

Factors associated with postpartum weight retention in women served in the vaccination sector of the Municipal Clinic in the city of Viçosa-MG, Brazil

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Abstract

Objective: This study aimed to evaluate the weight retention of women from the 2nd to the 18th month postpartum served in the vaccination sector of the Municipal Polyclinic in Viçosa-MG, Brazil, considering socioeconomic, behavioral, obstetrical, anthropometric factors and the occurrence of breastfeeding in this period. **Methods:** This was a cross-sectional study of women from the 2nd to the 18th month postpartum. A semi-structured questionnaire containing items related to identification, anthropometry, sociodemographic conditions, breastfeeding, and general habits of the participants was applied. There were self-reports of pregnancy weight and weight gain during pregnancy, and measurement of height and weight of the mothers; weight retention was calculated as the difference between current and pre-pregnancy weight. Descriptive statistics were performed through measures of central tendency and dispersion. **Results:** There was a high prevalence of overweight in women in the period less than or equal to six months postpartum and overweight and obesity in the period longer than six months postpartum; the latter finding is a concern. We also observed greater weight retention among women with excessive weight gain during pregnancy. **Conclusions:** Although the small sample size limited the conduction of some statistical associations, there was a relationship between retention of gestational weight gain and postpartum weight. On the positive side, the high prevalence of breastfeeding among the studied mothers can be mentioned.

Key words: Obesity. Postpartum Period. Weight Gain. Body Mass Index.

Introduction

Obesity results from a set of genetic and environmental factors and it is an emerging public health problem in several age ranges and regions in Brazil, and it is most prevailing among women, mainly.^{1,2} According to data from the Household Budget Survey (2008-2009), overweight and obesity were observed in approximately half of the adult men and women, and obesity was diagnosed in 12.5% of men and 16.9% of women. Therefore, overweight and obesity, not only in adults but across all age ranges, are concerning factors within the scope of Brazilian health.³

Considering that women during the reproductive age, above all during the gestation and postpartum periods, is more vulnerable to conditions that promote the weight gain that may lead to the establishment of obesity throughout the years, it is greatly important to control the gestational weight, in order to promote an adequate weight gain, preventing the postpartum weight retention.^{1,4} In that sense, an adequate follow-up of the pregnant woman during the prenatal period is fundamental for an adequate maternal-fetal prognostic, as well as to control the gestational weight gain.^{2,5}

However, it is noteworthy that, sometimes, the social and demographic characteristics of the pregnant and nursing women, such as low income, may difficult their access to assistance during the prenatal and puerperium periods, and it may compromise the prognostics of the gestation and postpartum.⁵ Such fact may be observed through the results of the National Demographic and Health Survey on Women and Children – PNDS (2006), according to which 77% of the mothers went through at least six prenatal consultations, however, only 39% of the puerperal women had a postpartum consultation, which shows the neglecting assistance to women during this phase in the country.⁶

Several intrinsic factors to the human being, such as genetics, gender and age, determine the body weight; however, some factors may be changed, such as physical inactivity and inadequate nutritional habits, which may be related to postpartum weight retention.² It may occur in combination an excessive weight gain during the pregnancy, determined by complex inter-relations, constituting a public health concern, considering that such factors may indicate an increase of the prevalence of obesity.^{1,5}

This study is justified by the conditions that promote weight gain to which mothers are subject during the postpartum period, which, associated to the pre-gestational nutritional status and to the physiological changes that occurred during the gestation, favor weight retention. In addition,

in Brazil, some studies^{4,7-9} study postpartum weight retention, but it is still necessary to conduct further research that analyze the nutritional status of women during these phases, in order to avoid excessive weight.

Considering the above, the objective of this study was to evaluate the weight retention of women from the 2nd to the 18th month postpartum served at the vaccination sector of the Municipal Polyclinic of Viçosa-MG, in relation to the socioeconomic, behavioral, obstetric, and anthropometric factors and the occurrence of breastfeeding during this period.

Methodology

This is a transversal study, it was conducted at the immunization facility of the municipality of Viçosa-MG, with mothers between the 2nd and the 18th month postpartum, during the period from April 14th, to June 6th, 2014. The sample was non-probabilistic due to convenience reasons, since the mothers were invited to participate in the study when they arrived at the collection facility.

The inclusion criteria for the sample was being inside the 2-18 month period postpartum, since this is the most common age range for the children that are served at the clinic. The exclusion criteria were: smokers, being under hypertension treatment or having problems on the thyroid gland during the gestational period or postpartum, adolescents and women who did not agree in being part of the research.

It is noteworthy that, according to these exclusion criteria, two adolescents, three women with hypertension and one woman with problems on her thyroid gland were excluded from the study. In addition, 14 women had one or more of the following characteristics: gestational intercurrent, pre-term delivery, and smoking.

The data were collected by applying a questionnaire previously elaborated by the researchers, containing items related to identification, anthropometry, sociodemographic conditions, breastfeeding and general habits.

In order to analyze the socioeconomic situation, the Economic Classification Criterion Brazil from the Brazilian Association of Research Companies (ABEP) was used, which has a questionnaire on the possession of items and schooling degree of the breadwinner, using its own cutoffs for categorization into economic classes from A to E. The gross average income a month for the families corresponded to R\$ 9,263.00 for class A; R\$ 5,241.00 for class B1; R\$ 2,654.00 for class B2; R\$ 1,685.00 for class C1; R\$ 1,147.00 for class C2; and R\$ 776.00 for classes D and E.

Considering the variety of postpartum periods analyzed, they were distributed into two classes: a) less or equal to six months, and b) over six months. In addition, the weight of the child at birth was classified as low for children born under 2,500g, insufficient weight for 2,500 to 3,000g, normal weight to 3,000 and 4,000g and macrosomia for those over 4,000g at birth, according to the cutoff points adopted by the World Health Organization.¹⁰

The height and weight of the participants were measured using a digital scale from the BALMAK brand, which had an anthropometric ruler able to measure up to two meter and with grading indications at every 0.5 centimeter, with capacity for 200 Kg and 100-gram intervals. The measurements were made according to the procedures established by the World Health Organization (WHO).¹¹

The pre-gestational weight and the gestational weight gain were self-reported, since most mothers did not have their pregnancy card when the questionnaire was applied, and those who did not remember the referred values were contacted by phone, after applying the questionnaire.

In relation to the anthropometric variables, both the pre-gestational Body Mass Index (BMI) and the postpartum BMI were classified according to the cutoff points of WHO,¹² which considers the following BMIs: $< 18.5 \text{ kg/m}^2$ for low weight degree 1, 18.5 to 24.99 kg/m^2 for eutrophia, $\geq 25.0 \text{ kg/m}^2$ for overweight, 25 - 29.99 kg/m^2 for pre-obese, 30 - 34.99 kg/m^2 for obesity degree 1, 35 - 39.99 kg/m^2 for obesity degree 2 and $\geq 40 \text{ kg/m}^2$ for obesity degree 3.

The weight gain at the end of the gestation was evaluated according to the recommendations of the Institute of Medicine / IOM¹³ for the total weight gain during pregnancy according to the pre-gestational BMI, and the weight gain of 12.5-18.0 kg; 11.5-16 kg; 7-11.5 kg and 5-9 kg were considered adequate for low-weight, eutrophic, overweight and obese pregnant women, respectively on this order; therefore, the weight gain was classified as adequate, insufficient or excessive.

The weight retention was calculated by the difference between the current weight and the pre-gestational weight,⁴ and it was evaluated according to the postpartum period, considering women within a period equal or less than six months or higher than six months. It is noteworthy that in order for the condition to be classified as “no weight retention”, the weight retention had to equal zero or have a negative value, representing women that currently have lower weight than the pre-gestational weight.

The database was created using the Microsoft Office Excel 2013 software, and the statistical analysis was conducted with the help of the Statistical Package for Social Science (SPSS) program version 20.0. The data were analyzed through descriptive statistics, and central trend and dispersion measurements were taken.

In addition, the test by Kolmogorov-Smirnov was conducted to verify the normality of the weight gain quantitative variable, as well as Student's t and analysis of variance (ANOVA) tests with significance of 5%, in order to compare the weight retention means according to some socioeconomic, behavioral and obstetric characteristics. In addition, Tukey's test was conducted, in order to evaluate the magnitude of the differences of the weight retention means among the groups.

This research is part of a larger study on behavioral changes upon breastfeeding in pregnant and nursing women, using behavioral theories, and approved by the Ethics Committee on Human Research of the Federal University of Viçosa, under # 412.814 (CAAE: 16549413.2.0000.5153). After clarifying the study objectives, the mothers that accepted to be part of it signed the Free and Clear Consent Term.

The follow-up of the participants of the study was conducted by delivering to them and explaining a folder containing guidelines for a healthy nutrition during the postpartum period and conducting the women in the following conditions to nutritional care: those with pre-gestational overweight or obesity and that continued to be overweight up to the sixth month postpartum; those with obesity on the first six months postpartum; and those with overweight and obesity associated to other diseases.

It is also noteworthy that, at the time of the data collection, the doubts of the volunteers as to other aspects of maternal-children nutrition were cleared. In turn, the return of the results obtained by the research for the vaccination sector was made by sending the final report of the course conclusion paper to the service coordination and making the educative material created available for the institution to use it with other mothers that fit this context.

Finally, it is noteworthy that this was a non-invasive study, and it was conducted on a short period of time, and that the mothers received a follow-up as to their nutritional status. In addition, clarifications to the women that refused to be part of the study but who had doubts as to postpartum weight retention were made.

Results

In total, 34 women were analyzed, which mostly had been born in Viçosa (70.6%, n=24) and all of them lived in that city. The mean age found was 27.24 (\pm 6.9 years old) and median of 27 years old, considering that the minimal age was 18 and the maximal, 42. Table 1 shows the sociodemographic, behavioral and economic data of the participants, and it is observed that most of the women did not work (n=22; 64.7%), and, among those who worked, 2.9% (n=1) were within a period less than or equal to four months postpartum and were not on maternity leave.

Table 1. Sociodemographic, behavioral and economic characteristics of the study participants. Viçosa-MG, 2014.

Characteristics	Absolute Frequency (n)	Relative Frequency (%)
Age		
18-30	20	58.8
31-42	14	41.2
Marital Status		
Married	13	38.2
Stable Relationship	7	20.6
Single	12	35.3
Separated	2	5.9
Working		
Yes	12	35.3
No	22	64.7
Maternity Leave		
Yes	6	17.6
No	28	82.4
Alcohol		
Yes	8	23.5
No	26	76.5
Practice of Physical Activity		
Yes	3	8.8
No	31	91.2
Economic Classification*		
B	5	14.7
C	24	70.6
D	5	14.7
Total	34	100

* Economic Classification Criterion Brazil – Brazilian Association of Research Companies (ABEP)

As it may be seen on table 2, in relation to the obstetric and postpartum characteristics, there was a higher frequency of women with less than six months postpartum ($n= 25$; 73.5%). The mean gestational term was 39.2 (± 1.07), median of 39 weeks, considering that the minimal term was 37 and the maximal, 42 weeks, respectively; in turn, the mean weight at birth was 3,255 g (± 393 g) and the median, 3,253 g, with a prevalence of children with normal weight at birth ($n= 24$; 70.6%). Among the multiparous women, the interval between gestations showed a mean of 6.22 (± 3.49 years) and median of seven years.

Table 2. Obstetric and postpartum characteristics. Viçosa-MG, 2014.

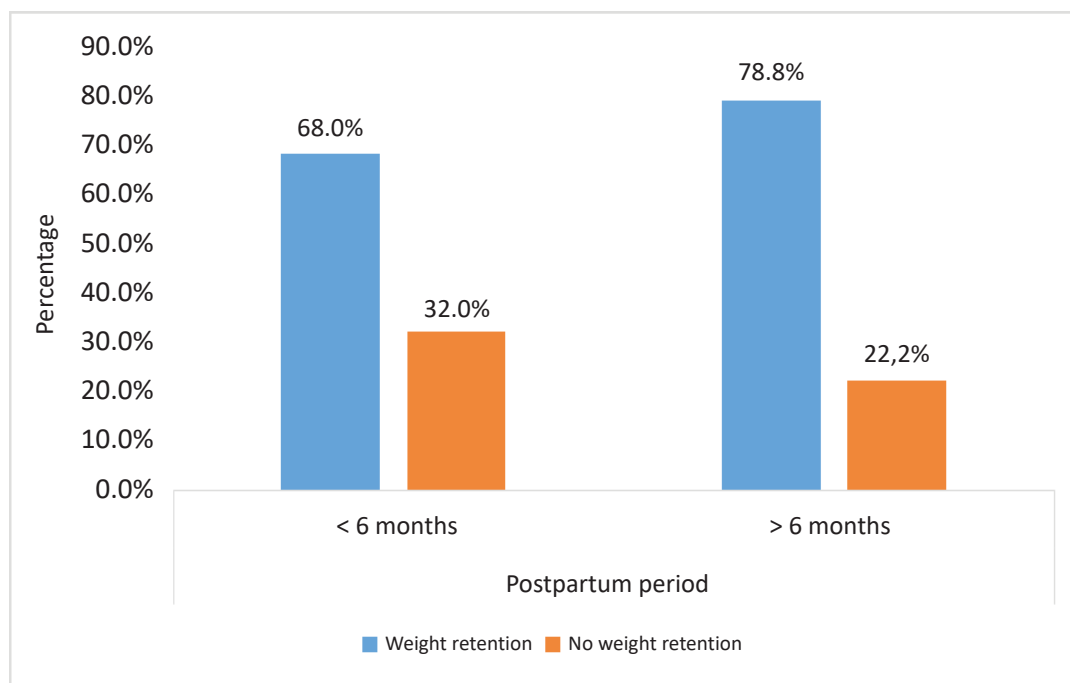
Characteristics	Absolute Frequency (n)	Relative Frequency (%)
Postpartum Period		
≤ 6 months	25	73.5
> 6 months	9	26.5
Weight at birth		
Macrosomia	2	5.9
Normal	24	70.6
Insufficient Weight	8	23.5
Parity		
Primiparous	18	52.9
Multiparous	16	47.1
Total	34	100

According to what may be seen on table 3, when questioned about breastfeeding, 84% ($n=21$) of the mothers within a postpartum period less than or equal to six months, and 55.6% ($n=5$) of the mothers within a period higher than six months postpartum answered that they were breastfeeding, and 4.0% ($n=1$) of the mothers with less than six months postpartum offered maternal milk and complemented it with some type of formula; in addition, from all women who were not currently breastfeeding ($n=8$; 23.5%), only one never offered breast milk.

Table 3. Occurrence of breastfeeding according to the postpartum period. Viçosa-MG, 2014.

Breastfeeding	Postpartum period		Total
	≤ 6 months	> 6 months	
Yes	21	5	26
No	4	4	8
Total	25	9	34

The weight retention percentage was higher than the non-retention percentage for both analyzed periods, but it is concerning to observe that the weight retention prevalence of women within a postpartum period higher than six months and those within a postpartum period less than or equal to six months were close values, as shown in Figure 1.

**Figure 1.** Distribution of weight retention according to the postpartum period. Viçosa-MG, 2014.

It is also noteworthy that, from all women with weight retention within the postpartum period, 16.7% (n=4) were obese, 54.2% (n=13) were overweight, and the remaining 29.1 % (n= 7) were eutrophic. Comparing the weight gain during gestation and the retained weight, it was observed that 5.9% (n=2) of all participants retained a higher weight than the weight gained during the gestational period – that is, in addition to not losing the gained weight, they gained more weight, considering that they were over six months postpartum.

According to the weight gain ranges recommended for pregnant women according to the pre-gestational status determined by the Institute of Medicine,¹³ the same amount of women in this study had a weight gain above (n = 12; 35.3%) and within the adequate (n = 12; 35.3%) range, according to the pre-gestational weight.

According to Figure 2, it may be noticed that, in both analyzed periods, there was a higher eutrophia percentage within the pre-gestational period in comparison to the current BMI. In addition, it is observed a high overweight prevalence as to the current BMI within the period lower or equal to six months postpartum.

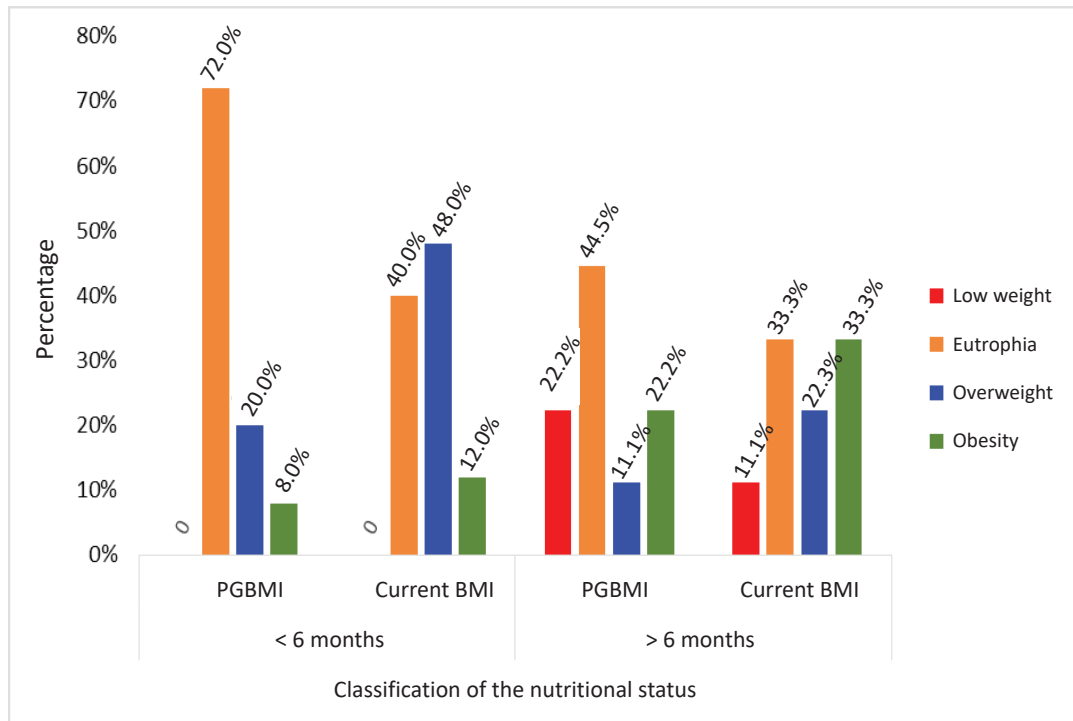


Figure 2. Classification of mothers by pre-gestational and current nutritional status according to the postpartum period. Viçosa-MG, 2014.

Table 4 represents the distribution of the postpartum weight retention mean according to the sociodemographic, behavioral and obstetric characteristics, and it may be observed that there was no significant difference on weight retention among the analyzed maternal ages, as well as to the habit of drinking alcoholic beverages, the practice of physical activities, the socioeconomic condition, and the parity and weight of the child at birth.

Table 4. Mean and standard deviation for postpartum weight retention according to behavioral, economic and obstetric characteristics. Viçosa-MG, 2014.

Characteristics	n	Postpartum weight retention mean	Standard Deviation	p*
Age				
18-30	20	3.14	6.00	0.433
31-42	14	4.84	6.32	
Alcohol				
Yes	8	7.64	5.95	0.042
No	26	2.67	5.76	
Physical Activity				
Yes	3	1.57	7.3	0.508
No	31	4.06	6.07	
Economic Classification				
B	5	3.66	6.24	0.156
C	24	2.87	5.90	
D	5	8.66	5.75	
Weight at birth				
Macrosomia	2	3.35	2.62	0.703
Normal	24	4.40	6.74	
Insufficient weight	8	2.28	4.58	
Parity				
Primiparous	18	3.75	6.52	0.930
Multiparous	18	3.94	5.79	
Gestational weight gain				
Excessive	12	7.98	6.60	0.006
Insufficient	10	0.44	5.47	
Adequate	12	2.53	3.52	
Total	34			

* Student's t test (comparisons between two categories) or ANOVA (comparisons among three categories)

However, there was a significant difference of weight retention as to the gestational weight gain ($p = 0,006$), and those women who gained excessive weight during gestation, according to the pre-gestational nutritional status, showed higher weight retention ($7.98 \text{ kg} \pm 6,6$) in relation to those who gained insufficient or adequate weight.

According to Tukey's test, conducted to determine the magnitude of the differences across the weight retention means in relation to the gestational weight gain variable, it was observed that there was a significant difference on the weight retention of women who gained excessive weight during gestation in relation to those who gained insufficient weight; however, there was no significant difference among those with insufficient and adequate weight gain.

It is also important to mention that there were some limitations on this study, such as: the self-report on the pre-gestational weight and the weight gained during gestation may have been under or overestimated; the reduced sample also may have limited the study, since it was impossible to conduct further statistical tests, and to verify the association of other variables to weight retention.

However, the association observed in this study (weight retention and gestational weight gain) was also found in other studies^{7,9,14,15-18} with larger samples, which suggests that such result could have been found in case the sampler was larger.

Discussion

The results of this study reveal a higher percentage of women with weight retention in the period of over six months postpartum, which is a concern, since it is expected that women during this period have already lost the weight reserve acquired during gestation. This loss occurs mainly during the first three months after delivery, keeping a slower and constant pace up to approximately the sixth month.¹ A relatively high value of overweight mothers during a period of less than or equal to six months postpartum and obese mothers in the period of over six months postpartum was observed.

The overweight observed in the postpartum period less than or equal to six months is expected, since it represents a fat reserve on women, and it is considered a positive factor from the point of view of breastfeeding. Since the beginning of gestation, the body prepares for the production of milk, and the accumulated fat tissue works as an energetic reserve to produce the maternal milk during the first months postpartum.¹ However, the overweight and obesity found in women on a postpartum period of over six months represents a concern, since it may indicate the existence of

body fat beyond the necessary to provide for the increase energetic demand of the nursing mother. This excessive deposit of fat tissue may not be used postpartum, allowing the weight retention and, thus, collaborating the increase on the prevalence of obese women.²

There was higher weight retention among women who had an excessive weight gain during gestation in comparison to those with adequate or insufficient weight gain. Such finding is similar to the findings by Rebelo et al.,⁷ Nast et al.¹⁴ and Vasconcelos et al.¹⁵ on their studies conducted within the period from one to one and a half month postpartum and from six weeks to six months postpartum, respectively.

The weight gain during gestation has been indicated as an important determining factor for postpartum weight retention, since the higher the gestational weight gain, the higher the postpartum weight retention.^{5,16,17} In that sense, studies mentioned by Zanotti⁹ indicate that women with high weight gain during gestation are prone to retain more weight, regardless of the pre-gestational body mass index (BMI) classification, collaborating for the weight retention during the postpartum period.

The Institute of Medicine¹³ recommends weight gain ranges during gestation according to the pre-gestational BMI, however, the purpose of these recommendations is to promote the adequate fetal growth. However, the effects of these recommendations on weight retention throughout the life of women are not known; therefore, the weight gain above the recommendations may be an important factor for weight retention.^{1,2,16}

Also in relation to the maternal age, the cohort study conducted by Kac et al.⁴ on the evolution of the weight retention in women, throughout nine months postpartum, indicated that women under 20 years old showed lower weight retention in relation to the others.

Corroborating with the result found on this study as to parity, primiparous women tend to gain more weight during pregnancy than multiparous women.^{2,16,17} However, Castro, Kac & Sichieri² found on their study that older women have lower tendency to gain high weight. The “maternal age”, “parity”, “income” and “schooling” variables are related to the weight change postpartum.^{1,2}

Schooling was evaluated together with the economic situation on the economic classification criterion used; therefore, it is implied that mothers who were classified with a lower economic class may also have a lower schooling level. In that sense, it is considered that, for the studied group, there was a higher weight retention among mothers with lower purchasing power and low schooling level, which is in agreement with the studies conducted by Kac et al.,⁴ Colebrusco⁸ and Zanoti, Cap & Wender,¹⁸ who observed that the weight retention is reduced as the schooling level increases.

A significant difference on weight retention was not observed among sedentary patients and those who practiced physical activity. However, Castro, Kac & Sichieri,² on their literature review, mention studies that indicate that physical activity, when regularly practiced by women postpartum, helps them to return to the pre-gestational weight and helps to promote lower retention of the weight gained during gestation. According to Leitão et al.¹⁹ and Kac et al.,²⁰ among the purposes of practicing physical activities by pregnant women are higher weight control and faster recovery immediately after delivery.

Conclusion

Although the small sample number has limited the conduction of some statistical associations, it was observed a relationship between postpartum weight retention and gestational weight gain, considering that the women who gained excessive weight during gestation had higher weight retention than those who gained insufficient or adequate weight.

As a positive point, the high prevalence of breastfeeding among the studies mothers may be mentioned.

The need to conduct further studies on postpartum weight retention is noteworthy, since the weight changes occurred during the gestation and postpartum phases are closely related to the development of obesity throughout the years.

Considering that, this study analyzed a broad postpartum period range (from the 2nd to the 18th month postpartum), which were grouped into two periods, one for women within a period lower than or equal to six months postpartum, and one for women over six months postpartum. Although the sample was small, it was possible to analyze in which period there was a higher prevalence of the analyzed variables.

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