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Original / *Obesidad*

Mixed dietary pattern is associated with a slower decline of body weight change during postpartum in a cohort of Brazilian women

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Abstract

Objective: The aim was to assess the effect of dietary patterns on postpartum body weight change (BWC).

Methods: A Food Frequency Questionnaire (FFQ) with 81 items was applied in 278 women having the first six months after delivery as the time frame. Body weight (BW) was measured at 15 days (baseline) and at 2.6 and 9 months postpartum. Principal components analysis was used to extract the dietary patterns. Linear mixed models were performed having BWC as the outcome and the dietary patterns as independent variables.

Results: Two major dietary patterns were identified: healthy and mixed. Energy intake was 2,838 kcal (DP = 624) and 2,233 kcal (DP = 455), for women classified in the highest quartiles of mixed and healthy dietary patterns, respectively. Mean BWC declined -0.151 kg/month (SE = 0.02) independently of the dietary pattern. Predicted values of BWC among women that have adhered to mixed dietary pattern indicated a lower BWC of 0.830 kg/month (SE = 0.24; p < 0.001) at 6 months and 0.938 kg/month (SE = 0.24; p < 0.001) at 9 months postpartum.

Conclusion: The mixed dietary pattern was associated with a slower rate of BWC during postpartum, compared the healthy dietary pattern.

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UN PATRÓN DIETÉTICO MIXTO SE ASOCIA CON UN MENOR DECLIVE EN EL CAMBIO DEL PESO CORPORAL DURANTE EL PUERPERIO EN UNA COHORTE DE MUJERES BRASILEÑAS

Resumen

Objetivo: El propósito de este estudio fue evaluar el efecto del patrón dietético sobre el cambio de peso corporal (CPC) en el puerperio.

Métodos: Se aplicó una Cuestionario de frecuencia de alimentos (CFA) con 81 ítemes a 278 mujeres en el marco temporal de los siguientes 6 meses después del parto. El peso corporal (PC) se midió a los 15 días (basal) y a los 2,6 y 9 meses posparto. Se utilizó el análisis de los componentes principales para extraer los patrones dietéticos. Se realizaron modelos lineares mixtos, siendo el CPC el resultado y los patrones dietéticos las variables independientes.

Resultados: Se identificaron dos patrones dietéticos principales: saludable y mixto. El consumo de energía fue de 2.838 kcal (DP = 624) y 2.233 kcal (DP = 455), para las mujeres clasificadas en los cuartiles más altos de los patrones dietéticos mixto y saludable, respectivamente. El decremento promedio del CPC fue de -0,151 kg/mes (EE = 0,02) independientemente del patrón dietético. Los valores predictivos del CPC en las mujeres con un patrón dietético mixto indicaron un menor CPC de 0,830 kg/mes (EE = 0,24; p < 0,001) a los 6 meses y de 0,938 kg/mes (EE = 0,24; p < 0,001) a los 9 meses posparto.

Conclusión: El patrón dietético mixto se asoció con un ritmo de pérdida de peso más lento durante el puerperio en comparación con el patrón dietético saludable.

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Palabras clave: *Patrón dietético. Puerperio. Cambio en el peso corporal. Estudios de cohortes.*

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Introduction

The dietary pattern, energy intake and the large intra-individuals dietary intake variation during pregnancy may increase gestational weight gain (GWG).[1-3] Excessive GWG has been identified as a critical determinant of postpartum weight retention,[4-5] which is the main expression of maternal obesity and may affect up to 20% of the women.[6]

Factor analysis considers the complex nature of dietary intake and has been used in epidemiologic studies to test the association of dietary patterns with health outcomes.[7-8] This approach is considered an important toll and has been used to access the effect of dietary pattern on body weight composition and obesity.[9-12]

Perceived role of the food and selection of a safe dietary pattern to ensure fetus health and improve breastfeeding are common concern among women during the reproductive period.[13] These concerns may increase the number of food items consumed, and consequently total energy intake.[14] The eating habit includes the diet quality and quantity and is modulated by many factors such as socio-economic variables.[15-16]

The literature regarding dietary pattern during postpartum is scarce and most studies have been performed during pregnancy.[1,17-18] The few studies concerning dietary changes during the reproductive cycle are still inconclusive.[19-20] Castro et al. (2006)[21] reported a decreased intake of carbohydrates, cereals, fruits, milk and dairy products during postpartum, when compared to pregnancy in Brazilian women. These authors have observed that an increase in protein intake during postpartum facilitated body weight loss.[22]

The aim of this study was to describe dietary patterns in a cohort of Brazilian women and to examine the effect of these patterns on body weight change (BWC) over nine months of postpartum follow-up.

Materials and methods

Study design and participants

Data for the present study was collected using a prospective cohort design conducted from May 1999 to April 2001 at the Marcolino Candau Municipal Health Center and from the main maternity hospital in the study catchment area, in Rio de Janeiro municipality, Brazil. Participants were recruited at prenatal routine care and during the newborn routine immunization, and immediately after birth in the maternity hospital.

The study design involved 15 months of recruitment and nine months of follow-up after delivery, in which data was collected approximately at 15 days, 2, 6 and 9 months postpartum. A Food Frequency Questionnaire (FFQ) was applied at 6 months postpartum and was used to analyze the effect of dietary pattern on BWC during the first nine months postpartum. Information was based on 278 (65%) women aged 18-45 years of 430 (100%) that were recruited at baseline. Previous analyses have shown non-random losses of follow-up.[6] We have demonstrated that the losses to follow-up were random with respect to all variables.[22-23] Body weight at baseline (P = 0.30) and pre-pregnancy weight (P = 0.27) were not different between those who were followed and those who dropped out. Final model were adjusted for age women, because except to this variable, younger women have dropped out from the study. Analysis showed a random pattern of losses of dietary intake.

The ethic committee from the Institutional Review Board of the Institute for Studies in Collective Health (IESC) at the Federal University of Rio de Janeiro (UFRJ) approved the study. All the study's stages were announced to the participants, which provided written informed consent prior to participation in the study. Details of the study design and participation rates were presented elsewhere.[22-23]

Anthropometric assessment

Body weight (BW) was collected at baseline (15 days after delivery) and on 3 waves of follow-up (2, 6, and 9 months postpartum). Women were weighted without shoes and wearing light clothes on a digital scale, with a capacity of 150 kg and a precision of 0.1 kg (PL 150 Model, Filizzola Ltda., São Paulo, Brazil). The assessment of the anthropometric variables was performed in accordance with Lohman's protocol.[24] Body mass index (BMI) was calculated using weight measured at baseline. Pre-pregnancy BMI (PPBMI) was calculated using self-reported pre-pregnancy weight (PPW) or BW registered until the 13th gestational week; stature was measured using a stadiometer with precision of 0.1 cm (Holtain-Harpeden, UK). Percent of body fat (%BF) was calculated using an electrical impedance technique with equations provided by RJL Inc (RJL, USA). Other methodological details were previously described.[6]

Body weight change

BWC was considered the outcome. This variable was obtained taking into account body weight (kg) measured at baseline (15 days after delivery) and in the three follow-up visits: 2, 6, and 9 months postpartum. Negative BWC refers to a body weight loss during follow up and positive BWC refers to a body weight gain during postpartum. The outcome was defined as a time dependent variable because assumes different values in each point of observation.

Assessment of dietary intake

Usual dietary intake was obtained through a FFQ, that was administered by nutritionist at 6 mo postpartum

Table I
Factor loading of rotated factor matrix for major dietary patterns for woman at 6 months postpartum.
Rio de Janeiro, Brazil (1999-2001)

Food items	Dietary pattern*		Pryor communality
	Mixed	Healthy	Estimates
Rice	0.41426	-0.12478	0.57042714
Beans	0.42550	-0.02192	0.60614407
Breads	0.65657	-0.07005	0.61415965
Pasta and wheat	0.31926	0.07747	0.62629893
Eggs	0.25629	0.13733	0.79610512
Sausages	0.32738	0.21164	0.80643141
High-fat products	0.51255	0.10439	0.59599470
Fruit juices and soda	0.33729	0.21859	0.63169993
Cake and biscuits	0.19987	0.05757	0.65326564
Sugar and suits	0.37545	0.06228	0.62579956
Coffee and tea	0.18739	0.07582	0.47363270
Fruits	0.14372	0.59588	0.67459767
Green leafy vegetables	-0.13465	0.52131	0.55826530
Legumes/other vegetables	-0.01646	0.57011	0.59313859
Potato, roots and corn	0.19401	0.30700	0.66827487
Meat and poultry	0.06848	0.23962	0.60507685
Fish	0.04122	0.30957	0.67487103
Milk and dairy products	0.09510	0.27600	0.63928841

Standardized Cronbach's alpha coefficient was 0.64 from Mixed and 0.57 from Healthy dietary pattern.

and has the first six months after delivery as the time frame. FFQ was composed by 81 food and beverages items and 8 answer options (never or almost never; 1-3 times/month, 1 time/week, 2-4 times/weeks, 5-6 times/weeks, 1 time/day, 2-3 times/day, or more than 3 times/day). The FFQ was developed and previously validated by Sichieri & Everharth (1998).[25] Standard portions sizes were given from each food item.[26] Estimates of total energy intake and gramature of nutrients, foods and foods groups were calculated with a program previously developed using Statistical Analyses System (SAS) 8.2.[27] This program considered the food composition database created by the Escola Paulista de Medicina.[28] Foods compositions that were not included in this database were assessed from a national family-budget study.[29]

To identify the dietary patterns, the 81 items listed in the FFQ were grouped into eighteen food groups, based on their nutritional characteristics: 1) Rice; 2) Beans; 3) Breads; 4) Cake and biscuits; 5) Meat and poultry; 6) Eggs; 7) Fish; 8) Green leafy vegetables; 9) Legumes and other vegetables; 10) Fruits; 11) Pasta and wheat; 12) Potato, roots and corn; 13) Sweetened beverages (Fruit juices and soda); 14) Sugar and suits (sugar, sweets and desserts); 15) Milk and dairy products; 16) High-fat products (processed meat, pizza, snacks, chips fries, butter, bacon and maiones); 17) Sausages (sausages, hamburger, viscous and ham); and 18) Coffee and tea.

Dietary patterns were extracted using principal component analysis (PCA). Firstly, Kaiser-Meyer-Olkin (KMO) was used to measure sampling adequacy. Two commonly applied criteria were used to identify the number of patterns to be retained: (a) the eigenvalues > 1.50 and (b) the Cattell's scree test plot. Factor loading of 0.25 was used as criteria to limit low inter-correlations between dietary variables in a factor.[30] Orthogonal varimax rotation of the factors was applied to improve the interpretation. Cronbach's alpha coefficient was used to evaluate internal consistency for each component retained. After all, the dietary patterns were named according to the nature of the food groups and the factors load (table I).

Assessment of co-variables

Breastfeeding, smoking and socio-demographic variables were investigated from structured questionnaires that were applied at the baseline, the first and second waves of follow-up. Family income (dollar), parity (number of children), age (years), schooling (years) and breastfeeding (days of predominant breastfeeding)[31] were treated as continuous variables. Skin color was categorized in white and non-white (black or brown), and marital status was classified as single or married/living with a partner.

Variables	Dietary pattern		p-value[1]
	Mixed	Healthy	
	Mean (SD)		
Intake:			
Energy (kcal)	2,838 (624)	2,233 (455)	< 0.001
Anthropometric:			
Body weight	62.7 (14.9)	60.6 (9.6)	0.398
BMI	24.5 (5.6)	23.8 (3.6)	0.454
BMI Pre-Pregnancy	22.7 (5.0)	22.5 (2.7)	0.756
Body fat (%)	29.4 (7.9)	29.6 (5.2)	0.779
Retention	3.2 (5.6)	2.8 (4.4)	0.679
Socio-demographic:			
Age (years)	25.0 (6.2)	27.0 (5.3)	0.080
Income (dollars)	255 (146)	450 (341)	< 0.001
Schooling (years)	6.8 (3.1)	8.5 (3.1)	0.006
Parity	2.2 (1.36)	1.9 (1.2)	0.333
Breastfeeding (days)	103 (57.7)	102 (60.7)	0.940
	N (%)		
Socio-demographic:			
Skin color			
White	18 (26.1)	15 (33.3)	0.404
No White	51 (73.9)	30 (66.7)	
Marital Status			
Married	51 (73.9)	40 (88.9)	0.051
Single	18 (26.1)	05 (11.1)	

[1]P-value refers to ANOVA for continuous variables and chi-square for proportions.

Statistics

To verify the mother's characteristics at higher score pattern adherence, energy intake, anthropometric and socio-demographic characteristics were evaluated across the forth quartile of mixed and healthy dietary patterns (table II) using means and standard deviations (SD) and prevalence (%). Women with high score on quartiles of both mixed and healthy were kept at first dietary pattern (factor 1). Analysis of variance was used for the comparison of continuous variables between higher quartiles of mixed and healthy dietary patterns, and chi-square test was used for categorical variables.

The effect of dietary patterns on BWC among 278 women was evaluated with linear mixed effect models.[32] The factor loading were standardized (mean equal to 0 and SD equal to 1) in order to make the multiple linear regression models comparables. Energy intake, family income and schooling that were associated were considered confounders ($p \leq 0.05$) as were associated with quartiles of both dietary patterns and with the outcome. %BF, age, skin color and marital status were also considered as potential confounding factors as were related with one of the dietary quartiles ($p \leq 0.05$). A final model was also adjusted for PPW.

Linear mixed effect models were fitted in four steps. The outcome and postpartum time elapsed since delivery was considered as random effects and all other variables as fixed effects. First, the unconditional growth model that included time variable was fitted and named model A. Then, the unadjusted model B was fitted and included the interaction between time and the predictor variables (score of mixed and healthy patterns). Adjusted conditional models were fitted including the following co-variables: energy intake, %BF, age, family income, schooling, skin color and marital status (model C) and model D (all variables from model C plus PPW). All models were nested from an unconditional mean model that describes partition of the outcome variation (table III). Analyses were performed using SAS version 9.1.

Results

Two different dietary patterns were identified and were named mixed and healthy. The eigenvalues were 2.73 and 1.96, respectively. The cumulative variance was 26.1%. The mixed pattern explained 15.2% of the total variance and was composed of rice (0.41426), beans (0.42550), breads (0.65657), pasta and wheat (0.31926), eggs (0.25629), sausages (0.32738), high-fat products (0.51255), fruit juices and soda (0.33729), and sugar and suits (0.37545). The healthy pattern explained 10.9% of the variance and was composed of fruits (0.59588), green leafy vegetables (0.52131), legumes and other vegetables (0.57011), potato, roots and corn (0.30700), fish (0.30957), and milk and dairy products (0.27600). Standardized Cronbach's alpha coefficient was 0.64 for mixed and 0.57 for healthy dietary pattern. The pryor communality estimates and the lower communality were 0.47363 for coffee and tea (table I).

Energy intake was statistically ($p < 0.001$) different among highest quartiles of the mixed and healthy patterns (table II). Women situated on the highest quartile of the healthy dietary pattern had higher family income (255 *versus* 450 dollars, $p = 0.001$) and higher schooling (8.5 *versus* 6.8 years, $p = 0.006$) than women that had adhered to the highest quartile of mixed dietary pattern. Results showed that higher proportion of married's women adhered to the highest quartile of healthy dietary pattern (88.9 *versus* 73.9 years, $p = 0.051$).

According to Model A, BWC declined -0.151 kg/month (SE = 0.02), independently of the dietary pattern. Unadjusted mean BWC (model B) was -0.534 kg/month (SE = 0.20; $p < 0.01$) at 2 months; -1.101 kg/month (SE = 0.20; $p < 0.001$) at 6 months and -1.420 kg/month (SE = 0.21; $p < 0.001$) at 9 months postpartum. Adjusted mean BWC was -1.409 kg/month (SE = 0.21; $p < 0.01$) at 9 months (model C) and -1.597 kg/month (SE = 0.20; $p < 0.001$) in model D.

Table III
Regression coefficients estimates for postpartum predicting body weight change (2, 6, and 9 months) according to women's dietary pattern at six months postpartum. Rio de Janeiro, Brazil (1999-2001)

Parameter	Model A[‡] β (SE)	Model B[‡‡] β (SE)	Model C[‡‡] β (SE)	Model D[‡‡] β (SE)
Fixed effects				
Intercept				
Weight	63.1(0.76)**	63.2 (0.77)*	59.9 (1.58)**	62.5 (0.795)*
Mixed Pattern	–	-0.122 (0.92)	-0.281 (0.95)	0.378 (0.50
Healthy Pattern	–	0.356 (0.95)	-0.409 (0.70)	0.562 (0.38)
Rate of change				
Months	-0.151 (0.02)**	–	–	–
Weight* 2 months	–	-0.534 (0.20)*	-0.534 (0.20)*	-0.593 (0.19)*
Weight* 6 months	–	1.101 (0.20)**	-1.101 (0.20)**	-1.297 (0.20)**
Weight* 9 months	–	-1.420 (0.21)**	-1.409 (0.21)**	-1.597 (0.20)**
Mixed pattern				
Weight* 2 months	–	0.269 (0.24)	0.269 (0.24)	0.235 (0.23)
Weight* 6 months	–	0.933 (0.24)**	0.933 (0.24)**	0.830 (0.24)**
Weight* 9 months	–	1.043 (0.25)**	1.403 (0.25)**	0.938 (0.24)**
Healthy pattern				
Weight* 2 months	–	0.055 (0.25)	0.055 (0.25)	0.043 (0.24)
Weight* 6 months	–	0.221 (0.25)	0.221 (0.25)	0.056 (0.25)
Weight* 9 months	–	0.086 (0.25)	0.080 (0.25)	-0.091 (0.25)
Variance components				
Level 1 (Within)	5.74 (0.29)**	5.59 (0.28)**	5.59 (0.28)**	5.01 (0.26)**
Level 2 (Between)	156.7 (13.4)**	157.6 (13.6)**	47.3 (4.21)**	10.6 (1.05)**
Goodness-of-fit				
-2 Res Log Likelihood	6,277.4	6,250.5	5,951.5	5,232.2
AIC**	6,281.4	6,254.5	5,955.5	5,236.2

[‡]Unadjusted model.
[‡‡]Adjusted model.
*p ≤ 0.01; **p ≤ 0.001; ***Akayke Information Criterion. Models were fitted using a random intercept. Model A was the unconditional growth model that included time variable. Model B added the interaction between linear time and predictor variable (score of Mixed and Healthy). Model C is a conditional model with the controlled effect of the predictor variable adjusted by energy intake, percent of body fat, age, schooling, family income, skin color and marital status. Model D is a conditional model with the controlled effect of the predictor variable adjusted by energy intake, percent of body fat, age, schooling, family income, skin color, marital status and pre-pregnancy body weight.

Model D showed that women that adhered to healthy dietary pattern had a non-significant higher increase in mean BWC (higher body weight loss) of -0.091 kg/month (SE = 0.25) at 9 months postpartum. On the other hand, the final multivariate model (model D) pointed a significant decreased on mean BWC (lower body weight loss) of 0.830 kg/month (SE = 0.24; p < 0.001) at 6 months and 0.938 kg/month (SE = 0.24; p < 0.001) at 9 months postpartum (table III).

Discussion

The main findings of this study showed that the dietary patterns among Brazilian women during postpartum were classified as mixed and healthy. The mixed pattern was composed mainly of breads, high fat products, rice and beans, while the healthy pattern was composed of fruits, legumes and vegetables, roots and fish. BW has decreased approximately 1.6 kg over a nine months period independently of the dietary pattern. However, women with mixed dietary pattern presented a slower BWC during the first nine months postpartum when compared with women that adhered to a healthy dietary pattern. BWC was categorized on time intervals and it was observed that women with mixed dietary pattern lost 0.830 kg less at 6 and 0.938 kg at 9 months postpartum compared with women that have adhered to healthy dietary pattern. To our knowledge, this is the first study that have investigated an association between dietary patterns and BWC during postpartum in the Brazilian population. Only one longitudinal study have comprised the whole reproductive cycle, however has analyzed the association of dietary patterns with lifestyle but not with BWC over time, as ours study did.[19]

Uusitalo et al. (2009)[1] has investigated the association of dietary patterns and GWG rate among 3,360 Finish women. The authors identified seven distinct dietary patterns: healthy, fast food, traditional bread, traditional meat, low fat, coffee and alcohol and butter. The results revealed a positive association between fast-food pattern and higher gestational GWG (kg/week). Other studies have evaluated the relationship between dietary patterns and obesity or body weight change (BWC), but were based only on cross-sectional or baseline data.[33-34] The two avail-

able longitudinal studies did not include postpartum women.[14,35] Schulze et al. (2006)[35] examined the association between dietary pattern and BWC among 57,670 North-Americans female nurses and observed that those who increased their western pattern score over time presented a greater weight gain from 1991 to 1999. Murtaugh et al. (2007)[11] found a positive association between western pattern and higher prevalence of excess of BW, in a cross-sectional dietary analysis, from a case-control study of breast cancer with 2,470 North-American women. On the other hand a prudent or healthy dietary pattern seemed to be associated with a lower risk of overweight or obesity.[10-11] Newby et al. (2006)[10] studied 33,840 women from the Swedish Mammography Cohort and showed that obese women who increase the score for the healthy dietary pattern, presented larger decreases in BMI over 9 years of follow-up.

In Brazil, results from a survey conducted in 1996 in Rio de Janeiro, Brazil with a probabilistic sample of 2,040 households described the effect of a traditional diet comprised of rice and bean, and a lower risk of overweight.[9] Sichieri et al. (2003)[36] based on food intake of 5,121 adults aged 20 to 50 years, from the Northeast and Southeast geographical regions, have shown a positive association between a pattern labeled mixed and higher BMI. The mixed pattern was comprised by industrialized foods such as sugar, cake, biscuits and dairy products.

Beyond the scarce scientific literature about dietary patterns in the postpartum period, there is a lack of evidence to understand how social and cultural factors could determine food intake change. Arija et al. (2004)[37] have verified a slight change in food consumption from pre-pregnancy to postpartum period between 80 recruited Spanish women and an increase in energy intake at 6 weeks postpartum coinciding with lactation. The study performed by Cucó et al. (2006)[19] with 80 healthy women volunteers planning to get pregnant, described two stable dietary patterns over the reproductive cycle named sweetened beverages and sugars and vegetables and meat. In the same line, Crozier et al. (2009),[20] have shown two stable dietary patterns labeled prudent and high-energy with 2,270 United Kingdom pregnant women.

In the present study, only two patterns were retained based on the eigenvalues and the Cattell's scree plot test, the two adopted criteria. It seems that women tend to include different kinds of foods to improve dietary intake during reproductive cycle.

Appropriate nutrition is an important toll of public health nutrition that aims guarantee health for women during reproductive cycle and to prevent excessive GWG.[35] Excessive GWG may represent in the future greater postpartum weight retention and obesity.[6,38] A diet that includes safe food during pregnancy or lactation that assures the health of both mother and child, and helps the breastfeeding process is a concern of most women. Arija et al. (2004)[37] has shown that women tend to increase consumption of fruits, vegetables and milk, and decrease the intake of sugar and alcoholic drinks during pregnancy.

During postpartum, it is important to assure that a healthy diet is followed with an increase on portion size. Some studies have shown that an adherence to exclusive breastfeeding could be associated with a higher energy intake[39-40] and, consequently, lower body weight loss. Chou et al. (1999)[39] have verified that although energy expenditure was similar between lactating mothers and the non-lactating group, the daily energy intake and fat consumption were higher among lactating women. Durham et al. (2011)[40] investigated 450 overweight and obese women between 6 and 9 weeks postpartum and compared food consumption according to breastfeeding status (exclusive or mixed/only formula feeding). Women that fully breastfeed their children had higher energy intake and consumed snacks more frequently than the others.[40]

It is important to highlight the women's abilities to improve their diet during pregnancy and postpartum. Improvements need to be qualitative. Crozier et al. (2009)[20] have observed a small decrease in the prudent diet from pre-pregnancy and a small increase in high-energy score of dietary pattern in late pregnancy. Women should not restrict food intake during pregnancy, but during postpartum, after lactation has been established, it is acceptable that a prudent and moderate body weight loss attained through a caloric restriction helping to return to pre-pregnancy BW.[22,41] An increase on the intake of safe foods like vegetables, legumes, fruits, low-fat dairy, beans and whole grains and a decreased of soda and sweetened beverages, fast-food, high sugar, fat foods and desserts, would prevent a higher weight gain during pregnancy and a lower postpartum weight retention.

In conclusion, authors signalize that dietary investigations about BWC during postpartum should consider lifestyle and socio-demographics factors in order to propose effective nutritional guidelines to prevent non-expected alterations on postpartum body weight. Was observed that women that have adhered to a mixed dietary pattern had a greater intake of energy, fat and industrialized products beyond beans and rice, and presented a slower rate of BWC during postpartum, compared to those with a healthy dietary pattern. The results presented here and in others studies should be accounted in this way.

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