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MACRO AND MICRONUTRIENT INTAKE DURING PREGNANCY: EVALUATION ACCORDING TO MATERNAL EDUCATION AND INCOME

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ABSTRACT

Pregnancy implies physiological and metabolic changes and changes in nutritional recommendations as well as in food habits and consumption. Considering all the factors that surround pregnancy, it is necessary to evaluate food intake during this period. The aim of this study was to investigate and identify whether sociodemographic factors such as education and income can influence the intake of macro and micronutrients by pregnant women. This is a cross-sectional study carried out with 198 pregnant women living in the city of Lavras-MG. Sociodemographic, obstetric and habitual food intake data were collected. SPSS version 20.0 was used for statistical analysis, presented by descriptive statistics and ANOVA variance analysis test. The mean age of the pregnant women was 27 ± 5.98 years. Of these, 61.1% had 8 to 11 years of schooling and 49% had an income of 1 to 2 minimum wages. It was evidenced that pregnant women with lower educational level presented a higher intake of carbohydrates, potassium and vitamin B3. Pregnant women with higher income had higher intake of vitamin C, cholesterol and percentage of lipids, as well as lower percentage of carbohydrates (considering daily energy). On the other hand, pregnant women with lower income had a lower intake of monounsaturated fat and vitamin B12. We conclude that maternal education and income influence the intake of macro and micronutrients. It is extremely important to develop public policies aimed at efficient nutritional intervention during prenatal care, in order to promote maternal and child health.

Key words: Pregnancy. Food Consumption. Maternal Nutrition. Maternal and Child Health.

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RESUMO

Ingestão de macro e micronutrientes durante a gestação: avaliação segundo escolaridade e renda materna

A gestação implica em mudanças fisiológicas e metabólicas e, alterações nas recomendações nutricionais como também no hábito e consumo alimentar. Ao considerar todos os fatores que circundam a gestação faz-se necessário a avalição do consumo alimentar durante esse período. O objetivo deste trabalho foi investigar e identificar se fatores sociodemográficos, como escolaridade e renda podem influenciar a ingestão de macro e micronutrientes de gestantes. Trata-se de um estudo de caráter transversal realizado com 198 gestantes residentes no município de Lavras-MG. Dados sociodemográficos, obstétricos e do consumo alimentar habitual foram coletados. Utilizou-se o SPSS versão 20.0 para análise estatística, apresentada por meio de estatística descritiva e teste de análise de variância ANOVA. A média de idade das gestantes foi de 27 ± 5,98 anos. Dessas, 61,1 % tinham de 8 a 11 anos de estudo e 49% renda de 1 a 2 salários-mínimos. Evidenciou-se que gestantes com menor nível de escolaridade apresentaram uma maior ingestão de carboidratos, potássio e vitamina B3. Gestantes com maior renda apresentaram maior ingestão de vitamina C, colesterol e percentual de lipídeos, assim como, menor percentual de carboidratos (considerando a energia diária). Por outro lado, gestantes com menor renda apresentaram uma menor ingestão de gordura monoinsaturada e de vitamina B12. Conclui-se que a escolaridade e renda materna exercem influência na ingestão de macro e de micronutrientes. É de extrema relevância o desenvolvimento de políticas públicas voltadas à intervenção nutricional de forma eficiente durante o pré-natal, visando a promoção da saúde materno infantil.

Palavras-chave: Gravidez. Consumo Alimentar. Nutrição Materna. Saúde Materno-Infantil.

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INTRODUCTION

The gestational period is defined by several physiological, anatomical, endocrine and metabolic changes (Vitolo, 2014). In addition, nutritional needs are also modified in this phase, in order to ensure proper fetal growth and development and avoid inadequate gestational outcomes such as anemias, micronutrient deficiency, preeclampsia, among others (Brasil, 2021).

Thus, nutritional assistance for pregnant women during prenatal care is extremely necessary, aiming to identify risk factors, establish the nutritional status, ensure nutritional planning with adequate recommendations of macro and micronutrients, and ensure food and nutrition education (Brasil, 2021; Brasil, 2022a; WHO, 2016).

In the literature, it is already well established that healthy food intake during pregnancy (rich in fiber, vitamins, and minerals) as opposed to a Western dietary pattern (rich in refined carbohydrates, fats, sugar, and sodium) has been associated with better outcomes for the mother and child (Almeida and collaborators, 2019; Baião; Deslandes, 2006; Cavalcanti, 2014).

Moreover, the assessment of the nutrient intake during pregnancy helps health professionals in health promotion strategies and healthy pregnancy, culminating in a valuable impact on public health, since it reduces the number of hospitalizations and morbidity and mortality (Brasil, 2019).

However, to better understand food consumption during pregnancy, other variables such as sociodemographic characteristics need to be considered. In this sense, the act of eating suffers various interferences, such as social conditions and financial availability, because these are directly associated with access to quality food and permanently (Fernandes and collaborators, 2018; Noronha, Andrade, 2007).

It is also worth noting that epidemiological studies show that pregnant women with lower educational level have less access to information and health services, which directly impacts the demand and adherence to health services. In contrast, those with better education and income have a more diversified diet and greater access to health services (Hoffmann and collaborators, 2013).

Considering the sociodemographic conditions as important health indicators, as well as the importance of dietary intake during pregnancy, the present study aimed to investigate the food intake of macro and micronutrients and identify its relationship with sociodemographic determinants (education and income) of pregnant women living in the city of Lavras-MG.

MATERIALS AND METHODS

This is a cross-sectional study conducted with pregnant women who underwent prenatal care in the units of Family Health Strategies - ESF's and in private gynecologists' offices in the municipality of Lavras - Minas Gerais, between July 2019 and February 2020.

The study is part of the base project entitled: "Evaluation of the Nutritional Status, Behavior and Food Practices in the phases of Pregnancy, Breastfeeding and Food Introduction" developed by the Federal University of Lavras (UFLA) and approved by the Ethics Committee on Research with Humans of the same institution under opinion 3.362.629.

For the base project a sample calculation was developed, with the aid of the Statcalc program of the Epi-info 7.2 softwares, which considered the total average number of live births in Lavras in the years 2013 to 2017 (n=1,396).

To obtain a sample value, we adopted a confidence interval of 95%, a sampling error of 5%, a prevalence of pregnant women with poor diet quality of 9.2% (Malta, 2010) and an addition of 40% to the sample to cover possible sampling losses (Raggio; Magnanini, 2000) resulting in a minimum necessary sample of 165 volunteers.

Participants were considered eligible if they were 18 years of age or older and had prenatal care in that city, and ineligible if they did not report data on their usual food intake.

The collection instrument (structured questionnaire) contained sociodemographic, obstetric, and pre-pregnancy data. The obstetric clinical characteristics (pre-pregnancy weight, gestational age, current weight and height) were collected from the pregnant woman's card and when not available, they were self-reported. For the classification of pre-pregnancy Body Mass Index (BMI) the cut-off points of the World Health Organization (WHO, 1995) were adopted and for the classification of gestational BMI the specific classification proposed by Atalah and collaborators, (1997),

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adopted by the Ministry of Health (Brasil, 2011), was used.

The food consumption was obtained through the report of a typical day of consumption of the usual diet of the participants, using the multiple-pass technique consisting of three steps: report of food consumed; details on the portioning of food and frequency of consumption (Johnson and collaborators, 1998).

An imagery instrument was used with food instruments or preparations to facilitate the description of food consumption. In order to minimize reporting bias, the energy underreporting ratio was calculated using predictive equations and the method of Goldberg and collaborators, (1991).

The Brazilian Table of Chemical Composition of Foods - TACO (NEPA/UNICAMP, 2011) and the United States Department of Agriculture Research Service – USDA (USDA, 2001) were used for quantification of food intake. This quantification was performed with the help of Microsoft Excel software where a specific spreadsheet was prepared for quantitative calculation of the diet using the TACO and USDA data. Macronutrient (carbohydrates, proteins and lipids) and micronutrient (all available in the food composition tables) consumption values, through grams (g), milligrams (mg) or micrograms (µg), calories (kcal) and percentage of the total caloric value of consumption (%VCT) were identified.

The data were double entered and validated in EPI INFO software (version 7.2). The statistical analyses were performed using Statistical Package for the Social Sciences® (SPSS) software version 20.0 (Chicago, Illinois, United States).

Descriptive analyses were performed on the sample regarding sociodemographic and obstetric data. The Kolmogorov-Smirnov test was used to assess normality and the ANOVA test was used to compare the nutrients of interest with the different classifications of education and income.

The statistical significance level adopted was $p < 0.05$. In order to show the difference in significance between the groups analyzed, superscript letters were used in Tables 2 and 3.

RESULTS

The sample consisted of 198 pregnant women, mean age 27 ±5.98 years, 68.7% (n= 136) of whom reported being black and 63.7% (n=126) living with a partner. Regarding education, 61.1% (n=121) had 8 to 11 years of schooling, and 67.2% (n = 133) had an income of less than 2 minimum wages, as shown in Table 1.

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Table 1 - Sociodemographic, clinical, and anthropometric characteristics, Lavras, Minas Gerais, 2020.

Variable (n)	% (n) or Mean (Min e Max)
Age-years (198)	27.7 (18;42)
Skin Color (198)	
White	30.8 (61)
Black	22.7 (45)
Brown	46 (91)
Indigenous	0.5 (1)
Education (198)	
Less than 8 years	5.6 (11)
8 to 11 years	61.1 (121)
12 years or more	33.3 (66)
Marital Status (198)	
Single	33.8 (67)
Stable Union	18.2 (36)
Married	45.5 (90)
Divorced	2.5 (5)
Monthly Income (198)	
Less than 1 minimum wage	18.2 (36)
1 to 2 minimum wages	49 (97)
More than 2 minimum wages	32.8 (65)
Planned Pregnancy (195)	
Yes	36.4 (72)
No	62.1 (123)
Number of Pregnancies (197)	
First pregnancy	43.9 (87)
Two or more pregnancies	55.6 (110)
Customer Care Sector (198)	
Unified Health System (SUS)	74.2 (147)
Private	25.8 (51)
Gestational Trimester (197)	
First Trimester	19.2 (38)
Second Trimester	40.4 (80)
Third Trimester	38.9 (77)
Gestational Age (weeks) (196)	23.52 (4;40)
Pregestational BMI (186) - kg/m^2	25.4 (16;50)
Pregestational BMI classification (186)	
Low weight	
Eutrophic	7.1 (14)
Overweight	42.4 (84)
Obesity	26.8 (53)
	17.7 (35)
Gestational BMI classification (184)	
Low weight	15.7 (31)
Eutrophic	30.3 (60)
Overweight	25.8 (51)
Obesity	21.2 (42)

The mean nutrient intake according to education is shown in Table 2. Pregnant women with less than 8 years of schooling had a significantly higher intake of carbohydrate (345.04 ± 62.05 g/day) when compared to the other groups. The group of pregnant women with 12 or more years of schooling had a higher intake of food sources of calcium (693.11 ± 65.68 mg/day), statistically different from the other groups.

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Table 2 - Mean intake and standard deviation for macronutrients and micronutrients according to maternal education level, Lavras - Minas Gerais, 2020.

Macro and Micronutrients	Less than 8 years	8 to 11 years	12 years or more
Carbohydrates (g)	345.04 ± 62.05[a]	253.92±9.40[b]	232.93±12.96[b]
Lipids (g)	40.67± 7.18	42.19±1.89	46.99±2.50
Proteins (g)	115.35±30.15	90.22±4.10	82.01±3.60
Carbohydrates (%TEV)	61.58±4.20	57.56±0.83	54,71±1.09
Lipids (%TEV)	16.99±2.12[a]	21.65±0.56[a]	25.29±0.83[b]
Proteins (%TEV)	21.49±3.55	20.81±0.70	19.99±0.75
Calcium (mg)	548.96±107.97[a,b]	505.73±38.49[a]	693.11±65.68[b]
Iron (mg)	10.28±0.88	9.07±0.37	8.61±0.40
Vitamin A (mg)	506.10±99.65	520.97±48.36	462.89±40.40
Folate (mg)	449.53±115.16	349.09±17.13	302.69±17.05
Vitamin C (mg)	96.68±40.30	143.99±14.04	171.76±17.74
Fiber (g)	35.17±4.51	29.66±1.37	25.46±1.32
Cholesterol (g)	256.34±99.02	241.76±18.92	273.78±26.38
Omega 3 (g)	0.56±0.08	0.57±0.03	0.69±0.11
Potassium (g)	3186.87±467.35[a]	2574.51±99.65[a,b]	2353.90±83.25[b]
Zinc (g)	10.51±1.30	10.81±0.54	9.97±0.52
Trans fat (g)	2.27±0.52	2.19±0.13	2.08±0.17
Saturated fat (g)	14.79±2.26	17.41±0.79	19.76±1.19
Polyunsaturated fat (g)	7.64±1.19	10.39±0.54	10.88±0.81
Monounsaturated fat (g)	11.01±2.07	12.51±0.54	14.02±0.72
Sodium (mg)	1011.94±182.31	1236.03±82.63	1136.03±79.97
Manganese (mg)	2.68±0.38	4.41±1.90	2.54±0.13
Selenium (mg)	67.75±41.79	45.34±4.93	38.70±4.79
Copper (mg)	0.97±0.18	1.16±0.21	0.95±0.05
Magnesium (mg)	278.52±27.18	242.26±9.07	240.37±11.80
Vitamin B6 (mg)	1.40±0.24	1.21±0.06	1.22±0.10
Vitamin E (mg)	1.48±0.30	2.18±0.18	6.32±3.91
Vitamin B1 (mg)	1.54±0.27	1.32±0.08	1.18±0.09
Vitamin B12 (mg)	1.65±1.40	12.61±4.02	18.39±4.56
Vitamin B2 (mg)	1.64±0.31	1.42±0.08	1.35±0.10
Vitamin B3 (mg)	50.68±24.37[a]	25.52±2.22[b]	21.36±1.92[b]
Vitamin D (mg)	0.27±0.23	1.82±1.05	8.12±5.28

Legend: Total Energy Value = TEV; [a,b] Different superscript letters indicate significant difference ($p<0.05$ ANOVA test) between the analyzed groups evaluated by Bonferroni's post-hoc test.

Furthermore, it was possible to identify the influence of income on the intake of nutrients in the diet of pregnant women, as shown in Table 3. The percentage of carbohydrate in relation to daily energy was lower in the group of women with income higher than 2 minimum wages, whereas the percentage of lipids, vitamin C intake and cholesterol was higher among pregnant women with higher income. On the other hand, the intake of monounsaturated fat (11.14 ± 0.84 g/day) and vitamin B12 (0.66 ± 0.43 g/day) was lower among pregnant women with income below 1 minimum wage.

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Table 3 - Mean intake and standard deviation for macro and micronutrients according to maternal family income level, Lavras, Minas Gerais, 2020.

Macro and micronutrients	Less than one minimum wage	1 to 2 minimum wage	Over 2 minimum wages
Carbohydrates (g)	2685± 22.55	259.70±10.97	234.45±13.47
Lipids (g)	37.57±2.62	43.30±2.18	47.70±2.69
Proteins (g)	94.64±10.93	85.51±4.04	90.76±5.06
Carbohydrates (%TEV)	59.04±1.77[a]	58.15±0.95[a]	53.64±1.02[b]
Lipids (%TEV)	19.55±0.91[a]	22.11±0.65[a]	25.03±0.88[b]
Proteins (%TEV)	21.43±1.62	19.74±0.73	21.35±0.79
Calcium (mg)	390.05±41.51	559.85±48.42	684.84±63.10
Iron (mg)	8.35±0.56	9.28±0.41	8.89±0.43
Vitamin A (mg)	450.87±73.88	492.09±47.97	541.39±57.35
Folate (mg)	391.33±51.64	332.73±16.60	320.65±17.47
Vitamin C (mg)	116.44±20.08[a]	130.89±14.33[a]	199.00±20.84[b]
Fiber (g)	31.32±2.11	29.91±1.46	25.04±1.66
Cholesterol (g)	252.28±38.75[a]	210.78±14.28[b]	371.08±34.38[c]
Omega 3 (g)	0.71±0.11	0.61±0.05	0.55±0.07
Potassium (g)	2663.03±199.92	2505.27±97.82	2513.10±126.54
Zinc (g)	9.70±0.90	10.70±0.60	10.69±0.62
Trans fat (g)	1.92±0.21	2.33±0.15	2.02±0.18
Saturated fat (g)	15.10±1.12	18.49±1.01	19.02±1.05
Polyunsaturated fat (g)	18.05±0.96	9.88±0.64	10.45±0.74
Monounsaturated fat (g)	11.14±0.84[a]	12.78±0.63[a,b]	14.15±0.73[b]
Sodium (mg)	1149.59±140.19	1269.83±85.94	1096.13±94.63
Manganese (mg)	9.16±6.45	2.47±0.11	2.52±0.14
Selenium (mg)	63.30±17.54	39.90±3.83	40.56±5.16
Copper (mg)	1.01±0.07	0.95±0.05	1.32±0.39
Magnesium (mg)	236.50±14.30	245.17±10.26	245.33±12.47
Vitamin B6 (mg)	1.19±0.11	1.25±0.07	1.21±0.10
Vitamin E (mg)	2.03±0.30	6.41±0.25	6.41±4.03
Vitamin B1 (mg)	1.46±0.15	1.33±0.09	1.12±0.09
Vitamin B12 (mg)	0.66±0.43[a]	11.68±4.39[a,b]	24.63±5.65[b]
Vitamin B2 (mg)	1.26±0.12	1.49±0.09	1.37±0.12
Vitamin B3 (mg)	33.10±7.87	22.81±1.66	25.53±3.62
Vitamin D (mg)	0.43±0.12	2.07±1.31	8.35±5.36

Legend: Total Energy Value = TEV; [a,b] Different superscript letters indicate significant difference ($p<0.05$ ANOVA test) between the analyzed groups evaluated by Bonferroni's post-hoc test.

DISCUSSION

We found worrying prevalences in the consumption of macro and micronutrients during pregnancy, including high consumption of rice, low consumption of vitamin B12 and high consumption of potassium, being more prevalent among pregnant women with lower family income and education. On the other hand, a higher intake of lipids and vitamin C was evidenced among pregnant women with higher income and education.

The sociodemographic variables, income and maternal education directly influenced the average intake of nutrients. The literature has already consolidated that pregnant women with low education and low income are more likely to have inappropriate eating habits, due to limited access to information and lower purchasing power (Silva and collaborators, 2019).

In the gestational period, eating habits refer to what pregnant women eat, as well as the amount, type of food, and even where they buy these foods, can be associated with different factors that impact maternal and child health (Gomes and collaborators, 2019).

In Brazil, according to data from the Household Budget Survey (POF), the food consumption pattern of pregnant women is mostly characterized by the consumption of fresh or minimally processed foods, with rice,

beans, meats, viscera, and fruits standing out (Brasil, 2022b).

Thus, in this study to evaluate the impact of income and education on food intake of pregnant women in a city of Minas Gerais, similar data were found, where a higher intake of carbohydrates was observed in women who had lower income and education.

Lower income and education have been associated with higher consumption of rice and beans, because they are foods present in the food basket, and thus more accessible to these women. This explains the high intake of these foods as a recurring pattern in low-income groups, being detected in all regions of the country, regardless of cultural differences (Hoffmann and collaborators, 2013).

As for potassium intake, a higher intake was observed in the group with the lowest level of education. Among the micronutrients present in legumes, potassium is the one found in the greatest quantity (Margier and collaborators, 2018).

According to data provided by the Food and Nutrition Surveillance System (SISVAN), which investigated 35,543 pregnant women followed in Primary Care throughout the country, it was evidenced that beans were one of the most consumed foods, being reported as present in the diet on the previous day in 80% of the 2020 survey (Brasil, 2022b).

Given this, it is hypothesized that this is a possible explanation for the result found (Margier and collaborators, 2018).

However, it is worth noting that the nutritional need, as well as the dietary intake of this mineral should be monitored, since a disproportionate increase in this mineral can lead to disorders in the maintenance of blood pressure and cause damage to the mother-child binomial (Fonseca and collaborators, 2015; Graciliano and collaborators, 2021).

With regard to vitamin B12 intake, women who had a family income of less than one minimum wage had a lower intake. Vitamin B12 in the gestational period has important implications for the formation of the baby's nervous system (WHO, 2016).

The dietary source of vitamin B12 is restricted to foods of animal origin, especially milk, meat, and eggs (Paniz and collaborators, 2005; SBV, 2012). Family income is a priority factor in the acquisition of food, with this due to the fact that products of animal origin have higher purchasing value, in several circumstances they are replaced by other food sources, in order to optimize family income. Studies show that lower profitability was negatively associated with the food pattern coming from animal origin (Gomes and collaborators, 2016).

In the present study, higher intake of Vitamin B3 (niacin) was identified in women with lower education. This vitamin has meat and its derivatives as a food source (Mielgo-Ayuso and collaborators, 2018). In this sense, the literature shows that the "traditional Brazilian" dietary pattern, which included meat consumption, was more adopted by pregnant women with lower levels of education (Zuccolotto and collaborators, 2019).

However, divergent studies are also evidenced, where they demonstrate that higher education and income of the population are associated with higher consumption of this food (Coelho and collaborators, 2015; Naspolini and collaborators, 2021).

In addition, it was observed that the intake of vitamin C was higher among pregnant women with income higher than two minimum wages. As reported in the literature, the low intake of vitamin C is little evidenced, given the high concentration of this vitamin in food sources (Silva Neto and collaborators, 2018).

In addition, a study conducted with women in the gestational period, evidenced that better socioeconomic conditions enable/facilitate higher consumption of source foods, especially fruits (Gomes and collaborators, 2019).

Another point worth mentioning is that both the percentage of lipids (in relation to daily energy) and the intake of monounsaturated fat and cholesterol were higher among pregnant women with higher levels of education and income.

The food transition process experienced in recent years, especially in economically emerging countries, is characterized by increased consumption of ultra-processed foods and reduced consumption of fresh or minimally processed foods (Brasil, 2014).

This transition evidences that in Brazil, it has among other consequences, the imbalance in nutrient intake and high energy intake (Brasil, 2014; Crivellenti and collaborators, 2018; Fernandes and collaborators, 2018).

Inadequate diet in the gestational period corroborates with negative outcomes to maternal and child health, besides being one of

the determining factors for increased predisposition to the development of obesity, as well as for the occurrence of other chronic noncommunicable conditions. It is believed that one of the drivers for the increased consumption of these foods is abusive marketing, which makes ultra-processed foods (UPA) attractive.

Another contributing factor may be eating meals in front of the television and other electronic equipment (Graciliano and collaborators, 2021).

In addition, it should be noted that accessibility may also interfere with the consumption of ultra-processed foods. Living in more vulnerable neighborhoods has been associated with greater availability of processed foods, in contrast to the low supply and quality of fresh foods in stores around homes (Cordeiro, 2021).

Moreover, another factor that could be associated is the insertion of women in the labor market, which favors the search for products of quick and practical preparation (Graciliano and collaborators, 2021).

Education was also associated with consumption of UPA. This variable reflects worse living conditions and access to goods, which can encourage the consumption of foods with lower costs, as is the case of many UPA, especially when compared to fresh or minimally processed foods.

More restricted access to information and health care, especially related to healthy eating, could also explain the relationship between income and education, and the consumption of these foods (Becker and collaborators, 2020; Graciliano and collaborators, 2021).

Considering that income and education can negatively influence maternal and child health, micronutrient supplementation can be an alternative for the maintenance of maternal nutrition, especially in pregnant women living in low-and middle-income countries (Oh and collaborators, 2020).

The strategies commonly used for micronutrient supplementation in this population are carried out through the encouragement of programs and public policies, among which we can highlight food fortification (Darnton-Hill, Mkparu, 2015).

Given the above, the data from this study should be evaluated with caution, considering some limitations. The cross-sectional design, which makes it impossible to control cause and effect, however, cross-sectional studies encourage future longitudinal studies that require more time and financial investment.

We also ponder the instrument applied to evaluate food intake, in which the food report of a usual day was used, not allowing the calculation of intra-individual variability.

The method used was employed because the demand for prenatal care was greater on Mondays, which made it impossible to record a typical day's food intake. In addition, recording the food consumed in the last 24 hours could lead to a systematic error, which may not reflect the estimated habitual diet of pregnant women.

However, to minimize possible reporting bias by collecting one day's food intake, energy underreporting was estimated using predictive equations and the method of Goldberg and collaborators, (1991).

The present study stands out for its originality in analyzing the influence of sociodemographic data (income and education) on nutrient intake (macro and micronutrients).

Thus, it is necessary to reinforce the importance of nutritional counseling for pregnant women during prenatal care, considering not only clinical conditions, but also maternal sociodemographic characteristics.

The adequacy of nutrients, arising from a healthy diet during pregnancy is recommended, since it plays a key role in the promotion and maintenance of maternal and child health (Acris and collaborators, 2022; Brasil, 2021).

In this sense, it is appropriate to conduct studies that evaluate the intake of nutrients during pregnancy in Brazil. It is believed that the information generated can act as a starting point for the strengthening and formulation of public health policies, in order to contribute to the promotion of adequate and healthy eating with a view to health promotion and disease prevention, meeting the purpose of the National Food and Nutrition Policy (PNAN).

CONCLUSION

Lower educational level was positively associated with carbohydrate intake, potassium intake and vitamin B3 intake, while lower income was significantly associated with lower intake of monounsaturated fat and vitamin B12.

Finally, women with higher income had higher vitamin C, cholesterol, higher percent lipid, and lower percent carbohydrate intake.

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