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Overweight in pregnant women attending health centers in Colombo, Paraná, Brazil

Excesso de peso em gestantes acompanhadas em unidades de saúde de Colombo, Paraná, Brasil

Abstract

Objective: To estimate the prevalence of overweight in pregnant women and associate it with socio-economic and demographic variables, obstetric history and pregestational overweight in pregnant women attending health centers in the city of Colombo, in Brazil. ***Methods:*** We used a questionnaire to collect the data between April and November 2016. Three hundred and sixteen pregnant women between 18 and 46 years old were included in our study. ***Results:*** The prevalence of gestational overweight was 46.2%. In the adjusted analysis, that prevalence was higher in pregnant women between 20 and 34 years old (PR 1.72; CI 95% 1.04-2.83) and over 35 years old (PR 2.08; CI 95% 1.18-3.66), in women with higher parity (three or more pregnancies - PR 1.47; CI 95% 1.04-2.09) and those who presented pregestational overweight (PR 5.09; CI 95% 3.63-7.14). Among the smokers, there was a lower prevalence of overweight (PR 0.45; CI 95% 0.23-0.89). ***Conclusion:*** Monitoring pregestational weight and weight gain during pregnancy is extremely important for primary care and it is recommended that women have an adequate weight before their pregnancy.

Keywords: Pregnancy. Overweight. Body weight. Maternal age. Cross-sectional studies.

Resumo

Objetivo: Estimar a prevalência de excesso de peso na gestação e identificar sua associação com variáveis socioeconômicas, demográficas, antecedentes obstétricos e excesso de peso pré-gestacional em gestantes usuárias de unidades de saúde de Colombo, Paraná. *Métodos:* A coleta de dados aconteceu por meio da aplicação de questionário, entre abril e novembro de 2016. Participaram do estudo 316 gestantes com idade entre 18 e 46 anos. *Resultados:* A prevalência de excesso de peso gestacional foi de 46,2%. Na análise ajustada, a prevalência do desfecho foi maior nas gestantes entre 20 e 34 anos (RP 1,72;IC95%1,04-2,83) e acima de 35 anos (RP 2,08;IC95%1,18-3,66), maior paridade (três ou mais gestações - RP 1,47;IC95%1,04-2,09) e com excesso de peso pré-gestacional (RP 5,09;IC95%3,63-7,14). Entre as fumantes, a prevalência foi menor (RP 0,45;IC95%0,23-0,89). *Conclusão:* Acompanhar o peso pré-gestacional e o ganho de peso gestacional é de grande importância para a atenção primária e é recomendável que as mulheres estejam com o peso adequado antes da gestação.

Palavras-chave: Gestação. Sobrepeso. Peso corporal. Idade materna. Estudos transversais.

INTRODUCTION

According to the World Health Organization (WHO), overweight and obesity are an abnormal or excessive accumulation of adipose tissue, which may result in health damages.[1] Obesity prevalence in Brazil has increased in the past few decades. Data from the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Surveys (VIGITEL)[2] from 2016 showed that of the Brazilian women older than 18 years, 50.5% were overweight and 19.6% were obese. The National Health Survey[3] performed in Brazil in 2013 showed that 24.4% of the Brazilian women in childbearing age were obese.

Pregnancy itself can trigger obesity or act as an aggravating factor when there is a preexisting obesity. The maternal nutritional status at the beginning of pregnancy and an adequate weight gain during this period have important implications on the health of the mother and the baby.[4] Adequate weight gain reduce the risks and unfavorable results during pregnancy and during labor for both the mother and the baby. Therefore, a nutritional diagnosis and follow-up of the pregnant woman are actions that bring quality to the attention given and must be a part of the prenatal care routine.[4]

Obesity during pregnancy contributes to gestational and fetal morbimortality. Maternal overweight is a risk factor for gestational diabetes, arterial hypertension syndrome, thromboembolism, fetal macrosomia, prematurity, neural tube defects, and it is related to an increased demand for cesarean deliveries as well as to surgery wound complications.[5-7]

A study performed in the United States (USA), with data from the National Vital Statistics System, used revised birth certificates between 2011 and 2015 from 48 States, Columbia District and New York City, resulting in 17,174,130 records for analysis (96% of the eligible births). The prevalence of pregestational obesity in 2015 was 25.6%, representing an 8% increase compared to 2011.[8]

Studies have shown some factors commonly associated with pregnancy overweight, including greater age,[9-11] lower income,[12] higher number of children,[9-11] and systemic arterial hypertension (SAH).[5,13] On the other hand, smoking has been associated with a lower weight gain during pregnancy.[14]

Although prevention is the ideal strategy to control obesity, no primary prevention program has been successfully implemented yet. The only effective alternative is preventing the complications obesity can bring, by informing women regarding the risks they may face throughout their pregnancy.[15] Considering that excessive weight gain and overweight during pregnancy may influence the gestation outcomes in addition to impact the health of the baby, if we know the factors related to that condition, we will be able to take actions to prevent overweight.

Our study aimed to estimate the prevalence of overweight during pregnancy and associate it with socioeconomic and demographic variables, obstetric history and pregestational overweight in pregnant women attending health centers that offer Family Health Strategies.

METHODS

Cross-sectional study carried out with pregnant women undergoing prenatal care in Family Health Centers (USF) in the city of Colombo, Brazil, between April and December 2016.

The city of Colombo is located in the metropolitan area of Curitiba, the capital of Paraná (PR), in the south region of Brazil. In 2016, the Brazilian Institute of Geography and Statistics (IBGE) estimated 234,941 habitants in Colombo,[16] and, in the same year, the health system of this city had 23 health centers, of which 17 were USF.

At the beginning of data collection (in May 2016), the Municipal Health Department of Colombo estimated at 1,352 the number of pregnant women receiving prenatal care in the USF of Colombo. Considering 50% of the outcomes had unknown prevalence (to maximize population size), a margin of error of five percentage points and a confidence interval of 95%, we obtained a minimum population of 301 pregnant women. We added 20% on that number to make up for refusals, which resulted in 361 pregnant women who were distributed according to their attendance in the prenatal care in each health center. Based on the minimum population size expected to study the prevalence (n=301) and considering a confidence interval of 95% and 80% power, we could identify associations between the outcome and the exposures with a minimum prevalence ratio of 1.3. We used the online applicative OpenEpi, of free access, to perform the calculations.

The researchers contacted the 17 USF to check the days and times of the prenatal sessions. Based on the schedule of the sessions established, the interviewers booked visits in those health centers. The distribution of the population was proportional to the number of pregnant women in each UFS. The pregnant women were verbally invited to participate in our study while they were waiting for their prenatal session, after they had passed through screening and had been received by a team of health professionals (to measure their current weight and blood pressure).

Inclusion criteria were as follows: pregnant women receiving prenatal care, living in the city of Colombo and older than 18 years. We invited all eligible pregnant women to join our research until we had the established number of participants for each USF.

Data collection was performed through a questionnaire containing demographic and socioeconomic variables, health-related behavior, obstetric history, and health and anthropo-

metric conditions. The variables in the questionnaire included: 1) demographic variables: age group (in years, up to 20, between 20-34, 35 or older), live with a partner (no, yes); 2) socioeconomic variables: education (in years, up to 7, between 8-10, 11 and over); 3) health-related behaviors (currently smoking - no, yes); 4) obstetric history: number of pregnancies (only the current pregnancy, two, three or more); 5) anthropometric conditions: pregestational nutritional status; and 6) health condition (pregestational SAH - no, yes), gestational quarter. The current weight of the pregnant women was measured with calibrated mechanical scales during a pre-session by the health professionals in the health center.

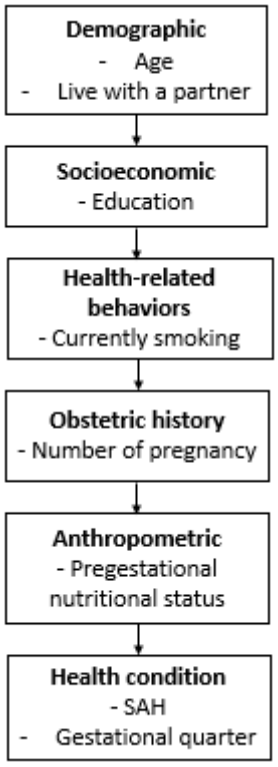
For the pregestational nutritional status, we calculated the body mass index (BMI)[17] and the BMI per gestational week, which was indicated by the Brazilian Ministry of Health,[18] according to Atalah et al.[19]. For the analyses, we grouped the categories of nutritional status assessment in excessive weight - yes (overweight and obesity) or no (thinness and eutrophy).

We performed a pretest on our research instrument in one of the health centers included in our study. The pregnant women who participated in this pretest as well as in the pilot study were not a part of the final sample of the research. The team consisted of nutritionists (n=4) and nutrition students (n=5) who were trained to standardize the method, aiming to minimize errors during data collection.

Data were typed with a double entry on the program EpiData 3.1 (Odense, Denmark). Controls were also inserted for data entry. We performed a descriptive analysis of the categorical variables by calculating the absolute (n) and relative (%) frequencies. For the continuous variables, we calculated the mean, standard deviation, median, minimum and maximum values. In addition, we calculated the crude and adjusted prevalence ratios (PR), and their confidence intervals of 95% (CI 95%), through Poisson regression models with robust variance. The variables with a p value lower than or equal to 0.25 were included in the adjusted variable and were considered significant when the p value was lower than or equal to 0.05. The order of entry of the variables in the analysis followed a hierarchical model in blocks, in which we introduced first the demographic variables, followed by socioeconomic variables, the health-related behaviors, obstetric history, and anthropometric and health conditions (figure 1). The analyses were performed in the Stata 12 program.

The Research Ethics Committee of the Federal University of Paraná (number 1463691) approved this research. The ethical behaviors shown in the Normative Resolution nº 466/2012 of the National Health Council of Brazil were followed throughout all the stages of our study.

Figure 1. Hierarchical model in blocks of the crude analysis
Note: SAH: Systemic Arterial Hypertension



RESULTS

We invited 322 pregnant women to participate in our study. Six of them (1.9%) refused to participate, resulting in a total of 316 participants (87.5% of the calculated population). The total number of 361 pregnant women was not reached because the researchers reached the minimum population size (n=301) in the period suggested for data collection (April to November).

Table 1 presents the characteristics of the pregnant women. Most of them were between 20 and 34 years old (75.6%) and lived with their partners (83.5%). Of the pregnant

women interviewed, 38.9% had between eight and ten years of education, 35.8% were in their second pregnancy and 49.5% were in the third gestational trimester. Pregnant smokers represented 9.8% of the individuals and 3.2% reported SAH diagnosis prior to their pregnancy. The prevalence of overweight was 40.8% in the pregestational period and 46.2% when we performed the study.

Table 1. Distribution of the socioeconomic and demographic characteristics, the health-related behaviors and health conditions of the pregnant women receiving prenatal care in health centers that offer Family Health Strategies. Colombo, Paraná, Brazil, 2016. (n=316)

Variables	n (%)
Demographic	
Age group (in years)	
Up to 20	44 (14.2)
20-34	239 (75.6)
35 and older	32 (10.1)
Live with a partner	
No	52 (16.5)
Yes	264 (83.5)
Socioeconomic	
Education (in years)	
Up to 7	74 (23.4)
8-10	123 (38.9)
11 and more	119 (37.7)
Health-related behaviors	
Currently smoking	
No	257 (90.2)
Yes	28 (9.8)
Obstetric history	
Number of pregnancies	
One pregnancy (current)	96 (30.4)
Two pregnancies	113 (35.8)
Three pregnancies or more	107 (33.9)

Table 1. Distribution of the socioeconomic and demographic characteristics, the health-related behaviors and health conditions of the pregnant women receiving prenatal care in health centers that offer Family Health Strategies. Colombo, Paraná, Brazil, 2016. (n=316) (cont.)

Variables	n (%)
Health conditions	
Arterial hypertension	
No	306 (96.8)
Yes	10 (3.2)
Gestational quarter	
1st	42 (13.4)
2nd	116 (37.0)
3rd	155 (49.5)
Anthropometric condition	
Pregestational overweight	
No	183 (59.2)
Yes	126 (40.8)
Outcome	
Gestational overweight	
No	163 (53.8)
Yes	140 (46.2)

Note: number of losses in each variable: Lives with partner n=30; Currently smoking n=2; Gestational quarter n=3; Pregestational overweight n=7; Gestational overweight n=13.

In the crude analysis, we observed an association between gestational overweight and the variables age, smoking, number of pregnancies, pregestational overweight and SAH. In the adjusted analysis, the prevalence of gestational overweight was 1.72 times higher (CI 95% 1.04-2.83) among pregnant women between 20 and 34 years old, and 2.08 times higher (CI 95% 1.18-3.66) in women aged 34 years or older, compared to adolescents. Among the smokers, the prevalence of the outcome was 55% lower (CI 95% 0.23-0.89) compared to the non-smokers. The participants that reported three or more pregnancies presented a prevalence of overweight 1.47 times higher (CI 95% 1.04-2.09) during their current pregnancy. Those who started their pregnancy with excess weight presented a prevalence of overweight 5.09 times higher (CI 95% 3.63-7.14) during their current pregnancy. The variable SAH was no longer significant in the adjusted analysis (table 2).

Table 2. Crude and adjusted analysis of gestational overweight with socioeconomic and demographic variables, health-related behaviors, obstetric history, health and anthropometric conditions in health centers that offer Family health Strategies. Colombo, Paraná, Brazil, 2016. (n=316)

Variables	Overweight (yes) n (%)	PR crude (CI 95%)	Value p*	PR adjusted (CI 95%)	Value p*
Demographic					
Age group (in years)			0.015		0.005[a]
Up to 20	12 (27.9)	1		1	
20 – 34	110 (48.0)	1.71 (1.03-2.83)		1.72 (1.04-2.83)	
35 and older	18 (58.1)	1.88 (1.11-3.18)		2.08 (1.18-3.66)	
Live with a partner			0.528		
No	21 (42.0)	1			
Yes	119 (47.0)	1.11 (0.78-1.59)			
Socioeconomic					
Education (in years)			0.979		
Up to 7	32 (46.4)	1			
8 – 10	54 (46.1)	0.99 (0.72-1.37)			
11 and more	54 (46.1)	0.99 (0.72-1.37)			
Health-related behaviors					
Currently smoking			0.031		0.023[b]
No	131 (48.3)	1		1	
Yes	7 (23.3)	0.48 (0.24-0.93)		0.45 (0.23-0.89)	
Obstetric history					
Number of pregnancies			0.006		0.025[c]
One (current)	33 (35.5)	1		1	
Two	51 (46.8)	1.31 (0.93-1.85)		1.24 (0.88-1.75)	
Three or more	56 (55.4)	1.56 (1.12-2.16)		1.47 (1.04-2.09)	
Anthropometric condition					
Pregestational Overweight			<0.001		<0.001[d]
No	30 (16.8)	1		1	
Yes	109 (90.1)	5.37 (3.58-8.05)		5.09 (3.63-7.14)	

Table 2. Crude and adjusted analysis of gestational overweight with socioeconomic and demographic variables, health-related behaviors, obstetric history, health and anthropometric conditions in health centers that offer Family health Strategies. Colombo, Paraná, Brazil, 2016. (n=316) (cont.)

Variables	Overweight (yes) n (%)	PR crude (CI 95%)	Value p*	PR adjusted (CI 95%)	Value p*
Health conditions					
Arterial hypertension			0.026		0.116[e]
No	131 (44.7)	1		1	
Yes	9 (90.0)	1.52 (1.05-2.22)		1.26 (0.94-1.70)	
Gestational quarter			0.296		
1st	20 (55.6)	1			
2nd	53 (45.7)	0.79 (0.56-1.12)			
3rd	67 (44.4)	0.55 (0.41-0.74)			

Note: *Wald Test; a: adjusted for demographic variables; b: adjusted for demographic variables and health-related behaviors; c: adjusted for demographic variables, health-related behaviors and obstetric history; d: adjusted for demographic variables, health-related behaviors, obstetric history and anthropometric conditions; e: adjusted for demographic variables, health-related behaviors, obstetric history, and for anthropometric and health conditions. PR: Prevalence Ratio; CI 95%: Confidence Interval of 95%.

DISCUSSION

Overweight is a serious problem for public health. Excessive weight gain during pregnancy and before conception is a risk factor for the outcomes of gestation and for the baby. Among the women we assessed, almost half of them were considered overweight for their gestational age. Lower overweight prevalence were observed in national studies performed in Rio de Janeiro (24.5%)[13] and in Campina Grande (27%),[20] in which less than a third of the pregnant women were overweight or obese.

In our study, approximately half of the pregnant women (40.8%) presented excessive weight prior to pregnancy as well as during pregnancy (46.2%). We observed a higher prevalence of overweight among the pregnant women we assessed who were older, displayed higher parity, among non-smokers and those with pregestational overweight.

Age was associated with a higher prevalence of overweight in both our and other studies.[9-11] As the person ages, metabolic changes, such as a reduction in the basal metabolic rate, and changes in lifestyle also decrease total daily energy expenditure, which may result in overweight. In a review study, Kac[21] shows that the mean BMI increased as the person aged, especially in women between 24 and 35 years old.

Although the lowest socioeconomic status was associated with overweight among Brazilian women,[12,22] in our study, we did not find any statistically significant associations between being overweight and education level. Possibly, the relative socioeconomic homogeneity of the pregnant women from the UFS was not enough for us to identify those differences. Another factor that might explain the absence of associations is that women with a higher level of education are more inclined to postpone pregnancy until they are older,[23] which might reduce the protective effect of having a higher level of education on being overweight during pregnancy, in an exclusive population of pregnant women.

The prevalence of overweight was lower among smokers compared to non-smokers. Changes in taste and smell, as well as changes in energy balance, result in a lower food intake,[24] which may explain weight loss in smokers. Smoking is associated with lower maternal weight gain regardless of calorie intake.[14] Although this weight loss in smokers might seem beneficial, women that smoke during pregnancy present a higher risk for complications compared to non-smokers.[25,26] Among the complications, we can include: early placental abruption, pre labor bleeding, premature birth, miscarriage, low birth weight and higher risk for sudden death of the baby in the first six months of life.

Among the women we interviewed in Colombo that reported SAH, overweight prevalence was higher in those who did not present this condition. In a retrospective cohort study[27] with 18,633 patients classified according to their pregestational BMI, a SAH prevalence of 1.56 (CI 95% 1.35-1.81) and 2.01 (CI 95% 1.64-2.45) times higher among overweight and obese pregnant women, respectively, was observed, compared to eutrophic women. In Brazil, another cohort study[28] carried out with 5,314 pregnant women showed a high risk of overweight (OR 2.5 - CI 95% 1.99-3.04) and obese (OR 6.6 - CI 95% 5.06-8.60) women to develop gestational hypertension when compared to eutrophic women. After the adjusted analysis, the SAH variable was no longer statistically significant in our study, probably due to the low number of pregnant women in that condition (n=10).

Women with higher parity (three or more pregnancies) showed a higher prevalence of overweight in our study. A prospective cohort study,[29] in Netherlands, followed 6,959 mothers and their children between 2001 and 2005, and they found that the pregnant women who presented higher risks for overweight and obesity prior to pregnancy were those with a lower level of education, multiparous and had an obese partner. The pregnant women that presen-

ted higher risks for excessive gestational weight gain were those of European ethnicity, nulliparous, with a higher energy intake, smokers during pregnancy and those who had an obese partner. One of the possible explanations for excessive weight in women with more children is that body fat accumulated during their first pregnancy is not lost over the pregnancies. That weight accumulation increases gradually with the number of children.[21]

The pregestational nutritional status revealed that 40.8% of the women were already overweight when they became pregnant, with a prevalence of keeping overweight 5.09 times higher until the moment of the interview. Higher prevalence of pregestational excessive weight were also observed in studies performed in other countries. Data from the National Vital Statistics Reports from the USA, in 2015, showed a prevalence of 51.4% of pregestational overweight in American women. Between 2011 and 2014, 54.1% of women were overweight prior to pregnancy in Wisconsin, USA.[8]

The Ministry of Health Department uses a graph and a table containing the BMI according to the gestational age and its classification as a reference for the assessment of the gestational nutritional status. In addition, it also uses the recommendations from the Institute of Medicine (IOM, United States) for an adequate weight gain during pregnancy.[18] One of the advantages of this method is that it allows the diagnosis of the nutritional status at any gestational age. However, after a systematic review of the studies on nutritional status in pregnant women, the authors observed that the methods used in the last few decades have considered the baby weight at birth, as the main reference for defining adequate weight gain in pregnancy.[30] Therefore, although these methods seem adequate, more studies carried out with Brazilians are necessary, so patterns in weight gain among pregnant women can be established.

Our study allowed us to identify characteristics associated with gestational excessive weight, with a representative population of pregnant women that use the Brazilian Unified Health System, receiving a prenatal follow-up in the USF of a city in the metropolitan region of Curitiba-PR.

Measuring anthropometric values is a non-invasive method and easy to be performed that provides a BMI value and a nutritional diagnosis. With this information, health professionals can establish, together with the pregnant woman, methods to prevent overweight and obesity. Therefore, during the prenatal follow-up, it is important that the health team for primary care follow weight gain of the pregnant women to avoid excessive gestational weight and its consequences for the health of the mother and the baby.

The limitations of our study include the information regarding pregestational weight reported by the patients, which might result in an over or underestimated value in addition to

the memory bias; and the presence or absence of hypertension prior to pregnancy was also reported by the patients.

Those women with complications, such as diabetes mellitus, were directed to the high complexity care and did not receive prenatal care at the primary health care center, and, therefore, did not participate in our study. The population size was calculated for a prevalence study and, because of that, we might not have been able to identify associations between some exposure variables and the outcome. In addition, the population comprised only pregnant women who use health centers from the Brazilian Unified Health System. Moreover, the cross-section design of our study can be also a limitation, since it does not allow us to infer cause and effect associations.

CONCLUSION

We observed a high prevalence of excessive weight during pregnancy among the participants in our study. Almost half of the pregnant women were overweight during pregnancy (46.2%) and before conception (40.8%). Women who were 35 years old or older, with three or more children and excessive weight in the pregestational period were more likely to present excessive weight during pregnancy.

Being overweight at any stage of life is a preventable risk factor for noncommunicable chronic diseases and has repercussions on the outcomes of the pregnancy as well as the life of the baby. Therefore, we highlight the importance of receiving prenatal care by an interprofessional team so the patient can have an integrated health care focused on the prevention of overweight before conception and during pregnancy. In addition, the patient can reduce weight accumulation between pregnancies.

Promoting access to food that is nutritionally adequate, safe and cost-effective is essential to prevent excessive weight. In addition, investing in actions that provide and encourage physical activities in safe and easily accessible places is another important action that should be highlighted.

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Contributors

Manera F contributed collecting and interpreting data. Manera F and Höfelmann DA participated in the design and outline of the study, data analysis, writing and critical review of the intellectual content and they approved the final version of the paper.

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