Excessive gestational weight gain in the Brazilian Unified Health System

Ganho de peso gestacional excessivo no Sistema Único de Saúde

Aumento de peso gestacional excesivo en el Sistema Único de Salud

Lorenna Viccentine Coutinho Monteschio[1] https://orcid.org/0000-0002-1486-6898
Sonia Silva Marcon[1] https://orcid.org/0000-0002-6607-362X
Guilherme Oliveira de Arruda[2] https://orcid.org/0000-0003-1690-4808
Elen Ferraz Teston[3] https://orcid.org/0000-0001-6835-0574
Evelin Matilde Arcain Nass[1] https://orcid.org/0000-0002-5140-3104
Josane Rosenilda da Costa[1] https://orcid.org/0000-0003-0369-977X
Mônica Oliveira Batista Oriá[4] https://orcid.org/0000-0002-1483-6656
Adriana Lenho de Figueiredo Pereira[5] https://orcid.org/0000-0002-2563-6174

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Corresponding author
Lorenna Viccentine Coutinho Monteschio
E-mail: helorenn@gmail.com

Abstract

Objective: To check the prevalence and factors associated with excessive weight gain during pregnancy.

Methods: This is a cross-sectional study carried out in a municipality in the countryside of southern Brazil, with 462 women who had a birth financed by the Brazilian Unified Health System. Sociodemographic, anthropometric, obstetric, eating habits and physical activity data were collected. Bivariate (chi-square) and multiple statistical analysis were performed using a logistic regression model.

Results: The study was predominantly carried out by women who were married/in a stable relationship, over 25 years of age and from economic classes C, D or E. The prevalence of excessive weight gain during pregnancy was 38.3%. Women with per capita income below one minimum wage had a lower frequency of excessive weight gain during pregnancy (p=0.020). The pregnant women who reported planning their pregnancy (p=0.048), who were overweight pre-pregnancy (p <0.001), who increased their food intake (p <0.001) and who consumed industrialized products more than three times a week (p=0.002) were those that presented a higher frequency of excessive weight gain.

Conclusion: The prevalence of gain of excessive gestational weight was 38.3% and was associated with higher per capita income, planned pregnancy, pre-gestational excess weight, increased food intake and higher weekly frequency of consumption of industrialized products.

Resumo

Objetivo: Verificar a prevalência e os fatores associados ao ganho de peso excessivo na gestação.

Métodos: Estudo transversal, realizado em município do interior do sul do Brasil, com 462 mulheres que tiveram parto financiado pelo Sistema Único de Saúde. Coletado dados sociodemográficos, antropométricos, obstétricos, hábitos alimentares e prática de atividade física. Realizou-se análise estatística bivariada (Qui-quadrado) e múltipla por meio de modelo de regressão logística.

Resultados: Participaram deste estudo, predominantemente, mulheres casadas/ em união estável, maiores de 25 anos e das classes econômicas C, D ou E. A prevalência de ganho de peso excessivo na gestação foi de 38,3%. As mulheres com renda per capita menor que um salário-mínimo apresentaram menor frequência de ganho de peso excessivo na gestação (p=0,020). Já as gestantes que referiram planejar a gestação (p=0,048), que tinham excesso de peso pré-gestacional (p<0,001), que aumentaram a ingesta alimentar (p<0,001) e que consumiram produtos industrializados mais do que três vezes por semana (p=0,002) foram as que apresentaram maior frequência de ganho de peso excessivo.

[1]Universidade Estadual de Maringá, Maringá, PR, Brazil.
[2]Universidade Federal do Mato Grosso do Sul, Coxim, MS, Brazil.
[3]Universidade Federal do Mato Grosso do Sul, Campo Grande, MS, Brazil.
[4]Universidade Federal do Ceará, Fortaleza, CE, Brazil.
[5]Universidade do Estado do Rio de Janeiro, Rio de Janeiro, RJ, Brazil.

Conflicts of interest: extracted from the thesis: "Prevalência e fatores associados ao ganho de peso gestacional excessivo e retenção de peso pós-parto", presented to the Graduate Program in Nursing at Universidade Estadual de Maringá (UEM), 2019.

Conclusão: A prevalência de ganho de peso gestacional excessivo foi de 38,3% e esteve associada à maior renda *per capita*, gestação planejada, excesso de peso pré-gestacional, aumento da ingesta alimentar e maior frequência semanal no consumo de produtos industrializados.

Resumen

Objetivo: Verificar la prevalencia y los factores asociados al aumento de peso excesivo en la gestación.

Métodos: Estudio transversal, realizado en un municipio del interior de la región Sur de Brasil, con 462 mujeres cuyo parto fue financiado por el Sistema Único de Salud. Se recopilaron datos sociodemográficos, antropométricos, obstétricos, hábitos alimentarios y práctica de actividad física. Se realizó un análisis estadístico bivariado (ji cuadrado) y múltiple mediante el modelo de regresión logística.

Resultados: Participaron en este estudio principalmente mujeres casadas/con unión de hecho, mayores de 25 años y de clase económica C, D o E. La prevalencia del aumento de peso excesivo en la gestación fue del 38,3 %. Las mujeres con ingreso per cápita menor a un salario mínimo presentaron menor frecuencia de aumento de peso excesivo en la gestación (p=0,020). Por otro lado, las mujeres embarazadas que indicaron una gestación planificada (p=0,048), que tenían exceso de peso pregestacional (p<0,001), que aumentaron la ingesta de alimentos (p<0,001) y que consumieron productos industrializados más de tres veces por semana (p=0002) fueron las que presentaron mayor frecuencia de aumento de peso excesivo.

Conclusión: La prevalencia de aumento de peso gestacional excesivo fue del 38,3 % y se relacionó con mayores ingresos por cápita, gestación planificada, exceso de peso pregestacional, aumento de la ingesta de alimentos y mayor frecuencia semanal de productos industrializados.

Introduction

The increase in the prevalence of overweight and obesity over the years has resulted in a greater proportion of obese people in all age groups, including in the beginning and/or during pregnancy.[1] The increase in body mass index (BMI) in pregnancy is associated with maternal complications, such as diabetes mellitus, gestational hypertension and pre-eclampsia, and elevated risks of fetal macrosomia, birth defects, perinatal mortality and metabolic diseases in children.[2-4] These complications and outcomes are related to pre-gestational maternal obesity and excessive gestational weight gain (GWG), which are considered serious public health problems in Brazil and worldwide.[4,5] Therefore, it is necessary to explore more evidence related to overweight and obesity among pregnant women.

A meta-analysis review study that included 37 pregnancy and birth cohorts from Europe, North America and Australia estimated that 21.7% to 41.7% of childhood overweight/obesity cases were associated with maternal overweight and obesity, while 11.4% to 19.2% were related to excessive GWG.[6]

In Brazil, the "Brazilian National telephone survey on the surveillance of risk and protective factors for chronic diseases" (VIGITEL - "*Inquérito telefônico nacional de vigilância dos fatores de risco e proteção para doenças crônicas*")[7] is carried out annually in the capitals, which verified the upward trend in the rates of overweight and obesity in women over 18 years of age from 2006 to 2016. During this period, overweight in adults increased by 22%, reaching the percentage of 50.5% and obesity jumped from 12.1% to 19.6%. [8] Considering the impact of overweight and obesity on pregnancy/in pregnant women, on maternal and neonatal outcomes, the Ministry of Health of Brazil recommends monitoring weight and assessing the nutritional status of pregnant woman in all prenatal consultations, through verification of anthropometric measurements, such as weight, height and calculation of BMI. These are simple procedures, with no costs involved and which are effective for monitoring nutritional status, the early detection of excessive weight gain and the direction of health actions.[9]

In the context of Primary Health Care (PHC), the nursing team is responsible for making measurements during pre-consultations. In the specific case of prenatal care, information regarding weight and height allows the doctor and nurse responsible for the consultation to assess the evolution of weight gain and perform specific interventions for each case. In view of this, it is necessary to substantiate the actions of these professionals in order to improve decision making regarding the identification of risk factors present in pregnant women and to outline strategies to face the problem of excessive weight gain in this population, and thus strengthen public policies in PHC.[10]

On the other hand, challenges in PHC still persist in relation to obesity prevention and control actions, such as the low valuation of the verification of anthropometric measures, among them the little involvement of professionals in tracking weight gain at different stages of

life. It should be noted that the increase, albeit small, in the income and purchasing power of the Brazilian population, due to social programs for low-income families, favors access to food products. However, this access does not always mean the consumption of nutritious and healthy foods. Most of the time, low-cost options are generally unhealthy, with a high content of sugars and carbohydrates, the consumption of which increases the chances of weight gain.[11]

Thus, socio-cultural factors, difficulties in accessing health services,[12] as well as obstetric, behavioral and socioeconomic variables can be associated with excessive GWG.[13] Thus, it is considered that the lack of monitoring of weight gain and information about the importance of physical activity and adequate eating habits, especially regarding the low consumption of industrialized products, can also be result in excessive GWG.[11]

Therefore, the investigation of predictors of excessive GWG is configured as an original study and a timely resource that can guide interventions within the scope of public policies aimed at women of childbearing age and, more specifically, during the gestational period. Thus, this study aims to verify the prevalence and factors associated with excessive GWG.

Methods

This is a cross-sectional study conducted with a non-probabilistic sample of puerperal women living in the city of Maringá-Paraná, whose delivery was financed by the Unified Health System (SUS – *Sistema Único de Saúde*). To define the sample size of 462 women, the approximate number of pregnant women in the municipality was considered and a prevalence of 13% for weight retention greater than 5 kg in women 12 months postpartum.[14]

In the municipality of Maringá, only two hospitals perform deliveries financed by SUS. Thus, the number of puerperal women included in the study was proportional to the number of deliveries that occurred in each hospital in 2015.

The study participants were located based on active searches, carried out daily, in the two hospitals. All hospitalized postpartum women who met the following inclusion criteria were addressed - single pregnancy, live birth, who gave birth at a gestational age greater than or equal to 37 weeks. In turn, those who did not know how to inform or who had no record of pre-gestational weight and weight at the end of pregnancy on the pregnant woman's card and women who did not understand the Portuguese language were excluded. All participants underwent prenatal care through SUS, most of them, in full. However, the professional who performed the consultations was not questioned.

Data were collected from December 2017 to September 2019, during hospitalization in the immediate postpartum period, through an interview, consultation of pregnant women's medical record and card. A mixed questionnaire was used, with closed and open questions, prepared by the author herself based on the objectives of the study, addressing self-reported anthropometric and gestational characteristics, socioeconomic aspects, obstetric history, current pregnancy data and life habits. In pregnant women's medical records and card, data not collected during the interview were collected, when, for example, the interviewee did not remember or did not know how to inform. Two nurses, doctoral students in nursing, properly trained, were responsible for data collection.

The dependent variable was excessive GWG, determined by the difference between weight at the end of pregnancy and pre-pregnancy weight. Pre-gestational weight was considered to be that referred up to two months prior to the conception or discovery of pregnancy, or that noted on the prenatal card until the 14th week of gestation. For the weight at the end of pregnancy, it was considered the one quoted by the woman, referring to, at most, 30 days prior to the date of delivery or the weight noted on the pregnant woman's card referring to the last prenatal consultation and which did not exceed 30 days before the date of delivery.

For categorization of the dependent variable ("yes" or "no" for excessive GWG), it was considered as excessive GWG when the gain was higher than recommended according to the nutritional status before pregnancy, with weight gain between 12 being considered adequate, 5 and 18 kg for women underweight; between 11 and 16 kg for eutrophic women;

between 7 and 11.5 kg for overweight women; and between 5 and 9 kg for obese women.[15]

The independent variables were grouped into four sets:

a. Socioeconomic: age group, marital status, completed high school (HS), paid work, formal contract, race/color, family allowance, per capita income and economic classification (C, D, E) according to the purchasing power of individuals.[16]
b. Obstetric: multiparous, previous cesarean section, previous vaginal delivery, time of beginning of prenatal care, number of prenatal consultations, planned pregnancy and type of current delivery.
c. Nutritional status: maternal family obesity, desire to lose weight, already used medication to lose weight and initial nutritional status according to BMI classified as overweight or normal/underweight (UW).
d. Eating habits: eating fast, changing diet during pregnancy, increased food intake, increased desire for sweets, considers healthy eating, received guidance on feeding during prenatal care and whether financial condition interferes with healthy eating. To identify the weekly frequency of consumption of sweetened artificial juice/soda and industrialized products, two questions from the VIGITEL survey were used.[7]
e. Physical activity (PA): work during pregnancy, physical effort at work, own car, driving frequently, physical inactivity during pregnancy, financial condition interferes with the practice of PA, change in UW during pregnancy, indication or prohibition of UW by a health professional, UW before and during pregnancy (divided by trimesters), rest, daily activities and walking (divided into the three trimesters).

The descriptive and statistical data analysis was performed using the SPSS® software, with an association test (Pearson's chi-square) being performed in bivariate analysis, and those with a p value <0.20 were inserted in the multiple logistic regression model (forward method). Odds Ratio (OR) was used as a measure of association, with a 95% confidence interval. Significance was established when p <0.05 for maintaining the variables in the logistic model. The level of fit of the model was verified using the Hosmer and Lemeshow test.

The study was approved by the Institutional Review Board of *Universidade Estadual de Maringá* (Opinion 2.180.586). All puerperal women who agreed to participate signed the Informed Consent Form (ICF).

Results

The prevalence of excessive GWG among the 462 puerperal women was 38.3% (n=177) and was more frequent among those with a stable union, paid work and formal contract, mixed race/black/yellow, per capita income greater than one minimum wage, with previous cesarean section, who had seven or more consultations, whose pregnancy was planned and the current delivery was cesarean (Table 1). In the bivariate analysis, it was found that the socioeconomic and obstetric variables that could be inserted in the multiple analysis were: paid work (p=0.06), formal contract (p=0.09), race/color (p=0, 19), per capita income (p=0.05), number of consultations (p=0.00), planned pregnancy (p=0.06) and type of current delivery (p=0.16) (Table 1).

In relation to nutritional status and eating habits, excessive GWG was significantly more frequent among those who were overweight before pregnancy, who wished to lose weight, had used medication for this, those who increased food intake during pregnancy and who consumed products industrialized three or more times a week. In relation to PA, excessive GWG was significantly higher among those who needed rest in the first trimester and who did not undergo PA in the same trimester (Table 2).

For multiple analysis, the following were selected: maternal family obesity (p=0.15), desire to lose weight (p=0.00), initial nutritional status (p=0.00), already used weight loss medication (p=0.05), increased food intake during pregnancy (p=0.00), increased desire for sweets during pregnancy (p=0.13), consider healthy eating (p=0.08) and the frequency of weekly consumption of products industrialized (p=0.00). As for PA, the following were selected: work during pregnancy (p=0.10), owning a car (p=0.11), physical inactivity during pregnancy (p=0.17), if financial condition interferes with the practice of PA (p=0.15),

Table 1. Bivariate analysis between excessive weight gain during pregnancy and socioeconomic/obstetric characteristics

Variables	Excessive weight gain during pregnancy			
	Yes n(%)	No n(%)	Total n(%)	P value
Age group (years)				
Less than 24	71(38.0)	116(62.0)	187(40.5)	0.96
25 and older	105(38.2)	170(61.8)	275(59.5)	
Marital status				
Single/widowed/ separated	18(32.7)	37(67.3)	55(11.9)	0.36
Stable union/married	159(39.1)	248(60.9)	407(88.1)	
High School				
Yes	92(38.2)	149(61.8)	241(52.2)	0.95
No	85(38.5)	136(61.5)	221(47.8)	
Paid work				
Yes	111(42.0)	153(58.0)	264(57.1)	0.06
No	66(33.3)	132(66.7)	198(42.9)	
Official recognized job				
Yes	76(43.2)	100(56.8)	176(38.1)	0.09
No	101(35.3)	185(64.7)	286(61.9)	
Race/color				
Brown/black/yellow	95(41.3)	135(58.7)	230(49.8)	0.19
White	82(35.3)	150(64.7)	232(50.2)	
Family Stipend				
Yes	21(31.8)	45(68.2)	66(14.3)	0.24
No	156(39.4)	240(60.6)	396(85.7)	
Per capita income (in minimum wage[#])				
≤ 1	106(35.1)	196(64.9)	302(65.4)	0.05
>1	71(44.4)	89(55.6)	160(34.6)	
C.D.E economy class				
Yes	128(37.4)	214(62.6)	342(74.0)	0.51
No	49(40.8)	71(59.2)	120(26.0)	
Multiparous				
Yes	108(38.3)	174(61.7)	282(61.0)	0.99
No	69(38.3)	111(61.7)	180(39.0)	
Previous cesarean section **				
Yes	69(40.8)	100(59.2)	169(59.9)	0.29
No	39(34.5)	74(65.5)	113(40.1)	
Previous vaginal childbirth**				
Yes	41(35.7)	74(64.3)	115(40.8)	0.45
No	67(40.1)	100(59.9)	167(59.2)	
Prenatal beginning				
GA <12 wk	137(39.5)	210(60.5)	347(76.1)	0.39
GA ≥12 wk	38(34.9)	71(65.1)	109(23.9)	
Number of consultations***				
≥7	156(42.2)	214(57.8)	370(81.3)	0.00
≤6	19(22.4)	66(77.6)	85(18.7)	
Planned pregnancy ****				
Yes	63(44.7)	78(55.3)	141(30.7)	0.06
No	113(35.5)	205(64.5)	318(69.3)	
Current				
Vaginal childbirth	67(34.5)	127(65.6)	194(42.0)	0.16
Cesarean section	110(41.0)	158(59.0)	268(58.0)	

*Chi-square; **n=282; ***n=455; ****n=459; [#]Minimum wage for 2018, quoted in the amount of R$ 965.00 (about US$175.50).

rest in the 1st and 2nd trimester (p=0.01; p=0.08), PA in the 1st trimester (p=0.06), PA as a means of transport in 1 2nd, 2nd and 3rd trimester (p=0.17; p=0.14; p=0.10) (Table 2).

Table 2. Bivariate analysis between excessive weight gain during pregnancy, nutritional status, eating habits and physical activity

Variables	Excessive weight gain during pregnancy			
	Yes n(%)	No n(%)	Total n(%)	P value
Maternal family obesity				
Yes	36(45.6)	43(54.4)	79(17.1)	0.15
No	141(36.8)	242(63.2)	383(82.9)	
Desire to lose weight				
Yes	105(47.7)	115(52.3)	220(47.6)	0.00
No	72(29.8)	170(70.2)	242(52.4)	
Initial nutritional status				
Overweight	118(49.6)	120(50.4)	238(51.5)	0.00
Normal/UW	59(26.3)	165(73.7)	224(48.5)	
Eat fast				
Yes	60(42.3)	82(57.7)	142(69.3)	0.25
No	117(36.6)	203(63.4)	320(30.7)	
Already used medicine to lose weight				
Yes	29(50.0)	29(50.0)	58(12.6)	0.05
No	148(36.6)	256(63.4)	404(87.4)	
Change of diet during pregnancy				
Yes	100(37.7)	165(62.3)	265(57.4)	0.77
No	77(39.1)	120(60.9)	197(42.6)	
Increased food intake during pregnancy				
Yes	91(49.2)	94(50.8)	185(40.0)	0.00
No	86(31.0)	191(69.0)	277(60.0)	
Increased desire for sweets during pregnancy				
Yes	121(40.9)	175(59.1)	296(64.1)	0.13
No	56(33.7)	110(66.3)	166(35.9)	
Consider healthy eating				
Yes	84(34.6)	159(65.4)	243(52.6)	0.08
No	93(42.5)	126(57.5)	219(47.4)	
Received guidance on feeding during prenatal care				
Yes	103(36.4)	180(63.6)	283(61.3)	0.29
No	74(41.3)	105(58.7)	179(38.7)	
Financial condition interferes with healthy eating				
Yes	62(37.8)	102(62.2)	164(35.5)	0.87
No	115(38.6)	183(61.4)	298(64.5)	
Weekly frequency of soft drink/ sweetened artificial juice				
3 times or more	93(40.4)	137(59.6)	230(49.8)	0.35
2 times or less	84(36.2)	148(63.8)	232(50.2)	
Industrialized consumption weekly frequency				
3 times or more	114(45.6)	136(54.4)	250(54.1)	0.00
2 times or less	63(29.7)	149(70.3)	212(45.9)	
Worked gestation				
Yes	98(42.1)	135(57.9)	233(50.4)	0.10
No	79(34.5)	150(65.5)	229(49.6)	
Physical effort at work**				
Yes	30(39.5)	46(60.5)	76(32.6)	0.58
No	68(43.3)	89(56.7)	157(67.4)	
Owning a car				
Yes	124(40.9)	179(59.1)	303(65.6)	0.11
No	53(33.3)	106(66.7)	159(34.4)	
Drives frequently				
Yes	77(39.3)	119(60.7)	196(42.4)	0.71
No	100(37.6)	166(62.4)	266(57.6)	

Continue...

Continuation.

Variables	Excessive weight gain during pregnancy			P value
	Yes n(%)	No n(%)	Total n(%)	
Sedentary lifestyle during pregnancy				
Yes	141(40.1)	211(59.9)	352(76.2)	0.17
No	36(32.7)	74(67.3)	110(23.8)	
Financial condition interferes with PA				
Yes	49(44.1)	62(55.9)	111(24.0)	0.15
No	128(36.5)	223(63.5)	351(76.0)	
PA before pregnancy				
Yes	52(40.6)	76(59.4)	128(27.7)	0.53
No	125(37.4)	209(62.6)	334(72.3)	
Change in PA during pregnancy				
Yes	62(42.2)	85(57.8)	147(31.8)	0.24
No	115(36.5)	200(63.5)	315(68.2)	
PA indication by health professional				
Yes	96(40.5)	141(59.5)	237(51.3)	0.32
No	81(36.0)	144(64.0)	225(48.7)	
PA prohibition by health professional				
Yes	21(46.7)	24(53.3)	45(9.7)	0.23
No	156(37.4)	261(62.6)	417(90.3)	
1st trimester rest				
Yes	30(53.6)	26(46.4)	56(12.1)	0.01
No	147(36.2)	259(63.8)	406(87.9)	
2nd trimester rest				
Yes	24(50.0)	24(50.0)	48(10.4)	0.08
No	153(37.0)	261(63.0)	414(89.6)	
3st trimester rest				
Yes	41(41.4)	58(58.6)	99(21.4)	0.48
No	136(37.5)	227(62.5)	363(78.6)	
1st trimester PA				
Yes	18(27.7)	47(72.3)	65(14.1)	0.06
No	159(40.1)	238(59.9)	397(85.9)	
2nd trimester PA				
Yes	22(33.8)	43(66.2)	65(14.1)	0.42
No	155(39.0)	242(61.0)	397(85.9)	
3rd trimester PA				
Yes	19(35.8)	34(64.2)	53(11.5)	0.70
No	158(38.6)	251(61.4)	409(88.5)	
1st trimester DA				
Yes	117(36.7)	202(63.3)	319(69.0)	0.28
No	60(42.0)	83(58.0)	143(31.0)	
2nd trimester DA				
Yes	109(36.6)	189(63.4)	298(64.5)	0.30
No	68(41.5)	96(58.5)	164(35.5)	
3rd trimester DA				
Yes	95(36.8)	163(63.2)	258(55.8)	0.46
No	82(40.2)	122(59.8)	204(44.2)	
PA as means of transport 1st trimester				
None	106(41.1)	152(58.9)	258(55.8)	0.17
Hiking/biking	71(34.8)	133(65.2)	204(44.2)	
PA as means of transport 2nd trimester				
None	110(41.2)	157(58.8)	267(57.8)	0.14
Hiking/biking	67(34.4)	128(65.6)	195(42.2)	
PA as means of transport 3rd trimester				
None	118(41.3)	168(58.7)	286(61.9)	0.10
Hiking/biking	59(33.5)	117(66.5)	176(38.1)	

* Chi-square; ** n=233

In Table 3, the result of the multiple analysis is presented, indicating that five variables remained in the final model and constitute the factors associated with excessive GWG. There was a lower frequency of excessive GWG with per capita income less/equal to a minimum wage, resulting in less chance (OR=0.603) on the part of these women to present the negative outcome.

Pregnant women who reported having planned the pregnancy (OR=1.562), were overweight pre-gestationally (OR=3.252), increased their food intake during pregnancy (OR=2.496) and had three times weekly consumption of industrialized products or more (OR=1.949) were those with the highest relative chance of presenting excessive GWG (Table 3).

Table 3. Factors associated with excessive weight gain during pregnancy based on logistic regression analysis

Variables	Excessive weight gain during pregnancy		OR (95% CI)	P value
	Yes n(%)	No n(%)		
Per capita income				
≤ 1 mw*	106(35.1)	196(64.9)	OR=0.6031 (0.3941–0.925)	0.020
> 1 mw	71(44.4)	89(55.6)		
Planned pregnancy				
Yes	63(44.7)	78(55.3)	OR=1,562 (1,005 - 2,427)	0.048
No	113(35.5)	205(64.5)		
Initial nutritional status				
Overweight	118(49.6)	120(50.4)	OR=3,252 (2,132 - 4,962)	<0.001
Normal/UW	59(26.3)	165(73.7)		
Increased food intake during pregnancy				
Yes	91(49.2)	94(50.8)	OR=2,496 (1,634 - 3,812)	<0.001
No	86(31.0)	191(69.0)		
Weekly frequency of consumption of processed products				
3 times or more	114(45.6)	136(54.4)	OR=1,949 (1,283 - 2,961)	0.002
2 times or less	63(29.7)	149(70.3)		

*Minimum wage for 2018, quoted in the amount of R$ 965.00 (about US$175.50); **Obtained in multiple logistic regression analysis

Discussion

As possible study limitations, the absence/deficiency of record related to the pre- and post-gestational weight in the pregnant woman's card and in the medical record stands out, which did not allow a single strategy to collect this information to be ad-

opted as well as the failure to identify possible confounding variables in the definition of the method.

Anyway, the results found can support discussions between managers and health professionals, especially nurses who sometimes act as team leaders, regarding the importance of carrying out educational interventions focusing not only on risk factors for non-chronic diseases communicable diseases, but also those that can compromise the health of women and their babies during pregnancy, childbirth and the puerperium.

In this sense, special emphasis should be directed to women of childbearing age, as it was identified that the pre-gestational nutritional status is a factor associated with excessive GWG. Likewise, monitoring actions must be implemented, with the establishment of indicators and targets to be achieved with pregnant women living in the territory covered by each Basic Health Unit/Family Health Strategy Team.

The prevalence of 38.3% of excessive GWG among puerperal women was slightly lower than that found in a Chinese study with 1,643 women (43.2%).[17] However, this finding reiterates the importance of tracking and monitoring weight gain throughout pregnancy, in order to enable early interventions to combat complications for both pregnant women and children.

With regard to income, although most of participants belong to classes C, D and E, the frequency of excessive GWG was higher among those with per capita income greater than a minimum wage. It is worth considering that these women may have more access and consumption of food, especially processed and industrialized foods, which increases the risk of excessive GWG. However, this result differs from those observed in the literature, because in the northeast of Brazil an association of excessive GWG and family income below a minimum wage was identified,[12] while a study carried out in the countryside of São Paulo, identified an association between per capita income larger and suitable GWG.[18]

In the studied population, planning for pregnancy showed a significant relationship with excessive GWG, diverging from a study carried out in a municipality in northeastern Brazil.[19] Since unplanned pregnancies can predispose problems to a woman's life, especially those in a situation of socioeconomic or nutritional vulnerability, the relevance of counseling before conception, of obese women or those with overweight who wish to become pregnant.[20]

It should be noted that starting pregnancy with a high BMI or having a high BMI in the first trimester favors excessive weight gain during pregnancy, and is associated with the occurrence of depressive symptoms.[21] A study carried out with 607 puerperal women, in Maringá Paraná, found that high pre-gestational BMI is one of the factors associated with high gestational risk.[22]

This is worrying because, according to the World Health Organization (WHO), from 2005 to 2013, in Latin America and the Caribbean, more than 50% of women aged between 15 and 49 years, living in urban areas, were overweight or obese.[23] In Brazil, it is no different, as in 2016 the Vigitel survey identified that 50.5% of women over 18 years of age were overweight and 19.6% were obese.[7]

It is evident that the sample studied consisted of women with a high prevalence of pre-gestational excess weight and that a considerable portion of them had an excessive increase in weight during pregnancy. This result corroborates those of a survey carried out in the United States, which in the period from 2000 to 2009, observed an increase in the percentage of women with excessive GWG, which was associated with overweight and obesity before pregnancy.[24] and also the results of a prospective cohort conducted in Canada, which pointed to pre-pregnancy excess weight as one of the factors that favor excessive GWG.[25]

This aspect needs to be considered by health professionals, as the high BMI is associated with the occurrence of complications during pregnancy and childbirth, in addition to gestational diabetes, hypertensive disorders, macrosomia, perineal and pathway lacerations, increasing the risk of postpartum bleeding. As a result of these associations, maternal BMI has been used as a predictor of the mode of delivery, increasing the risk of cesarean delivery when greater than 30 kg/m^2.[20] In fact, a study based on administrative records of 216,481

births in New York pointed out that overweight and pre-pregnancy obesity contribute proportionally to the greater risk of cesarean sections among black and Hispanic women, when compared to white or Asian women.[26]

Among the factors that contribute to the altered BMI is a sedentary lifestyle, which showed a high proportion among the study participants. This fact may be related to the lack of security of health professionals to recommend PA during pregnancy, concerned with the restriction of intrauterine growth, abortion, musculoskeletal injury, or premature birth. These aspects, however, have not been proven in uncomplicated pregnancies.[27]

In addition, it should be noted that eating habits also influence weight gain during pregnancy. Thus, health professionals must have knowledge and in their performance, value the strong relationship between fast food pattern, processed foods, snacks and sugars and GWG.[28] Thus, the greater consumption of these foods harms maternal-fetal health by increasing only the energy gain, predisposing to hyperglycemia, but without adequate nutritional support.[29]

It should be noted that the use of processed foods by pregnant women has been reported, mainly, due to the greater adherence to fast-food-type eating habits. This variable should be considered in the assessment of eating habits, as metabolic changes such as hyperglycemia and high blood pressure associated with food insecurity have already been identified among pregnant women seen in the public health system.[29]

A study conducted in the countryside of southeastern Brazil, for example, found low frequency in the consumption of processed foods among pregnant women, which was attributed to the fact that they underwent nutritional monitoring.[30] However, in our country, most pregnant women do not have access to a nutritionist, so it is necessary that other professionals who assist women during pregnancy have knowledge about these aspects to fully assist them.[31]

Considering that weight is a modifiable factor and that women are more willing to follow health guidelines during pregnancy, the need to emphasize this theme in prenatal consultations and in groups of pregnant women is highlighted. In this sense, the multiprofessional team, especially nurses, must reinforce the importance, for both mother and baby, of a healthy, varied and balanced diet.

It is worth mentioning that in the scope of Primary Care, nurses have an important role in planning and assisting women during the pregnancy-puerperal cycle, including caring for and monitoring women and their children from the gestational and puerperal period.[9] Study points out that the type of relationship and the bond established with nurses, especially in the initial contacts can influence the way women will behave in relation to health guidelines throughout pregnancy. However, despite the Ministry of Health recommending that in medium and low risk pregnancies consultations are interspersed between doctor and nurse, this routine is not always guaranteed in all units, whether due to inadequate staffing or work infrastructure. The performance of nurses in prenatal care is still limited by several factors such as the fact that care is still based almost exclusively on the biomedical model, and the lack of recognition and even ignorance of nurses' work by the population and other health professionals. Regarding the category itself, it is possible to mention the need for professional qualification, the lack of protocols and systematization in carrying out consultations (often implemented to supply the absence of the medical professional), deficiency of physical structure and accumulation of function.[32,33]

Pregnancy is a period of frequent contact with the health service. Proof of this is that the majority of women in the study had seven or more consultations, a favorable condition for the adequate surveillance of nutritional status and the provision of quality information. Nurses must have the potential to welcome, assist and encourage healthy habits during and after the gestational period[32], with a view to preventing excessive GWG, favoring physical, mental well-being and self-esteem, and demystifying myths in relation to pregnancy.

It is considered that the construction and discussion of adequate dietary plans together with pregnant women, which take into account, as far as

possible, food preferences, characteristics of family context and conditions of access to healthy foods, increase the chances of them being followed.

In this sense, an intervention study with obese and overweight pregnant women, found that the group that had a diet with less consumption of sugar and saturated fat showed a lower risk of complications.[34] In turn, a review study with controlled, randomized trials of dietary intervention and exercise, concluded that diet or exercise, or both, during pregnancy can reduce the risk of excessive GWG. Other benefits include lower risk of caesarean delivery, occurrence of maternal hypertension, macrosomia and neonatal respiratory morbidity.[35] Thus, comprehensive lifestyle interventions with a focus on reducing caloric intake and adopting balanced nutrition can effectively reduce excess GWG.[26]

Still, the importance of nursing in care during prenatal, delivery and postpartum is reiterated, being co-responsible for health promotion, together with the multiprofessional team.[10] It is emphasized that through educational activities carried out during prenatal care, it is possible to empower women to take care of themselves and the baby.[36,37] Regarding this, it is necessary to address the risk factors for excess weight, especially those that can be modified, in all meetings/interactions with pregnant women, whether they are carried out during the consultation in nursing or in group activities.

Finally, it is reinforced that economic aspects and pregnancy planning can also predict excessive GWG, in addition to nutritional factors. In practical terms, these factors highlight the relevance of actions by PHC teams, in conjunction with other services that offer prenatal care, in order to intervene in the identification and minimization of risks. Knowing the factors related to GWG is important for nurses to conduct their actions better during prenatal consultation, to prevent obstetric and neonatal complications, to promote pregnant women's cardiovascular health, thus reflecting on the construction of better health indicators with a view to achieving of the goals established by the United Nations Sustainable Development Goals - Agenda 2030.

Conclusion

The prevalence of gain of excessive gestational weight was 38.3% and the associated factors were: higher per capita income, planned pregnancy, pre-gestational excess weight, increased food intake and higher weekly frequency in the consumption of industrialized products.

Collaborations

Monteschio LVC, Marcon SS, Arruda GO, Teston EF, Nass EMA, Costa JR, Oriá MOB and Pereira ALF contributed to the study design, data analysis and interpretation, article writing, relevant critical review of intellectual content and version approval final to be published.

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