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PERCEPTIONS TOWARDS A HEALTHY DIET AMONG A SAMPLE OF UNIVERSITY PEOPLE IN PORTUGAL

Running Title: PERCEPTIONS TOWARDS A HEALTHY DIET

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Abstract

Purpose: A healthy diet has been recognized as one of the most important factors associated with the maintenance of human health as well as to help preventing the development of some chronic diseases. Therefore, this work aimed at studying the perceptions of a sample of university people regarding a healthy diet.

Methodology: It was undertaken a descriptive cross-sectional study on a non-probabilistic sample of 382 participants. The data was collected among a sample of Portuguese university people and measured if people´s perceptions were compliant with a healthy diet.

Findings: The results revealed that the participants' perceptions were, in general, compliant with a healthy diet (scores between 0.5 and 1.5, on a scale from -2 to +2). However, were found significant differences between age groups (p=0.004), with a higher average score for young adults, and also between groups with different levels of education (p=0.025), with a higher score for university degree. The variable chronic diseases also showed significant differences (p=0.017), so that people who did not have any chronic diseases obtained a higher score.

Originality/Value: This study is considered important because it provides evidences about the relation between nutrition knowledge and the perceptions towards a healthy diet. The study allowed concluding that the participants were aware about some nutritional aspects of their diets and, therefore, their perceptions were compliant with a healthy diet. This finding is very relevant, because it could be a support for health policy initiatives directed at promoting healthy eating behaviours.

Keywords: Chronic diseases, healthy diet, nutrition knowledge, perceptions, survey.

INTRODUCTION

It is well established that an inadequate diet and low levels of physical activity are associated with many non-communicable diseases, besides having many social and economic consequences (Campbell, 2003; Naughton et al., 2015; Ogden et al., 2007; World Health Organization, 2000).

Food behaviour is a complex process influenced by many factors, such as socioeconomic status, demographics, taste, convenience, food cost, lifestyle characteristics, security, cultural and religious beliefs or nutrition knowledge (Deshmukh-Taskar et al., 2007; Spronk et al., 2014). Nutrition knowledge is a multifactorial construct and it is affected by several aspects such as age, sex, level of

education and socio-economic status (Hendrie, Cox, et al., 2008; Parmenter et al., 2000; Spronk et al., 2014). Therefore, the specific contribution of nutrition knowledge to dietary behaviour in view of a healthy diet is considered complex (Wardle et al., 2000) and some scientific evidences suggest that nutrition knowledge is a major factor in promoting favourable health and dietary changes (Dammann and Smith, 2011; Petrovici and Ritson, 2006; Rustad and Smith, 2013).

According to the recommendations, a healthy diet should contain a high amount of fruit, vegetables and dairy products, a good portion of starchy foods like bread, potatoes and pasta, a moderate portion of meat or fish, and not too much saturated fatty acids, added sugars or refined grains. It is also important the adequate intake of water and the energy intake should be according to individual's needs (Guenther et al., 2013; Vereecken et al., 2009). Since nutrition knowledge is one of the factors influencing a healthy diet, numerous studies have investigated the association between nutrition knowledge and people's dietary behaviour. Some of those studies suggested that individuals with higher nutrition knowledge are more likely to follow a healthy diet (Grafova, 2006; Parmenter et al., 2000; Worsley, 2002). Other studies, however, showed weak associations between nutrition knowledge and healthy eating habits (Dickson-Spillmann and Siegrist, 2011; Sapp and Jensen, 1997; Shepherd and Towler, 1992; Wardle et al., 2000). In fact, people's perceptions about a healthy eating are complex and reflect their personal, social and cultural experiences, as well as their living environment. Furthermore, some people can understand the concept of a healthy diet, but nevertheless may be unwilling or unable to adopt it (Bisogni et al., 2012). Eating habits among young adults are an important health concern, because in most cases involve a transition from secondary school to university where they need to adapt to a new social environment that often translates into poor eating habits (Deliens et al., 2014; Eves et al., 1995; Ganasegeran et al., 2012; Rodrigues et al., 2013). Because the information about Portuguese's eating habits, especially among university people, is limited, it is crucial to perform more studies in this area, in order to promote more efficient health strategies among this group.

This study is included in the project entitled "Psycho-social motivations associated with food choices and eating practices (EATMOT)" which intends to perform a research on different countries about some psychic and social motivations that determine people's eating patterns in relation to their choices or eating habits.

The main goal of this particular study was to evaluate if people's perceptions corresponded to a healthy diet, for a sample of Portuguese university people, including staff, teachers and students. It was also analysed in what way factors such as gender, level of education, living environment, and anthropometric data or behavioural and health related elements could influence the participants' perceptions about a healthy diet. The research hypothesis was therefore as follows: Are the perceptions of the participants compliant with practices of a healthy diet?

MATERIALS AND METHODS

Instrument

To undertake this study was prepared a questionnaire to access information about several issues related to dietary practices, and which included the following sections: Part I – Sociodemographic data; Part II – Anthropometric data and behavioural and health related elements; Part III – Perceptions about a healthy eating. To measure the perceptions about healthy eating, were included in part III questions about which the respondents were asked to state their accordance measured on a 5-point Likert scale varying from 1 to 5: 1 (totally disagree), 2 (disagree), 3 (neither agree nor disagree), 4 (agree) and 5 (strongly agree) (Likert, 1932). Hence, the respondents were asked to indicate their extent of agreement towards the following statements: 1. "A healthy diet is based on calorie count", 2. "We should never consume sugary products", 3. "Fruit and vegetables are very important to a practice of a healthy eating", 4. "A healthy diet should be balanced, varied and complete", 5. "We can eat everything, as long as it is in small quantities", 6. "I believe that food produced in a biological way is healthier" and 7. "We should never consume fat products". The

statements for the perceptions about a healthy eating were created through a review of previous research (Aikman et al., 2006; Jackson et al., 2003; Lindeman and Väänänen, 2000; Renner et al., 2012; Roininen et al., 1999; Steptoe et al., 1995; van Strien et al., 1986) and discussions between the project team members. The Portuguese team was composed by six members from the areas of food science, nutrition, health sciences, statistics, education sciences and psychology.

Data collection

This descriptive cross-sectional study was undertaken on a non-probabilistic sample of 382 participants living in Portugal and belonging to the university community, including staff, teachers and students.

The questionnaires were applied by personal interview, after verbal informed consent only to adults (aged 18 or over). The data collection was carried out between January and June 2017. All ethical issues were verified when formulating and applying the questionnaire, which was approved by the Ethical Committee with reference nº 04/2017.

Statistical Analysis

Basic descriptive statistical tools were used for exploratory analysis of the data. In order to analyse the relations between the different sociodemographic variables and the perceptions towards a healthy diet, as well as the relations between the different variables of the anthropometric data and behavioural and health related elements and the perceptions towards a healthy diet, it was necessary to calculate an average of the scores obtained for all the items included in part III of the questionnaire. For this, the scale used was reformulated to allow the calculation of an average score without the influence of the score attributed to the mean point of the Likert scale (3 = neither agree nor disagree). Therefore, the items were recoded into a new scale as follows: -2 (totally disagree), -1 (disagree), 0 (neither agree nor disagree), 1 (agree) and 2 (strongly agree). These scores were then

used to calculate the average score obtained for each participant, thus giving the variable *perceptions towards a healthy eating*. Note that before calculating the average, items 1, 2 and 7 were inverted. The variable *perceptions towards a healthy eating* corresponds to values varying from -2 to +2, and which could be interpreted as follows: values ≥ -2.0 & < -1.5 = perceptions not at all compliant with a healthy diet; values ≥ -1.5 & < -0.5 = perceptions not compliant with a healthy diet; values ≥ -0.5 & < 0.5 = perceptions poorly compliant with a healthy diet; values ≥ 0.5 & < 1.5 = perceptions compliant with a healthy diet; values ≥ 1.5 & ≤ 2.0 = perceptions fully compliant with a healthy diet.

The Student´s t-test for independent samples and one-way ANOVA were used to compare the means of two groups and the means of three or more groups, respectively. In the case of ANOVA, the post-hoc Tukey HSD test was used to assess the differences between groups. The Tukey's test, also known as the Tukey's HSD (Honestly Significant Difference) test is a statistical test to find out which means are significantly different from each other, and consists in a single-step multiple comparison procedure, coupled to ANOVA (Guiné et al., 2015). In this test the difference between means is evaluated to see whether or not it is greater than the standard error (Guiné et al., 2014; Rodrigues et al., 2014; Santos et al., 2014). Also the crosstabs and the chi square test were used to assess the relations between some of the variables under study. Cramer's V was used in some cases to evaluate the strength of the significant relations found between some of the variables at study. This coefficient varies from 0 to 1, and for V ≈ 0.1 the association is considered weak, for V ≈ 0.3 the association is moderate and for V ≈ 0.5 or over, the association is strong (Witten and Witte, 2009). In all tests the level of significance considered was 5% ($p<0.05$) and for all data analyses was used the SPSS software from IBM Inc. (version 24).

Sample Characterization

Table 1 summarizes the demographical data for the sample studied. In this survey participated 382 adults, from which 77% were women and 23% were men. The average age of the participants

was 26±11 years, ranging from 18 to 70 years. The average age of women was lower (25±10 years) when compared to the average age of men (28±13 years). The participants were classified into age groups according to: young adults (18y ≤ age ≤ 30y), accounting for 82.2%; average adults (31y ≤ age ≤ 50y), corresponding to 13.1%; senior adults (51y ≤ age ≤ 64y), representing 3.9%; and finally elderly (≥ 65y), which accounted for 0.8% of the sample. The majority of the participants, 79.6%, had completed secondary school, 20.2% had a university degree and only 0.3% had the lowest level of education (primary school) as their terminal education. As for the civil state, 82.2% of the participants were single, 14.7% were married or lived together as a marital couple, 2.6% were separated or legally divorced and 0.5% were widowed. Regarding the living environment, 46.3% of the participants lived in an urban environment, 41.4% lived in rural areas and 12.3% lived in a suburban area. Concerning the professional status, most of the participants were students (74.3%), 17.5% were employed, 7.3% were working students, 0.5% were unemployed and 0.3% were retired.

When the participants were asked if their professional activity or studies were related to nutrition, food, agriculture, sports, psychology or other health related activity, 36.3% answered no, 30.2% indicated that they had a professional activity or field of studies related to health, 12.4% to sport, 11.5% to food science, 4.4% to psychology, 4.4% to agriculture and only 0.8% had an activity or studies in the area of nutrition. When analysed by gender, a higher percentage of the women (34.8%) had a professional activity or field of studies related to health when compared to men (15.3%). The majority of the participants indicated that they were responsible for buying their own food (83.1%), against 16.9% that answered that they were not.

RESULTS AND DISCUSSION

Anthropometric data, behavioural aspects and health related elements

Because anthropometric data and some behavioural aspects are intimately related to people's food behaviour, these aspects were also included in the questionnaire. Height and weight were obtained by

self-response, allowing then to calculate the body mass index (BMI), as weight (kg) divided by height squared (m^2). The results of the BMI were classified according to the standards of the International Classification: underweight (BMI < 18.50 kg/m^2), normal weight (18.50 ≤ BMI ≤ 24.99 kg/m^2), overweight (25.00 ≤ BMI ≤ 29.99 kg/m^2) and obese (BMI ≥ 30.00 kg/m^2) (World health Organization, 2006). There were also included questions about the intensity of physical activity, dietary regimen, chronic diseases, food allergies/intolerances and information about episodes of eating disorders.

Table 2 shows the prevalence of BMI in the population studied and shows that the majority of the participants had a normal weight (73.3%), 18.1%, were overweighted, 5.7% were underweighted and 3.0% were obese. According to gender, the majority had a normal weight, being this percentage 73.0% for women and 74.4% for men. The results of the Chi square test made to the association between the variables *BMI* and *Gender*, showed no significant differences, meaning that gender did not influenced *BMI*. As to the possible association between the variables *BMI* and *practice of physical activity*, it was not found a significant association between these variables, and therefore the *practice of physical activity* did not influence *BMI*.

When asked about the frequency of practicing physical activity, 27.2% of the participants answered that they practiced physical activity moderately (2-3 times/week) and 10.5% practiced intensively (more than 3 times/week). With sporadic physical activity (less than once/week) were 27.0%, occasionally (once/week) 23.6% and never 11.8%, which is considered inappropriate. Physical inactivity is one of the important risk factors for morbidity and mortality worldwide (Reiner et al., 2013; World Health Organization, 2009). When seen by gender, the results were quite different. While 31.0% of the women practiced physical activity sporadically (never: 13.9%, sporadically: 31.0%, occasionally: 25.9%, moderately: 25.5%, intensively: 3.7%), for men there seems to be a slight trend to increase intensity of physical activity (never: 4.5%, sporadically: 13.6%, occasionally: 15.9%, moderately: 33.0%, intensively: 33.0%). These differences between genders

were statistically significant (χ^2 = 72.030; p < 0.05), and gender proved to influence the practice of physical activity, with a moderate association (Cramer's V = 0.434). These findings are consistent with previous scientific research, where it was found that men tend to practice more exercise than women (Chalabaev et al., 2013).

It was also evaluated if the participants considered practicing a balanced diet. The results indicated that most of the participants (51.0%) thought that they did it sometimes, 39.5% did it frequently, 7.1% did it rarely, 1.6% did it always, and only 0.8% responded that they never practiced a balanced diet. These trends were not much different for both genders, women (never: 1.0%, rarely: 7.8%, sometimes: 49.7%, frequently: 40.1%, always: 14%) and men (never: 0.0%, rarely: 4.5%, sometimes: 55.7%, frequently: 37.5%, always: 2.3%). As it was expected in view of these results, it was not found an association between the variables *balanced diet* and *gender*. There were also investigated other possible associations, namely the influence of variables like *level of education* and *civil state* on the practice of a *balanced diet*. It was observed that the *level of education* did not influence the practice of a *balanced diet*, but *civil state* did (χ^2 = 34.231; p = 0.001). Nevertheless, the association between the variables *balanced diet* and *civil state* was weak (V = 0.173).

Table 3 presents the dietary regimen practiced by the participants, and the results showed that most of the participants (82.2%) did not practice any specific voluntary dietary regimen, being this percentage higher for men (92.0%) when compared to women (79.2%). None of the participants followed a vegan or raw foodism dietary regimen. As it can be observed, 10.5% of the participants followed a caloric restriction as their dietary regimen. When seen by gender, 13.0% of the women indicated following a caloric restriction diet, against only 2.3% of men. The results of the Chi square test proved that these differences between genders were significant, meaning that *gender* influenced *dietary regimen* (χ^2 = 15.494; p = 0.017), although, the values of Cramer's coefficient indicated that this association was weak (V = 0.202). In fact, women tend to have more body image disturbances

and dissatisfaction with body image has been seen as a factor for conditioning food intake, namely in terms of restriction (Fett et al., 2009; Vocks et al., 2007).

As to the possible association between the variables specific *dietary regimen* and *BMI*, it was found that the variables were not correlated, and therefore *BMI* did not influence the practice of a specific voluntary *dietary regimen*.

Table 4 presents the participants' chronic diseases. As it can be observed, most of the participants (84.9%) indicated that they did not have any chronic disease and 8.2% affirmed that they had other chronic diseases not specified in the question, such as asthma or allergic rhinitis. All the other chronic diseases affected a low percentage of participants, which is not surprising since 82.2% of the participants were young adults ($18y \leq age \leq 30y$). To assess the relation between the variables *absence of chronic diseases* and *age category*, also the Chi square test was used ($\chi^2 = 26.521$; $p = 0.004$) and significant differences were encountered, which demonstrated that there was an association between *absence of chronic diseases* and *age category*, so that the prevalence of chronic diseases tended to increase with age. The association between these variables was weak to moderated ($V = 0.265$). According to the evidences, ageing is an important risk factor for the development of most diseases and conditions the quality of life (Kennedy et al., 2014).

Also the *BMI* class has proven to influence the *absence of chronic diseases* (Chi square test: $\chi^2 = 13.556$; $p = 0.004$) and people with higher BMI tended to have at least one chronic disease. However, in this case the association between the variables was weak ($V = 0.192$). In fact, overweight and obesity are major contributors to the global burden of disease (Kearns et al., 2014; World Health Organization, 2016).

Table 5 presents the participants' food allergies or intolerances, and the results showed that most of the participants (89.7%) indicated that they did not have any food allergy or intolerance and only 6.3% indicated they suffered from lactose intolerance. All the other food allergies/intolerances had a low percentage of incidence among the enquired. When seen by gender, it was observed that there

were significant differences between men and women for lactose intolerance (χ^2=4.077; p = 0.005), with no men suffering from this food intolerance against 8.3% women who suffered from it. However, the association was weak (V = 0.143). According to the evidences, approximately 75% of the world's human population is lactose intolerant (Silanikove et al., 2015).

When the participants were asked if they, at any time of their life, experienced any eating disorders, 93.2% answered that they did not, being this percentage higher for men (97.7%) when compared to women (91.8%), as it can be observed in Table 6. Nevertheless, when the association between the variables *eating disorders* and *gender* was tested by the Chi square test, no significant differences were found, meaning that these variables were not associated (χ^2=4.077; p = 0.396). Other epidemiological studies have shown that women have higher tendency to suffer from bulimia and anorexia nervosa than men (Hoek, 2006; Striegel-Moore and Bulik, 2007). However, the prevalence of binge-eating has been reported as similar for women and men (Hudson et al., 2007; Striegel-Moore et al., 2009). In fact, women are usually more concerned about body image and for some of them the body changes that occurs with ageing are perceived as negative (Marshall et al., 2014).

It was also tested the possible association between the variables *eating disorders* and *dietary regimen*, and in this case significant differences were found (χ^2=100.640; p < 0.05) with a weak to moderate association (V = 0.257), which means that the participants who had already experienced an episode of any eating disorder were more likely to adopt a specific dietary regimen.

Perceptions towards a healthy eating

Individual's characteristics

Table 7 presents the results for the relations between sociodemographical characteristics and the *perceptions towards a healthy diet*, and as it can be observed for young adults the mean score was 1.05±0.35, for average adults was 1.02±0.45, for elderly the value was equal to 1.00±0.29 and with

a lowest score came the group of senior adults (0.69±0.57), meaning that, in general, for those participants the perceptions were compliant with a healthy diet. The results of the ANOVA test showed that there was a significant difference in the perceptions towards a healthy eating among age groups. This finding is not consistent with the ones obtained in previous studies, where it was found that healthy eating motivation becomes stronger with increasing age (Hearty et al., 2007; Kearney et al., 1998; Naughton et al., 2015; Roininen et al., 1999). Furthermore, in another study it was suggested that as people get older and more susceptible to various diseases they may be more interested in health issues and healthy eating (Maddock et al., 1999).

As for gender, it was found that both women and men had perceptions compliant with a healthy diet (1.05±0.38 for women and 0.99±0.38 for men) and the results of Student's t-test showed no significant difference between genders. These results are not consistent with those obtained in other studies, in which was suggested that women tended to have a healthier eating behaviour than men (Hendrieet al., 2008; Kiefer et al., 2005; Prättälä et al., 2007).

Social relationships are an important aspect of a person's life, which affect health and can also influence dietary behaviour (Conklin et al., 2014). Several studies suggested that marital status is an important determinant for health-promoting behaviours including healthier eating habits (Hartmann et al., 2014; Johnson et al., 2000; Joung et al., 1995; Pollard et al., 2001; Roos et al., 1998; Umberson, 1992; Wickrama et al., 1995; Yannakoulia et al., 2008). However, in this study all mean scores for the different marital status had values between 0.5 and 1.5, which indicate that single, married/living together and divorced/separated or even the widowed participants had perceptions compliant with a healthy diet. In fact, the highest score achieved was for the single participants (1.05±0.36), but no significant differences were found between the different civil state groups regarding the perceptions towards a healthy eating.

As for the level of education, it was observed that the participants with a university degree were those who achieved the highest score in healthy diet perceptions (1.13±0.38), followed by the

participants that had completed secondary school (1.01±0.37) and finally the participants with the lowest level of education (primary school) as their terminal education (0.57±0.0), with values corresponding to perceptions compliant with a healthy eating in all cases. As it was expected, were found significant differences between the levels of education concerning the perceptions towards a healthy eating. In general, a higher educational level is associated with a healthier diet (Lê et al., 2013).

Social and professional factors

Regarding the relations between social or professional factors and the *perceptions towards a healthy diet*, the results showed that there were no significant differences between the participants who were responsible for buying their own food against the participants who were not, as it can be observed in Table 7. For both groups the scores were higher than 0.5 and lower than 1.0, which means that the participants' perceptions were compliant with a healthy diet.

Poor dietary patterns and obesity have been associated with neighbourhood deprivation, neighbourhood minority composition, and low area population density (usually found in rural areas) (Araújo, 2008; Chang, 2006; Diez-Roux et al., 1999; Larson et al., 2009; Lopez, 2007; Nelson et al., 2006; Robert and Reither, 2004; Rundle et al., 2007; Stimpson et al., 2007). However, in this study were not found significant differences in the scores representing the perceptions towards a healthy diet among the participants that lived in different areas. In fact, with a higher score came the participants who lived in rural areas (1.04±0.36), followed by the participants who lived in urban areas (1.03±0.41) and finally the ones who lived in suburban areas (0.99±0.35). These results revealed that in the three cases the participant's perceptions were compliant with a healthy diet.

In most industrialized countries it persists a pattern of social inequalities in diet quality and in health (Darmon and Drewnowski, 2015; Estaquio et al., 2008; Harrington et al., 2011; Kant and Graubard, 2007; Lallukka et al., 2007; Malon et al., 2010; McNaughton et al., 2008; Mullie et al.,

2010; Northstone and Emmett, 2010; Raffensperger et al., 2010), and groups of lower socioeconomic status tend to adopt diets with poorer nutritional value and of lower quality (Darmon and Drewnowski, 2015). For the sample at study, the scores obtained for *the perceptions towards a healthy diet* according to the professional status were 1.05±0.34 for students, 1.00±0.00 for retired, 0.99±0.48 for working students, 0.97±0.47 for employed participants and 0.79±0.91 for unemployed participants, which means that the participants in all of these professional groups had perceptions compliant with a healthy diet. However, there were no significant differences in the perceptions among the different professional status. This finding is consistent with other study, in which was shown that students are usually more slightly aware about nutritional issues (Barzegari et al., 2011). On the contrary, according to the results of the study of Dunne and Somerset (2004), unhealthy eating habits are common among university students.

Regarding the area of studies or work, as it was expected the participants who had a work or studies related to nutrition were the ones obtaining a highest score (1.48±0.36). For all the other groups, the scores were very similar and revealed that the perceptions were still compliant with a healthy diet. Furthermore, there were no significant differences among the areas of study/work. In a recent study, it was also found that people who had studies or professional activity in the area of nutrition tended to have healthier eating habits (Kobayashi et al., 2015) Furthermore, in a study developed by Nani (2016), it was demonstrated that nutritional knowledge contributes to better food choices and more adequate nutritional intake.

<u>BMI and physical activity</u>

Table 8 shows the relations between anthropometric data, behavioural and health related elements and the *perceptions towards a healthy diet*. As it can be observed, as BMI increased, the healthy diet perception scores decreased, being the highest value for the underweight class (underweight: 1.07±0.39, normal weight: 1.05±0.37, overweight: 0.96±0.46, obesity: 0.91±0.21). These results

mean that independently of the BMI class, the participant's perceptions were still compliant with a healthy diet. It is however important to note that in the sample at study the prevalence of underweight or obesity was small. Nevertheless, no significant differences were found across the BMI classes. This finding is consistent with the one obtained in the study of Fyler et al. (2014), where it was also found that there was no significant differences across BMI classes.

Physical activity plays an important role in some aspects of food choices and it has been associated with a better diet quality and higher intake of fruits and vegetables (Bellisle, 1999; King, 1998; Naughton et al., 2015). However, in this study the scores for all levels of physical activity were very similar and corresponded to perceptions compliant with a healthy eating (never: 1.00±0.41, sporadically: 1.05±0.35, occasionally: 1.04±0.40, moderately: 1.00±0.37, intensively: 1.08±0.43). Therefore, there were no significant differences between the different levels of physical activity.

Eating practices

As it can be seen in Table 8, most of the mean scores obtained for each level of practice of a healthy diet were very similar (never: 1.10±0.50, rarely: 1.05±0.34, sometimes: 1.01±0.38, always: 1.03±0.38), with only the exception for the participants who considered practicing a balanced diet frequently (0.64±0.46). This seems rather surprising, since the participants who assumed they frequently have a healthy diet revealed a slightly lower score for the *perceptions towards a healthy diet*, meaning that they might not be fully conscientious of their behaviours. Nevertheless, even for that group the score corresponds to perceptions compliant with a healthy diet. To examine the differences in healthy diet perceptions based on the eating practices, ANOVA was conducted and the results revealed that there were no significant differences. This finding is contrary to that of Fyler et al. (2014), according to which the participants with higher diet quality had proper healthy eating attitudes.

As for healthy diet perceptions based on special food regimens, the results revealed that the lowest score was obtained for caloric restrictions (0.89±0.41). Still, since all scores were between 0.5 and 1.5, it can be concluded that despite the special food regimen, the participants' perceptions were compliant with a healthy diet. Furthermore, no significant differences were found across the different food regime groups. Other studies suggested that vegetarians tend to have more consciousness about health aspects when compared with omnivores (Dinu et al., 2017; Kwok et al., 2014).

Health factors

The participants who suffered from chronic diseases as well as those who did not, revealed perceptions compliant with a healthy diet (Table 8). Nevertheless, the score was higher for the participants who did not have any chronic disease (1.05±0.38) when compared to those who had (0.92±0.42), with significant differences between them ($p < 0.05$). According to Böhn et al. (2013) the presence of multiple food intolerances can have a negative impact on quality of life, because multiple dietary exclusions can lead to a highly restrictive diet and deficient in essential micronutrients (Zheng et al., 2015). For the sample at study, the participants who indicated having a food allergy or intolerance demonstrated to have perceptions compliant with a healthy diet (1.06±0.47), being this trend similar for the participants who did not have any food allergy or intolerance (1.03±0.37). The results of the t-test showed that there were no significant differences in the healthy diet perception scores between these two groups.

As for the relation between eating disorders and the perceptions towards a healthy eating, the results showed that the highest healthy diet perception score was for the participants who already had experienced an episode of binge-eating (1.14±0.48), followed by the participants that never had any eating disorder (1.04±0.37), participants who had experienced an episode of anorexia nervosa (0.95±0.49), other eating disorders (0.86±0.49) and finally the ones who had experienced an episode of bulimia nervosa (0.57±0.49). Since all of the scores were between 0.5 and 1.5, it can be

considered that all of the participants in the eating disorder groups demonstrated, nevertheless, perceptions compliant with a healthy diet. The results of the ANOVA test revealed that no significant differences were found across the eating disorders groups. This finding is not consistent with previous research, where it was suggested that people who have an eating disorder have a series of inadequate and dysfunctional attitudes towards eating, with a complex relationship with food (Alvarenga et al., 2014). This difference might be due to the small amount of participants who suffered from these disorders among the sample at study.

CONCLUSION

This work allowed obtaining interesting results about the sample of population at study, namely in terms of some behavioural aspects and the perceptions towards a healthy eating. Among the most relevant results is the fact that, in general, the participants revealed positive perceptions towards a healthy diet. There were no significant differences in healthy diet perception scores regarding gender, civil state, the fact that the participants were responsible for buying their own food or not, the living environment, the professional status, the fields of work/studies, the BMI classes, the level of physical activity, the self-report of practicing a healthy diet or not, the practice of special food regimens, the incidence of food intolerances/allergies, or the experience of eating disorders. On the other hand, there were significant differences among age groups, for which young adults obtained the highest score for the perceptions compliant with a healthy diet and senior adults the lowest; and also regarding the level of education, with participants who had a university degree showing better perceptions towards a healthy diet. It was also found a significant difference in average scores from those who did not have any chronic disease and those who had, with a highest score for the participants who did not have any chronic disease.

Overall, the results allowed concluding that the participants in the study had knowledge about some nutritional aspects of their diet, and therefore their perceptions were compliant with a healthy

diet. These findings are very important, because they allow to identify how people interpret a healthy eating, which is fundamental to promote and implement strategies that may contribute to healthier eating habits among this group of population.

One limitation of this study is related to the fact that height and weight values have been self-reported, which means that they might not be as accurate as physical anthropometric measurements. Another limitation is the relatively low number of participants representing the targeted population and also the fact that they were mostly students. Nevertheless, the relative proportions of these groups (students, staff and professors) are indicative of the real proportions in the Portuguese universities. Finally, some possible improvements for future studies could be to include a larger number of university people from different institutions, possibly including more staff and professors, and to access the height and weight through direct measurement.

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728

729 Table 1. Sociodemographical characterization of the sample at study.

Sociodemographic Data		**Frequency (N)**	**Percentage (%)**
Age	18y ≤ age ≤ 30y	314	82.2
	31y ≤ age ≤ 50y	50	13.1
	51y ≤ age ≤ 64y	15	3.9
	Age ≥ 65y	3	0.8
Gender	Women	294	77.0
	Men	88	23.0
Highest Level of Education	Primary School	1	0.3
	Secondary School	304	79.6
	University Degree	77	20.2
Civil State	Single	314	82.2
	Married/Living Together	56	14.7
	Divorced/Separated	10	2.6
	Widow	2	2.6
Profession	Student	284	74.3
	Employed	67	17.5
	Unemployed	2	0.5
	Retired	1	0.3
	Working student	28	7.3
Total Number of Participants		**382**	**100.0**

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Table 2. BMI according to gender.

BMI class (kg/m^2)	**Global**	**Women**	**Men**	**Chi square test[1]**	**Cramer´s Coefficient[2]**
	N (%)	**N (%)**	**N (%)**	***p-value***	**V**
Underweight (BMI< 18.50)	21 (5.7)	21 (7.4)	0 (0.0)	0.058	0.142
Normal weight (18.50 ≤ BMI ≤ 24.99)	272 (73.3)	208 (73.0)	64 (74.4)		
Overweight (25.00 ≤ BMI ≤ 29.99)	67 (18.1)	48 (16.8)	19 (22.1)		
Obesity (≥ 30.00)	11 (3.0)	8 (2.8)	3 (3.5)		

[1] Used to assess the relations between the variables under study (level of significance 5%).
[2] Used to evaluate the strength of the significant relations found between the variables at study.

Table 3. Voluntary dietary regimen practice by the participants, according to gender.

Specific dietary regimen	**Global**	**Women**	**Men**	**Chi square test[1]**	**Cramer´s Coefficient[2]**
	N (%)	**N (%)**	**N (%)**	***p-value***	**V**

Raw foodism	0 (0.0)	0 (0.0)	0 (0.0)		
Fruitarianism	2 (0.5)	2 (0.7)	0 (0.0)		
Vegetarianism	11 (2.9)	10 (3.4)	1 (1.1)		
Veganism	0 (0.0)	0 (0.0)	0 (0.0)		
Flexitarianism	8 (2.1)	7 (2.4)	1 (1.1)	0.017	0.202
Caloric restriction	40 (10.5)	38 (13.0)	2 (2.3)		
Religious restriction	2 (0.5)	2 (0.7)	0 (0.0)		
Other	5 (1.3)	2 (0.7)	3 (3.4)		
None	313 (82.2)	232 (79.2)	81 (92.0)		

[1] Used to assess the relations between the variables under study (level of significance 5%).
[2] Used to evaluate the strength of the significant relations found between the variables at study.

748 Table 4. Participants' chronic diseases.

Chronic diseases	Global		Women		Men		Chi square test[1]	Cramer's coefficient[2]
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	*p-value*	V
Cardiovascular diseases	1.1	98.9	1.0	99.0	1.1	98.9	0.927	0.005
Diabetes	0.8	99.2	0.7	99.3	1.1	98.9	0.672	0.022
High cholesterol	2.4	97.6	3.1	96.9	0.0	100.0	0.096	0.086
Arterial hypertension	2.1	97.9	1.4	98.6	4.6	95.4	0.068	0.094
Gastric disorders	0.5	99.5	0.7	99.3	0.0	100.0	0.437	0.040
Intestinal disorders	0.3	99.7	0.3	99.7	0.0	100.0	0.583	0.028
Obesity	1.1	98.9	0.7	99.3	2.3	97.7	0.199	0.066
Others	8.2	91.8	8.6	91.4	6.9	93.1	0.608	0.026
None	84.9	15.1	85.2	14.8	83.9	16.1	0.773	0.015

749 [1] Used to assess the relations between the variables under study (level of significance 5%).
750 [2] Used to evaluate the strength of the significant relations found between the variables at study.
751

752 Table 5. Participants' food allergies/intolerances.

Food allergies/intolerances	Global		Women		Men		Chi square test[1]	Cramer's coefficient[2]
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	*p-value*	V
Lactose intolerance	6.3	93.7	8.3	91.7	0.0	100.0	0.005	0.143
Casein	0.3	99.7	0.3	99.7	0.0	100.0	0.581	0.028
Gluten	1.1	98.9	1.0	99.0	1.1	98.9	0.935	0.004
Nuts	0.3	99.7	0.0	100.0	1.1	98.9	0.069	0.093
Shellfish	2.1	97.9	2.1	97.9	2.3	97.7	0.907	0.006
Others	1.9	98.1	2.1	97.9	1.1	98.9	0.570	0.029
None	89.7	10.3	88.3	11.7	94.3	5.7	0.103	0.084

753 [1] Used to assess the relations between the variables under study (level of significance 5%).
754 [2] Used to evaluate the strength of the significant relations found between the variables at study.
755

Table 6. Participants' eating disorders.

Eating disorders	**Global**	**Women**	**Men**	**Chi square test[1]**	**Cramer´s Coefficient[2]**
	N (%)	**N (%)**	**N (%)**	***p-value***	**V**
Bulimia	3 (0.8)	3 (1.0)	0 (0.0)		
Anorexia	13 (3.4)	12 (4.1)	1 (1.1)		
Binge-eating	7 (1.8)	6 (2.0)	1 (1.1)	0.396	0.103
Other	3 (0.8)	3 (1.0)	0 (0.0)		
None	356 (93.2)	270 (91.8)	86 (97.7)		

Table 7. Relations between sociodemographical characteristics and the *perceptions towards a healthy diet* (scale from -2 = perceptions not at all compliant with a healthy diet to +2 = perceptions fully compliant with a healthy diet).

Variable		**Mean ± SD**	***p-value***
Age group	18y ≤ age ≤ 30y	1.05±0.35b	*0.004*[1]
	31y ≤ age ≤ 50y	1.02±0.45b	
	51y ≤ age ≤ 64y	0.69±0.57a	
	Age ≥ 65y	1.00±0.29b	
Gender	Women	1.05±0.38	*0.197*[2]
	Men	0.99±0.38	
Civil state	Single	1.05±0.36	*0.158*[1]
	Married/Living together	0.94±0.45	
	Divorced/Separated	0.91±0.70	
	Widowed	0.86±0.20	
Level of Education	Primary School	0.57±0.00a	*0.025*[1]
	Secondary School	1.01±0.37b	
	University	1.13±0.38b	
Is responsible for buying the food	Yes	1.02±0.39	*0.438*[2]
	No	1.06±0.35	
Living Environment	Rural	1.04±0.36	*0.750*[1]
	Urban	1.03±0.41	
	Suburban	0.99±0.35	
Professional status	Employed	0.97±0.47	*0.444*[1]
	Unemployed	0.79±0.91	

	Student	1.05±0.34	
	Retired	1.00±0.00	
	Working student	0.99±0.48	
Work or studies related areas	Nutrition	1.48±0.36	*0.147*[1]
	Food	1.07±0.43	
	Agriculture	1.06±0.40	
	Sport	1.06±0.35	
	Psychology	1.13±0.29	
	Health	1.05±0.33	
	Others	0.97±0.38	

[1]ANOVA for comparison of 3 or more groups (Level of significance 5%).Mean values with the same letter are not statistically different ($p<0.05$).

[2]Student's t-test for independent samples for comparison of 2 groups (Level of significance 5%).

Table 8. Relations between anthropometric data, behavioural and health related elements and the *perceptions towards a healthy diet* (scale from -2 = perceptions not at all compliant with a healthy diet to +2 = perceptions fully compliant with a healthy diet).

Variable		**Mean ± SD**	***p-value***
BMI class (kg/m^2)	Underweight (BMI< 18.50)	1.07±0.39	*0.223*[1]
	Normal weight (18.50 ≤ BMI ≤ 24.99)	1.05±0.37	
	Overweight (25.00 ≤ BMI ≤ 29.99)	0.96±0.46	
	Obesity (≥ 30.00)	0.91±0.21	
Physical activity[2]	Never	1.00±0.41	*0.753*[1]
	Sporadically	1.05±0.35	
	Occasionally	1.04±0.40	
	Moderately	1.00±0.37	
	Intensively	1.08±0.43	
Considers to practice a healthy diet	Never	1.10±0.50	*0.093*[1]
	Rarely	1.05±0.34	
	Sometimes	1.01±0.38	
	Frequently	0.64±0.46	
	Always	1.03±0.38	
Special food regimen	Raw foodism	------[3]	*0.177*[1]
	Frutarianism	0.93±0.30	
	Vegetarianism	1.14±0.39	

	Veganism	------[3]	
	Flexitarianism	1.02±0.49	
	Caloric restriction	0.89±0.41	
	Religion restrictions	0.93±0.91	
	Other	1.26±0.27	
	No special regimen	1.04±0.37	
Chronic diseases	No	1.05±0.38	*0.017*[4]
	Yes	0.92±0.42	
Allergies and intolerances	No	1.03±0.37	*0.610*[4]
	Yes	1.06±0.47	
Eating disorders	Bulimia	0.57±0.49	*0.177*[1]
	Anorexia	0.95±0.49	
	Binge-eating	1.14±0.48	
	Other	0.86±0.49	
	None	1.04±0.37	

[1]ANOVA for comparison of 3 or more groups (Level of significance 5%).

[2] Physical activity: never – no physical activity besides the daily life activities; sporadically – less than once/week; occasionally – once/week; moderately – 2-3 times/week; intensively - > 3 times/week.

[3] There were no occurrences.

[4] Student's t-test for independent samples for comparison of 2 groups (Level of significance 5%).