiques and personalities, was particularly important and seemed to foster a strong group identity and related accountability, which seemed

to help with motivation and continuing engagement. Group based activities were apparently enjoyed by many, along with fairly intensive support from programme providers. However, some described struggling with the various physical activities (due to a range of physical co-morbidities) and not everyone enjoyed group interaction with others (sometimes due to various mental health co-morbidities).
Conclusion: Although group-based interventions were favoured, developers should bear in mind that people with very severe obesity might be especially vulnerable to both physical and mental co-morbidities which could inhibit engagement with certain intervention components (e.g. group based interaction; physical activities).

PO2.233

'Just because I'm old it doesn't mean I have to be fat': a qualitative study exploring older adults' views and experiences of weight management

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Introduction: The last three decades have seen a substantial rise in the number of older people affected by overweight and obesity, as a result of increases both in the total number of older adults and the proportion who are carrying excess weight. However, there has been relatively little research into how best to promote and achieve healthy weight loss among older adults, and whether weight loss is even indicated for those at older ages is a controversial issue that has attracted considerable attention. As such, medical professionals are often reluctant to advise that older patients affected by obesity should lose weight. The aim of this study was to explore older adults' own beliefs about the appropriateness of weight management, and how their experiences and expectations of weight management have changed as they have got older.
Methods: Qualitative semi-structured interview study of older adults (≥65 years) in the United Kingdom who had recent (<5 years) experience of trying to manage their weight (n = 15; 12 women, 3 men).
Results: Data were analysed using thematic analysis. Emergent themes highlighted that weight remained a significant concern for many older adults. Although participants felt it was more socially acceptable to have excess weight at older than younger ages, they reported substantial negative impacts on physical and psychological health associated with carrying excess weight that they felt could be alleviated by weight loss. Participants were motivated to lose weight for appearance and health reasons, with the latter gaining prominence with age. Participants described how losing weight had become more difficult as they had got older, citing a range of barriers to effective weight management including age-related declines in health and mobility, emotional factors such as comfort eating and lack of willpower, changes in the food environment, and the impact of retirement on food intake and physical activity. While the majority indicated that they would appreciate support from a health professional in managing their weight, few reported having received useful advice in the past.
Conclusion: Health professionals should be encouraged to broach the issue of weight management with older patients and offer guidance and support to those who want it. The development of materials – for both health professionals and older adults – providing information on losing weight safely at older ages and ways of managing issues relating to retirement and declining health and mobility could help address the unmet needs of older people who want help to manage their weight.

Conflict of Interest: None Disclosed.

Funding: Research relating to this abstract was funded by Cancer Research UK (ref no. C1418/A14133).

PO2.234

Proteomic and metabolomic manifestations of different variants of apolipoprotein e genes polymorphism in obese patients

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Background: Currently questions on the role of genes polymorphism that regulate metabolism and implicated in metabolic disorders are disputed. Objective. The study of proteomic and metabolomic manifestations of different variants of apolipoprotein E genes polymorphism in obese patients.
Materials and Methods: The study involved 217 obese patients. All the patients underwent genotyping of polymorphic sites c.388 (T>C) c.526 (C>T) of the ApoE gene. Proteomic studies included the determination of the content ofadipokines (adiponectin, resistin, apelin and visfatin), cytokines (IL-6, TNFa, IL-1a), CRP and fatty acids L-FABP, annexin V. Assessment of metabolomic markers was based on a study of the lipid profile.
Results: It was established that, with the ApoE genotypes ε3 / ε3 and ε2 / ε3 of the ApoE gene, the content of lipids and glucose in patients with obesity was statistically significantly reduced, which indicated a high efficiency of diet therapy. In patients with the genotypes ε2 / ε2 and ε4 / ε3, no such patterns were found. The most pronounced changes in lipid metabolism are revealed in carriers of C allele at position c.388 and T at position c.526 of ApoE gene (c.388 T/C+c.526C/T and c.388 T/C+c.526 T/T). In the course of the execution of the correlation analysis ofmetabolomic and proteomic markers 1SNP or absence of SNP (c.388 T/T+c.526 C/T or s.388 T/C+c.526 C/C) in ApoE gene was found to be accompanied with dyslipidemia and the initiation of inflammation. At 2 SNP in the ApoE gene (c.388 T/T+c.526 T/T and c.388 T/C+c.526 C/T), we have identified correlations of lipid metabolism markers and adipokines (adiponectin, visfatin). At 3 SNP we found the relationship between adipokines (apelin, visfatin, resistin) and pro-inflammatory cytokines (IL1a), annexin V and lipid metabolism markers.
Conclusion: The studied polymorphic genotypes may be used in the complex with the individual characteristics of energy metabolism, hormonal and immune status of the patient for preventive medical measures and the implementation of a personalized diet of obese patients.

PO2.235

Burden of illness associated with rare genetic disorders of obesity

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Introduction: Rare genetic disorders of obesity result from an impaired melanocortin-4 receptor (MC4R) pathway, marked by insatiable hunger and early-onset, severe obesity. The burden of rare genetic disorders of obesity and their quality-of-life impact is not well characterized. The objective of this study was to assess clinical symptoms, disease burden, and healthcare resource utilization in patients reporting a diagnosis or symptoms of rare genetic disorders of obesity.
Methods: A quantitative survey instrument was developed to assess disease burden associated with rare genetic disorders of obesity. Lifetime hyperphagia experience and diagnosis of genetic obesity or concurrent severe obesity (>40 BMI) were inclusion criteria. The study included a separate caregiver questionnaire for patients <18 years of age or with cognitive impairment. Patient experience and healthcare utilization was collected for the preceding 12 months.
Results: 60 responses were collected, 56 from adult patients and 4 from caregivers (BMI >40-50: 70%, BMI >50: 30%). Numerous physiological and psychological sequelae emerged. A majority of respondents reported psychological symptoms, including depression (62%), anxiety (55%),

and feelings of powerlessness (58%). 40% experienced hyperphagia in the past 12 months, with 71% of those noting daily symptoms. 57% reported frustration with eating behaviors out of their control, with 65% reporting daily symptoms. Among the 78% of respondents visiting a healthcare provider at least annually, significant utilization of prescription medication was reported, including for diabetes (33%), blood pressure (28%), asthma (23%), and cholesterol (22%). Substantial durable medical equipment (DME) utilization was observed, including use of canes (28%), nebulizers (18%), walkers (18%), and continuous positive airway pressure (17%). Respondents reported an average of 3.3 urgent care visits due to acute or severe pain. Respondents also reported emergency department or outpatient hospital visits (mean 1.8) and inpatient hospitalizations (mean 0.6) for an average of 4.1 nights per hospitalization.
Conclusion: Individuals who self-report diagnosis or symptoms of rare genetic disorders of obesity experience myriad physiological and psychological symptoms and carry significant disease burden, despite substantial use of prescription medication, DME, and other healthcare resources. While this is a preliminary analysis, further investigation is warranted to fully characterize the burden of rare genetic disorders of obesity on this orphan population and implications for healthcare resource utilization.

PO2.236

Initial experiences of a new computer assisted clinical feedback system to improve mental health in patients undergoing obesity surgery

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Background: A major concern is that mental health problems after bariatric surgery is common, often despite of patients having satisfactory weight loss. To date, no published studies have evaluated the effects of innovative computer assisted clinical treatments to improve mental health outcomes in bariatric surgery patients. We present an innovative clinical approach to fill this knowledge gap along with our initial experiences.
Methods: All patients at our obesity clinic fill out six patient-reported outcome questionnaires on an tablet before all consultations before and after surgery. The information from these assessments are instantly available for the clinician who present and discuss the results with the patients as an integrated part of the consultation. The main measure is "The Norwegian Outcome Response System for Evaluation (NORSE) which is a Routine Outcome Monitoring (ROM) innovation for mental health, with a dynamic clinical feedback system (CFS), developed at Førde Hospital Trust. The full NORSE is a computer adaptive clinical system for patients' self-reports. It personalizes the interaction to the individual patient based on a pool of 80 clinical items, 4 therapeutic needs and 5 alliance items, establishing scores vis-à-vis a relevant norm population for 17 clinical- and resource dimensions. Once completed it automatically generates a graphic feedback report to patient and clinician based on this information. In addition to NORSE we also include measures that capture issues related to living with obesity and having bariatric surgery.
Results: Our initial experience is that this innovation works quite well in our obesity clinic. Patients involvement seem to be stimulated and feedback from patients are positive. Sometimes the feedback-report seem to reveal information that otherwise would have gone under the radar (i.e., drinking problems and suicidal thought). The dialogue between clinician and patient based on the feedback-report is regarded as essential for adding value to the treatment. It is important to underpin that it took a lot of time and work to implement this innovation. Some challenges should be mentioned. Patients sometimes forget to bring their login bank-ID, which they need for security reasons. In rare cases, patients do not have a bank-ID. Some patients also have language problems that makes the assessment challenging. Some patients also regard all the questionnaires as lengthy.
Conclusion: The first edition of the innovation seems promising and may lead to more individualized consultations according to patient's needs.

PO2.237

Can neck circumference be used as an indicator of metabolic syndrome?

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Introduction: The aim of the study was to evaluate the usability of neck circumference as a risk factor for metabolic syndrome according to the NCEP-ATP III.
Methods: One hundred-ninety-six individuals without thyroid disease, lactation and pregnancy period, were included in the study. The data were gathered face to face with a questionnaire including information about physical activity levels, anthropometric measurements, evaluation of dietary assessment. The patients underwent measurement of waist circumference, blood pressure (BP), level of glucose, triglycerides and HDL-cholesterol in fasting.
Results: The mean age of men was 46.0±14,1 years; women was found to be 43.4±12.7 years. Forty-seven point one percent of women and 46.2% of men have metabolic syndrome. Seven point one percent of the participants with metabolic syndrome are smokers. There was a significant relationship between smoking and metabolic syndrome in males ($p<0.05$); no significant relationship was found in women ($p>0.05$). There was no significant relationship between salty meal preference and metabolic syndrome ($p>0.05$). According to dietary assessment data, there was no significant relationship between energy, carbohydrate, fat intake and metabolic syndrome ($p>0.05$). When the physical activity levels were evaluated, it was determined that 94.8% of the participants were sedentary. There was no significant relationship between physical activity and metabolic syndrome ($p>0.05$). The average neck circumference of women with metabolic syndrome was 37.0±2.7; 39,5±2,7 of the males were found. The relationship between neck circumference and metabolic syndrome was statistically significant ($p<0.05$).
Conclusion: Neck fat is thought to be closer to visceral fat, which is more strongly associated with cardiometabolic risks than subcutaneous fat. This suggests the availability of neck circumference as an indicator of metabolic syndrome. In addition, neck circumference is not affected by respiration or stomach fullness, it is repeatable and easy to measure. Therefore, more studies are needed on this subject.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.238

Comparison of the methods used to determine the level of physical activity

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Introduction: The aim of the study was to determine the difference between the two different methods used to determine the level of physical activity of the students.
Methods: The study was conducted with 43 20- to 25-years-old non-obese students without chronic disease, studying at Ankara University, Faculty of Health Sciences. The study data were collected through face-to-face interviews using a questionnaire about individuals' general information, dietary habits and physical activity levels. Physical activity level of students was calculated by using the Physical Activity Level (PAL) and Metabolic Equivalent Task (MET) method. For this purpose, the students were administered an activity record form. The form questioned a 24-hour period which covered sleeping time and other activities. The physical activities were multiplied by the physical activity ratio (PAR) based on their type

and the value obtained were divided by 24-hours; thus, the physical activity level was determined. For the other method, the International Physical Activity Questionnaire (IPAQ) was used to score the physical activity and to classify it into MET total.

Results: The mean age of female students was 21.4±1.5 and for males 21.1±1.1 years. Eleven point six percent of the students said they used supplements and 58.1% of the students consumed three main meals in a day. The mean BMI of the female students was found to be 22.6±2.5 kg/m^2 and the males were 24.5±3.32 kg/m^2. The mean waist-length and waist-hip ratio of the participants were 0.4±0.03 and 0.7±0.0 for males and 0.4±0.0 and 0.8±0.0 for females, respectively. When physical activity levels were evaluated, it was determined that more than half (53.5%) of the students were sedentary, 41.8% moderately active and 4.7% vigorously active according to PAL. According to MET score, 14.0% of students were sedentary, 48.8% moderately active and 37.2% vigorously active. These two methods significantly different each other ($p<0.05$).

Conclusion: The fact that healthy lifestyle factors become a habit in the early stages of life is important in maintaining these habits for life. However, the methods used to determine the level of physical activity are inconsistent. In this regard, more studies are needed to determine the most accurate method.

Conflict of Interest: None Disclosed.

Funding: No Funding.

PO2.240

Development of competencies to promote comprehensive obesity medicine education across undergraduate and graduate medical education and fellowship training

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Introduction: A 2016 survey of 1,003 primary care physicians, 250 obstetrician-gynecologists, and 253 nurse practitioners in the U.S. found that most did not correctly answer questions on evidence-based obesity management guidelines, suggesting the need for better education. To improve training of health care providers (HCPs), The Obesity Medicine Education Collaborative (OMEC), a group of 15 professional societies, was formed to develop a competency-based framework for undergraduate and graduate medical education and fellowship training on obesity.

Methods: Six working groups were created to establish measurable obesity-focused competencies for each of the Six Core Domains of the U.S. Accreditation Council for Graduate Medical Education. Between August 2016 and September 2017, working group members collaborated by in-person meetings, teleconferences, and emails to identify competencies and define developmental milestones. In October 2017, the 32 obesity related competencies were circulated to 17 professional societies for review. Based upon this feedback, the working groups made revisions to the competencies.

Results: A final document describing 32 Obesity-focused competencies and assessment benchmarks was completed in April 2018, and endorsed by 20 professional societies. The Core Domains and number of competencies are:

Practice-Based Learning and Improvement 5
Patient Care and Procedural Skills 5
System-based Practice 4
Medical Knowledge 13
Interpersonal and Communication Skills 3
Professionalism 2

Conclusion: Through a collaborative effort, obesity-focused competencies and benchmarks for training of HCPs were developed. Communication and discussion of these competencies with other professional organizations both in and outside the U.S. is ongoing and will be useful in the development of training programs globally that will improve knowledge of obesity management.

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Conflicts of Interest: None.

Funding: None.

Tab. 1. Benchmarks for knowledge of pharmacologic treatments of obesity.

Score 1	Scores 2, 3	Scores 4, 5, 6	Scores 7, 8	Score 9
Does not recognize anti-obesity medication as an appropriate form of therapy. Lacks basic knowledge of the pharmacotherapeutic options for the treatment of obesity, including their indications, contraindications, side effects and mechanisms of action.	Recognizes anti-obesity medication as an appropriate form of therapy, and has basic knowledge of the pharmacotherapeutic options for the treatment of obesity, including their indications, contraindications, side effects and mechanisms of action.	Has average knowledge of the pharmacotherapeutic options for the treatment of obesity, including their indications, contraindications, side effects and mechanisms of action and can apply that knowledge to the clinical care of patients.	Has above average knowledge of the pharmacotherapeutic options for the treatment of obesity, including their indications, contraindications, side effects and mechanisms of action and can apply that knowledge to the clinical care of patients.	Has exceptional knowledge of the pharmacotherapeutic options for the treatment of obesity, including their indications, contraindications, side effects and mechanisms of action and can apply that knowledge to the clinical care of complex patients.

This table shows the benchmarks for evaluating the competency, "Apply knowledge of the pharmacological treatments of obesity as part of a comprehensive personalized obesity management care plan".

PO2.241

Dietary intake of advanced glycation endproducts and 5-year changes in body weight in adults

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Purpose: There is experimental evidence that exposure to dietary advanced glycation endproducts (AGEs) may promote weight gain by inducing insulin resistance. In this study we examined the relationship between dietary AGEs intake and changes in body weight over 5 years.

Methods: Prospective cohort of 373293 men and women, aged 25 to 70 years, recruited between 1992 and 2000 from 10 European countries in the European Prospective Investigation into Cancer and Nutrition (EPIC). Body weight was measured at recruitment and self-reported 5 years later. Usual dietary intake at recruitment was assessed with country-specific validated dietary questionnaires. A reference database was compiled containing UPLC-MS/MS-measured Nε-(carboxymethyl) lysine (CML), Nε-(1-carboxyethyl)lysine (CEL), and Nδ-(5-hydro-5-methyl-4-imidazolon-2-yl)-ornithine (MG-H1) in around 200 common European foods. This reference database was matched to EPIC foods and decomposed recipes obtained from country-specific validated dietary questionnaires and intake of CML, CEL, and MG-H1 was estimated. Associations between energy-adjusted dietary AGE intake and body weight change were estimated separately for each of the three AGEs using

multilevel mixed linear regression models with country as random effect and dietary AGE intake and relevant confounders as fixed effects.
Results: The average weight change of the study population over 5 years was 2.1 kg (standard deviation, SD 5.0 kg). Mean dietary intakes of CEL, CML, and MG-H1 were 2.2 mg/day (SD 0.9), 3.0 mg/day (SD 1.3) and 21.6 mg/day (SD 9.4), respectively. A one-SD increment in CEL intake was associated with 0.07 kg (95% CI 0.06 to 0.09) additional weight gain over 5 years. The corresponding additional weight gain for CML and MG-H1 was 0.04 kg (0.03 to 0.06) and 0.02 kg (0.004 to 0.04), respectively. These associations were more pronounced in women than in men. The top six food groups contributing to AGEs intake, with varying proportions across the AGEs, were cereals/cereal products, meat/processed meat, cakes/biscuits, dairy, sugar and confectionary, and fish/shellfish.
Conclusion: In this study of European adults, higher dietary AGEs intake was associated with slightly greater weight gain

PO2.242

A « caring » workshop to experience or not obesity

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Introduction: Patients seen in a specialised consultation of internal medicine may also sometimes suffer from obesity. How to take these people in charge taking into account their overweight? How to avoid stigma?
Aim: The aim of this workshop is to make health care providers aware of taking care of people presenting this difference.
Methods: We have included our experiential workshop within a one-day training programme. To meet this need, experts in the field of obesity and adult education have been asked to elaborate a specific workshop for health care providers. Concretely, they have been put in a situation of obesity and dressed with a jacket loaded with 2 kg of sand for a maximum of 10 kg per person during a course with stairs and obstacles. It is mainly a moment of sharing, their feelings and emotions. The workshop tries to promote the awareness of the participants and to confront them with the daily life of persons with overweight during 15 minutes. Professionals of therapeutic education structure and promote the development of this activity in link with the reality of care in outpatient situation. The debates focus on the experience and representations of these health care providers on the complexity of obesity. In a context of kindness and respect, each person could freely express ones' feelings.
Results: 66 participants out of 5 training sessions improved their knowledge rate of different stages of obesity and its comorbidities from 66% to 83%. The immediate weight gain experience through the loaded jackets and its consequences on the body raised awareness from 58% to 79%. All the participants found the workshop to be a highlight of the day (great, dynamic, interesting, very good idea and motivating)
Conclusion: Results are not only in terms of knowledge of obesity but also psychologically bringing awareness on the experience of becoming suddenly overweight.

PO2.243

Understanding the role of health-related practices in the experiences of individuals who attend a twelve-week weight management programme

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Background: Weight management programmes often focus on behaviour change at the individual level. These programmes aim to reduce fatness by targeting individuals' physical activity levels and food consumption. Such focus on individual(ised) behaviours may explain why these approaches do not work in the longer term. According to sociological thinking, behaviours like physical activity and diet are social practices that are enacted and reproduced in social environments.
Therefore, this study aims to identify the role health-related practices play in the experiences of those who attended a twelve-week weight management programme that adopts a calorie counting approach to dietary change.
Methods: This research adopts a qualitative research design, the experiences of 21 individuals are explored through semi-structured life history interviews. Data were analysed using thematic analysis.
Findings: Despite the weight management programme focusing on individual behaviours, findings suggest that participants who completed the programme and adopted some of the programme's key messages, successfully changed their health-related practices. Given that the focus of the current weight management programme is to change dietary intake by calorie counting, the practices discussed here are food related. These include shopping, cooking and eating.
Findings also suggest that those who struggle to complete the programme, or struggle to adopt the programme's key messages may well be because of the difficulties they experience in getting support from partners or family members at a household level to change their shared food related practices.
Conclusion: This research concludes that health-related practices play an important role in shaping peoples experiences of weight management intervention, specifically, their ability to complete a programme or adopt the programmes key messages.

PO2.244

Evolution of sucrose and fatty acid response thresholds and subjective food sensations after sleeve gastrectomy or gastric by-pass in adult women

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Introduction: Morbid obesity is one of the major public health challenges worldwide. Body mass loss secondary to restrictive bariatric surgery (Sleeve gastrectomy – SG) or mixt procedure with malabsorption (Roux-en-Y gastric by-pass – RYGB) is usually associated with healthier food choices. However, origin of this behavioral change remains elusive.
Objective: to explore the respective impact of SG and RYGB both on the oro-sensory perception to sweet and fattiness stimuli and on the related changes in food sensations in adult women suffering from severe obesity (BMI >35 kg/m^2).
Methods: Sucrose and linoleic acid (LA) response thresholds were studied using 3 alternative-forced choice procedures in adult women, 2 weeks

before and 6 months after SG (n = 32) or RYGB (n = 13). Eight and 18 increasing concentrations of Sucrose and LA were tested in the morning in overnight fasted patients subjected to a standardized meal the previous evening.
Results: Six months after SG and RYGB, the body mass loss was 31.6 ± 3.5 kg and 32.4 ± 6.9 kg, respectively. Sucrose response thresholds were similar before and after surgery whatever the technique used, although a downward trend was found after RYGB. Similarly, SG elicited no significant change in orosensory perception of LA. By contrast, LA response threshold was significantly decreased after RYGB (0.41 mM vs 0.90 mM before surgery, p = 0.01) demonstrating a greater orosensory sensitivity to fat. Paradoxically, these data were discordant with the food acceptability of patients who described an increase in the intensity of sweet and "fatty" tastes in more than two thirds of cases, independently of the type of surgery.
Conclusion: These findings suggest that i) restrictive and malabsorptive surgeries haven't the same impact on the oral fat perception and ii) oro-sensitivity to sweet and fat stimuli can be regulated independently. Thus, the change in dietary choices following bariatric surgery appears to be a complex phenomenon that cannot be reduced to the taste sensitivity.

Conflict of Interest: None Disclosed.

Funding: grants for this work have been received from Téréos, Avril and Labex LipSTIC (ANR-11-LABX-0021-LipSTIC).

PO2.245

Quality of life five years after sleeve gastrectomy

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Introduction: Impaired quality of life (QOL) is a strong incentive to seek bariatric surgery. Sleeve gastrectomy (SG) has recently become the most frequently performed bariatric technique worldwide, and long-term reports on QOL are warranted. We investigate changes in QOL and its associations with weight loss five years after SG.
Methods: Demographic, anthropometric and patient-reported data were prospectively collected preoperatively, and at one and five years. Disparate dimensions of QOL were assessed with the Obesity-Related Problem Scale (OP) and the Short-Form 36 (SF-36) using the two summary scores: Mental Composite Score (MCS) and Physical Composite Score (PCS). Change over time in OP, MCS and PCS along with predictors of OP five years after surgery were studied using longitudinal models.
Results: 127 adult SG patients (mean age 41 (± 12) years, 68% women) was included, with a follow-up rate of 87% and 64% at one and five years, respectively.
Percent excess BMI loss (%EBMIL) was 76.1% (95% CI: 72.6 to 79.6) and 64.4% (95% CI: 58.9 to 69.9) after one and five years, respectively.
The OP-score improved significantly from before SG (mean 63, 95% CI: 59 to 67) to one year after surgery (mean 21, 95% CI: 18 to 25) followed by a slight trend toward baseline after five years (mean 31, 95% CI: 25 to 36). MCS (mean 43, 95% CI: 41 to 45) and PCS (mean 38, 95% CI: 37 to 40) improved from before SG to one year after surgery (MCS: mean 53, 95% CI: 51 to 55) (PCS: mean 52, 95% CI: 51 to 54). Slight declines were observed at five years (MCS: mean 48, 95%CI: 45 to 50) (PCS: mean 46, 95% CI: 44 to 49).
Multiple regression analysis revealed that %EBMIL after five years significantly predicted OP (b = -0.4, 95% CI: -0.6 to -0.2) adjusted for preoperative OP, age, sex and medically treated anxiety and depression.
Conclusion: Significant improvements in all dimensions of QOL five years after SG were identified, and changes over time closely reflected the pattern of weight change. Targeted postoperative support may benefit patients in risk of long-term inadequate weight loss and impairments in QOL.

PO2.246

Cardiometabolic markers as a function of body composition in young adults: beyond body fat

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Introduction: Human variability in cardiometabolic markers is often reported to be better related to variability in measures of body fat rather than body-mass-index (BMI) or waist circumference (WC), but the relative importance of fat-free mass (FFM) to this variability is rarely invoked. We investigated the relationships between cardiometabolic markers, anthropometry (BMI, WC) and measures of body composition (FFM, total fat and fat%, abdominal fat%) in young adults in Mauritius – an island nation with a high prevalence of type 2 type diabetes and cardiovascular disease.
Methods: In 175 healthy (disease-free) Mauritian men and women (age: 20-42 y; BMI: 15-41 kg/m^2) and belonging to the two main ethnicities (Indians of South Asian descent; Creoles of African/Malagasy descent), anthropometry and blood pressure were measured after an overnight fast. Blood was then withdrawn for analysis of glycemic profile (glucose, insulin, HbA1c, HOMA IR), lipid profile (triglycerides, total cholesterol, HDL cholesterol), inflammatory profile (CRP, TNF-α, IL-6, adiponectin), leptin and other cardiometabolic health markers (uric acid, urea, cortisol). For body composition, total fat and FFM were assessed by isotopic Deuterium dilution technique, and abdominal fat% by bioimpedance analysis.
Results: In addition to gender differences in total and abdominal body fat% (greater in women than in men for the same BMI and WC, respectively), gender-specific ethnic differences in body composition among Indians and Creoles are also observed, with Indian men showing greater body fat% (total and abdominal) than Creole men for the same BMI or WC. Regression and co-variance analyses indicate that body fat% is the strongest correlate for plasma leptin and CRP, and entirely explains gender and ethnic differences in leptin. However, it is the FFM which is the stronger correlate for all the other cardiometabolic markers, and furthermore FFM explains all or most of the gender differences in fasting blood glucose, triglycerides, adiponectin, TNF-α, cortisol, uric acid, urea as well as blood pressure (all higher in men than in women).
Conclusion: In this cohort of disease-free young adults with a large range of BMI, it is the fat-free-mass (rather than measures of body fat), which is the stronger determinant of variability for most cardiometabolic markers.

PO2.247

Obesity is an independent risk factor of chronic kidney disease in Korean men

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Background: The prevalence of chronic kidney disease (CKD) is increasing in parallel with comorbidities such as diabetes and hypertension. However the association between obesity and CKD is unclear. We evaluated the association between obesity and decreased GFR in Korean men.
Methods: We analyzed 1,812 subjects using data from the Korea National Health and Nutrition Examination Survey (KNHANES) VII-1 (2016) after excluding participants with cancer or debilitating chronic diseases. Normal GFR referred to GFR ≥60 mL/min/1.73m^2, and decreased GFR was defined as GFR < 60 mL/min/1.73m^2. The association between obesity or abdominal obesity and decreased GFR was analyzed after adjustment for demographic variables and lifestyle factors. The odds ratio (OR) and 95% confidence interval (CI) were calculated by multivariate logistic regression analyses.
Results: As age increased, the ORs for decreased GFR increased in men. In comparison to the men with BMI <23 kg/m^2, the OR for decreased GFR increased in men with BMI 23-24.9 kg/m^2 (OR 1.32; 95% CI 0.66-2.66) and men with BMI ≥25 kg/m^2 (OR 1.86; 95% CI 1.04-3.22) (P for trend < 0.05). Also, in comparison to the men with waist circumference < 90cm, the OR for decreased GFR increased in men with waist circumference ≥90 cm (OR 1.89; 95% CI 1.16-3.08).
Conclusion: Decreased GFR was independently associated with obesity or abdominal obesity. Appropriate body weight control is needed to prevent chronic kidney disease in Korean men.

PO2.248

Not Prader-Willi syndrome: successful fertility in a patient with an erroneous diagnosis for over 25 years

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We present a 29-year-old man diagnosed as Prader-Willi Syndrome (PWS). In childhood some facial dysmorphic features and learning difficulties were noted but he lacked many of the typical features of PWS with normal appetite, weight and behavior. The diagnosis of PWS was based solely on chromosomal analysis performed in infancy.
At puberty he had poorly developed secondary sexual characteristics. He was diagnosed with hypogonadotrophic hypogonadism and commenced on testosterone replacement. MRI pituitary was normal. Further investigations revealed hypothyroidism and growth hormone deficiency following which thyroxine treatment was commenced.
He presented age 25 with fertility concerns. On review he lacked features of PWS and pituitary profile was inconsistent with expected results in PWS. Semen analysis off testosterone confirmed azoospermia. Repeat detailed genetic testing showed no evidence of PWS. Extensive regions of loss of heterozygosity were identified. This is consistent with consanguinity and increased risk of inherited cognitive difficulties in any offspring. A clear alternative diagnosis for our patient was not identified.
He did not attend genetic counselling and underwent fertility treatment without success. Following discontinuation of fertility treatment his wife had a spontaneous pregnancy and later gave birth to a daughter.
This case highlights the importance of revisiting an established diagnosis. Despite the previous genetic confirmation, no clinical evidence supported a diagnosis of PWS. In addition to the ethical issues of inappropriate diagnosis and treatment in a patient with an unclear, potentially inheritable condition consideration must also be given to the appropriateness of offering fertility treatment. The availability of the technology does not absolve the clinician of responsibility to act in a patient's best interest.

Obesity Facts
The European Journal of Obesity

Author Index

Obesity Facts 2019;12(suppl 1):1–290

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