THE ADJUSTED EFFECT OF MATERNAL BODY MASS INDEX, ENERGY AND MACRONUTRIENT INTAKES DURING PREGNANCY, AND GESTATIONAL WEIGHT GAIN ON BODY COMPOSITION OF FULL-TERM NEONATES

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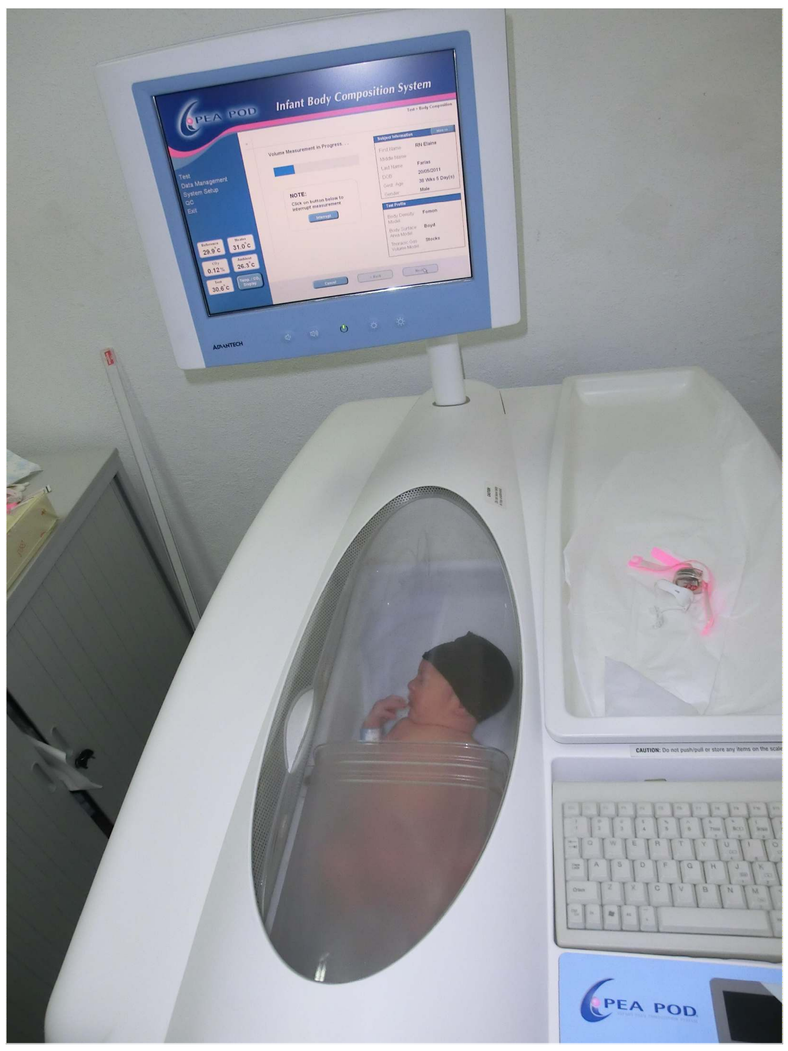
AIM

To evaluate the adjusted effect of the maternal nutritional status on the body composition of full-term appropriate-for-gestational age neonates.

METHODS

- Cross-sectional study of a systematic convenience sample of mother–infant pairs.
- Maternal nutritional status was assessed by:
  - prepregnancy body mass index (BMI),
  - maternal energy and macronutrient intakes during pregnancy,
  - gestational weight gain (GWG).
- Food intake during pregnancy was assessed by food frequency questionnaire and its nutritional value was calculated using Food Processor Plus® (ESHA Research, Salem, OR, USA).
- Neonatal body composition was assessed both by anthropometry and air displacement plethysmography (ADP) (Pea Pod® ML, Concord, CA, USA).
- Explanatory models for neonatal body composition were tested by multiple linear regression analysis (SPSS® 19.0, SPSS Inc., Chicago, IL, USA).



Measuring neonatal body composition by air displacement plethysmography (Pea Pod®) in the Nutrition Lab, Hospital Dona Estefânia, Centro Hospitalar de Lisboa Central.

RESULTS

100 mother–infant pairs were assessed.

For the **whole sample** of males and females (**Table 1**):

- Prepregnancy overweight positively associated with the offspring's weight, weight/length (W/L), BMI, and fat-free mass (FFM),
- Higher energy intake from carbohydrate positively associated with the offspring's mid-arm circumference (MAC) and W/L .

In **females** (**Table 2**):

- Higher GWG positively associated with the offspring's weight, length, and MAC.

In **males** (**Table 3**):

- Prepregnancy overweight positively associated with the offspring's MAC, ponderal index (PI), and fat mass (FM).

Table 1. Adjusted associations between neonatal measurements and prepregnancy overweight, in the whole sample.

	Prepregnancy BMI β estimate (95% CI)	*p*
Weight[a]	**0.233** (0.056, 0.410)	< 0.05
W/L[b]	**3.646** (0.728, 6.563)	< 0.05
BMI[c]	**0.565** (0.043, 1.088)	< 0.05
FFM[b]	**0.182** (0.059, 0.305)	< 0.05

Variables considered for the multivariable models: a – prepregnancy BMI, gestational weight gain, %TEV from protein and %TEV from carbohydrate; b - prepregnancy BMI, %TEV from protein and %TEV from carbohydrate; c - prepregnancy BMI.

Table 2. Adjusted associations between neonatal measurements and gestational weight gain in the female offspring.

	Gestational weight gain β estimate (95% CI)	*p*
Weight[a]	**0.014** (0.000, 0.028)	< 0.05
Length[b]	**0.087** (0.016, 0.157)	< 0.05
MAC[c]	**0.037** (0.001, 0.073)	< 0.05

Variables considered for the multivariable models: a – Gestational weight gain and %TEV from carbohydrate; b – Gestational weight gain, %TEV from carbohydrate, and %TEV from protein.

Table 3. Adjusted associations between neonatal measurements and prepregnancy overweight in the male offspring.

	Prepregnancy BMI β estimate (95% CI)	*p*
Weight[a]	**0.403** (0.191, 0.615)	< 0.01
MAC[a]	**0.765** (0.111, 1.419)	< 0.05
W/L[b]	**6.943** (3.362, 10.524)	< 0.01
BMI[b]	**1.162** (0.490, 1.834)	< 0.01
PI[b]	**0.002** (0.000, 0.003)	< 0.05
FM[c]	**0.120** (0.029, 0.212)	< 0.05
FFM[d]	**0.266** (0.116, 0.416)	< 0.01

Variables considered for the multivariable models:
a – prepregnancy BMI, %TEV from protein and %TEV from carbohydrate; b – prepregnancy BMI; c - prepregnancy BMI and % TEV from carbohydrate; d - prepregnancy BMI and %TEV from protein.

CONCLUSIONS

Greater prepregnancy BMI was found to be associated to greater offspring weight, W/L, and FFM. Higher maternal energy intake from carbohydrate was positively associated with the offsprings MAC and W/L. While in males greater adiposity was associated to prepregnancy BMI, in females greater body size at birth was associated to greater GWG.

Both larger observational studies and interventional studies controlled for more factors affecting fetal nutrition, using accurate estimates of both maternal diet and neonatal body composition, are need to confirm these results .

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