

Food Choices and Dietary Intake Markers Among Pregnant Women

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Highlights

- Ultra-processed foods are associated with adverse outcomes.
- High intake of ultra-processed foods is associated with an increased risk of obesity during pregnancy.
- Most pregnant women reported consuming them every day of the week.
- Socioeconomic factors proved to be potentially determining factors.

Abstract

Introduction: To assess dietary intake markers in pregnant women and the factors associated with their food choices.

Methods: A cross-sectional quantitative study was conducted with 32 pregnant women residing in Porto Alegre, Brazil, attending Primary Health Care Units. Dietary intake markers and the perceived importance of various determinants of food choices were evaluated.

Results: Thirty-two pregnant women from Porto Alegre participated in the study, with a mean age of 27.5 ± 6.8 years. Most had completed or incomplete secondary education (56.3%). The factors rated as most important in food choice were the baby's health and guidance from health professionals (100%), followed by economic factors (97%). Regarding consumption patterns, a high frequency of legume intake and sugar-sweetened beverages was observed. Positive correlations were identified between education level and the intake of cooked vegetables ($\rho = 0.389$; $p = 0.028$), as well as between education level and fresh fruit consumption ($\rho = 0.429$; $p = 0.014$). Age was negatively correlated with the consumption of instant noodles, packaged snacks or salty crackers ($\rho = -0.403$; $p = 0.022$).

Conclusion: The study identified both favorable and concerning dietary behaviors among pregnant women. Education level and age were associated with diet quality. The findings underscore the need to strengthen food and nutrition education initiatives targeting pregnant women, considering socioeconomic conditions as central determinants of food choices.

Keywords: Pregnant Woman; Feeding Behavior; Food; Processed

Introduction

During pregnancy, food choices are modulated by physiological, emotional, socioeconomic, and cultural factors that interact in a complex way and directly influence the eating behaviors of pregnant women ¹. These elements, individually or

together, determine maternal-fetal nutritional and health outcomes, reinforcing the importance of understanding the determinants of eating behavior during this period. Thus, identifying these factors is fundamental to guiding effective nutritional interventions and promoting a healthier pregnancy for both mother and baby ².

A diet based on whole and minimally processed foods is essential for proper fetal development and maternal health ³. Evidence indicates that high intake of ultra-processed foods is associated with an increased risk of obesity during pregnancy ⁴. However, national data reveal that these recommendations are not yet fully reflected in the dietary patterns of pregnant women in Brazil. In 2022, the Food and Nutrition Surveillance System (SISVAN) recorded that half of pregnant women in Brazil were overweight (28.2%) or obese (24.35%), according to BMI per gestational week. In Rio Grande do Sul, 29.11% of pregnant women were classified as overweight and 27.79% as obese. Furthermore, in 2024, SISVAN reports indicated that 72% of pregnant women monitored (adolescents and adults) consumed ultra-processed foods ⁵.

Considering the importance of the gestational period for maternal and infant health, the need for a balanced diet, predominantly composed of unprocessed or minimally processed foods, is highlighted. This ensures an adequate supply of nutrients essential for fetal development and the well-being of the pregnant woman ⁶⁻⁷. Conversely, excessive consumption of ultra-processed foods is associated with adverse outcomes such as excessive weight gain, gestational hypertension, diabetes, and a higher risk of complications during childbirth and the postpartum period ⁹⁻¹⁰. Given this scenario, the objective of this study was to evaluate the markers of food consumption and the factors associated with the food choices of women during pregnancy.

Methods

Study Design

This is a cross-sectional study with a quantitative approach, conducted with pregnant women residing in Porto Alegre who were receiving prenatal care at primary healthcare units.

Ethical Aspects

The project was approved by the Research Ethics Committee (CEP) of the Federal University of Health Sciences of Porto Alegre (number 7,639,953). The study followed the guidelines set forth in Resolution 466/2012 of the National Health Council. The Informed Consent Form (TCLE) described the nature, objectives, and methods of the research, as well as the expected benefits and potential risks and discomforts.

Data Collection

Data collection took place from July to September 2025 in two health units, one located in the central region and the other in the southern region. Pregnant women over 18 years of age, capable of understanding and responding to the electronic questionnaire and who agreed to participate in the study were included.

Data collection was carried out using a self-administered electronic questionnaire, developed on the RedCap platform. The link to the questionnaire was disseminated through the distribution of digital and printed folders containing information about the research and a QR Code, which allowed direct access to the form in a practical and quick way. In addition, some questionnaires were provided in printed form to be filled out. Before starting the questionnaire, participants viewed the electronic Informed Consent Form (ICF). Only after express acceptance of the ICF was the questionnaire made available for completion. The instrument included three main sections, with the following variables: sociodemographic and health characteristics, food consumption markers, and factors influencing food choices.

Sociodemographic and Health Characteristics

Information was obtained regarding age (in complete years), marital status, education level, monthly family income, and number of residents in the household. Variables related to maternal health were also collected, including gestational trimester and the presence of self-reported pre-existing diseases. Participants also reported whether they received guidance on nutrition during pregnancy, specifying the source of this guidance.

Food Consumption Markers

Food consumption was assessed using the food consumption markers from the Food and Nutrition Surveillance System Protocols ¹¹. The frequency of consumption of ten food groups, preparations, and foods considered food consumption markers was evaluated in the seven days preceding the survey: raw salads; cooked vegetables (except potatoes and cassava); fruits; beans; milk or yogurt; potato chips, packaged chips, or fried snacks; hamburgers and processed meats; savory biscuits or packaged snacks; sweet biscuits, sweets, and chocolates; and soft drinks. This questionnaire contains eight increasing response options for consumption frequency, ranging from "I did not eat in the last seven days" to "I ate all seven in the last seven days".

Factors Influencing Food Choices

The factors influencing food choices during pregnancy were measured using a four-point Likert scale (1 = not important at all; 4 = very important). Individual aspects (personal preference, physical symptoms, emotional state, available time), social aspects (family influence, partner support), economic aspects (access to food, income, receipt of donations), and health-related aspects (concerns about the baby, professional guidance, knowledge about healthy eating) were addressed.

Data Analysis

Data were collected directly using REDCap (Research Electronic Data Capture) software and analyzed using the Statistical Package for the Social Sciences (SPSS), version 25.0. Categorical variables were presented as absolute and relative frequencies. Continuous variables were summarized using mean and standard deviation or median and interquartile range (IQR). Correlations and comparisons of food consumption with sociodemographic variables were assessed using Spearman's correlation coefficient, Student's t-test, and ANOVA. The Chi-square and Fisher's exact tests were used to associate the importance of determinants of food choices with sociodemographic variables. In all analyses, a significance level of 5% ($p < 0.05$) was adopted.

Results

Thirty-two pregnant women residing in Porto Alegre participated in this study. The pregnant women evaluated had a mean age of 27.5 ± 6.8 years. The majority were single (56.3%). Regarding education, incomplete high school (37.5%) and complete high school (28.1%) predominated, while only 9.4% had completed higher education. The median per capita income was R\$894.85 (IQR = 386.41 - 1627.00). Most lived with three people in the household (34.4%). Regarding the gestational trimester, 28.1% were in the first trimester, 40.6% in the second trimester, and 31.3% in the third trimester. Regarding receiving guidance on their diet during pregnancy, 50% ($n=16$) received it from a health professional (nutritionist/physician) during prenatal care.

The scores assigned to the determining factors of the pregnant participants' food choices are described in **Table 1**. The factors "Thinking about my baby's health," "Being afraid that certain foods will harm the baby," and "Receiving guidance from health professionals (doctor, nutritionist, nurse, etc.)" were classified as "important/very important" by 100% of the participants.

Table 1: Scores assigned to the determining factors of the dietary choices of the participating pregnant women ($n = 32$).

	Not important n (%)	Little important n (%)	Important or very important n (%)
Thinking about my baby's health	0 (0)	0 (0)	32 (100)
Being afraid that certain foods might harm the baby.	0 (0)	0 (0)	32 (100)
Receive guidance from healthcare professionals (physician, nutritionist, nurse, etc.)	0 (0)	0 (0)	32 (100)
The taste of the food (personal preference)	1 (3.1)	0 (0)	31 (97)
Having money to buy the food I would like	1 (3.1)	0 (0)	31 (97)
Thinking about my health	0 (0)	1 (3.1)	31 (97)
The price of food	1 (3.1)	1 (3.1)	30 (94)
Having enough food at home every day	0 (0)	3 (9.4)	29 (91)
How am I feeling emotionally (anxious, sad, nervous, or stressed)?	2 (6.3)	2 (6.3)	28 (88)
Receiving support or encouragement to eat better	2 (6.3)	3 (9.4)	27 (84)
Receiving help from family or partner to eat better	3 (9.4)	2 (6.3)	27 (84)
It's a food that I ate before I was pregnant	3 (9.4)	4 (12.5)	25 (78)
Having doubts about what is or isn't healthy to eat	2 (6.3)	6 (18.8)	24 (75)
Having time to cook	5 (15.6)	5 (15.6)	22 (69)
To be easy or quick to prepare	3 (9.4)	9 (28.1)	20 (63)

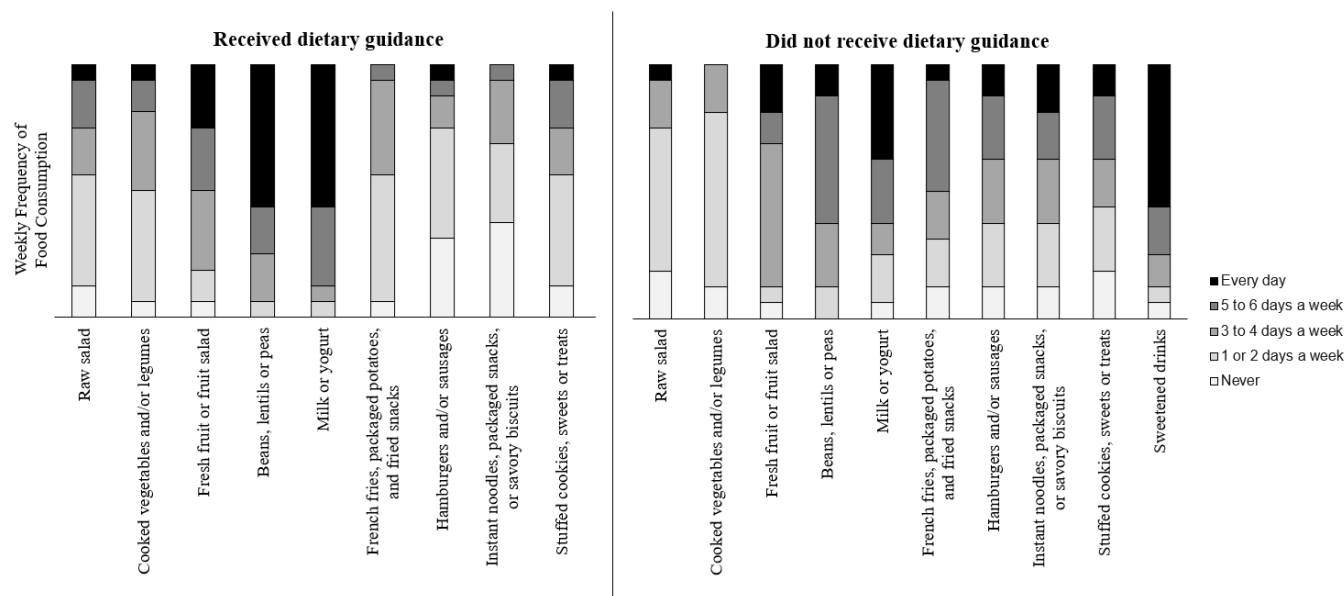
Feeling nauseous, having heartburn, or experiencing other symptoms that make eating difficult	6 (18.8)	7 (21.9)	19 (59)
Working outside the home or caring for other people (like children) interferes with my eating habits	6 (18.8)	9 (28.1)	17 (53)
Knowing how to prepare healthy meals	6 (18.8)	10 (31.3)	16 (50)
Having time to eat calmly	16 (50)	5 (15.6)	11 (34)
Having food available to buy near home	16 (50)	6 (18.8)	10 (31)
My family's food customs	15 (46.9)	8 (25)	9 (28)
Watch tips or videos about food on social media or the internet	17 (53.1)	7 (21.9)	8 (25)
Receiving basic food baskets or food donations	18 (56.3)	8 (25)	6 (19)

Table 2 presents the frequency of food consumption in the last week, highlighting the consumption of legumes, with 34.4% of participants consuming them 5 to 6 days a week and 34.4% consuming them every day. In contrast, the consumption of sweetened beverages was 12.5% 5 to 6 days a week and 62.5% every day. **Figure 1** presents the frequency of food consumption in the last week of pregnant women according to the dietary guidelines received during prenatal care. No significant differences were found between the two groups.

Table 2: Frequency of food consumption in the last week of pregnant participants (n = 32).

	Never n (%)	1 to 2 days a week n (%)	3 to 4 days a week n (%)	5 to 6 days a week n (%)	All days n (%)
Raw salad (lettuce, tomato, carrot, cucumber, cabbage, etc.)	5 (15.6)	16 (50)	6 (18.8)	3 (9.4)	2 (6.3)
Cooked vegetables and/or legumes (do not include potatoes or cassava)	3 (9.4)	18 (56.3)	8 (25)	2 (6.3)	1 (3.1)
Fresh fruit or fruit salad (do not consider fruit juice)	2 (6.3)	3 (9.4)	14 (43.8)	6 (18.8)	7 (21.9)
Beans, lentils or peas	0 (0)	3 (9.4)	7 (21.9)	11 (34.4)	11 (34.4)
Milk or yogurt	1 (3.1)	4 (12.5)	3 (9.4)	9 (28.1)	15 (46.9)
French fries, packaged potatoes, and fried snacks (chicken croquettes, kibbeh, pasties, etc.)	3 (9.4)	11 (34.4)	9 (28.1)	8 (25)	1 (3.1)
Hamburgers and/or processed meats (ham, mortadella, salami, sausage, hot dogs)	7 (21.9)	11 (34.4)	6 (18.8)	5 (15.6)	3 (9.4)
Instant noodles, packaged snacks, or savory biscuits	8 (25)	9 (28.1)	8 (25)	4 (12.5)	3 (9.4)
Stuffed cookies, sweets or candies (candies, lollipops, chewing gum, caramel, gelatin)	5 (15.6)	11 (34.4)	6 (18.8)	7 (21.9)	3 (9.4)
Sweetened beverages (soda, boxed juice, powdered juice, boxed coconut water, guarana/currant syrups, fruit juice with added sugar)	1 (3.1)	3 (9.4)	4 (12.5)	4 (12.5)	20 (62.5)

Figure 1: Frequency of food consumption in the last week of pregnancy according to dietary guidelines received during prenatal care.



Correlation analysis revealed statistically significant associations between the frequency of food consumption and some sociodemographic characteristics of pregnant women. A positive correlation was observed between education level and the consumption of cooked vegetables ($\rho = 0.389$; $p = 0.028$), as well as between education level and the intake of fresh fruit ($\rho = 0.429$; $p = 0.014$). On the other hand, age showed a negative correlation with the consumption of instant noodles, packaged snacks, or savory biscuits ($\rho = -0.403$; $p = 0.022$). Furthermore, a positive correlation was identified between the number of people in the household and the consumption of sweetened beverages ($\rho = 0.379$; $p = 0.032$). The other correlations evaluated did not show statistical significance.

Discussion

Pregnancy is a period marked by intense metabolic and physiological changes, and the quality of nutrition plays an essential role in promoting maternal-fetal health¹². This study sought to understand the markers of food consumption among pregnant women and the factors associated with food choices, considering sociodemographic, behavioral, and contextual elements. Among the aspects most valued by the participants were the care for the baby's health, guidance from health professionals, and economic factors related to the price and availability of food, aligning with studies that identify income and education as central determinants of nutrition during pregnancy¹⁰.

The sample studied consisted mostly of young pregnant women with low levels of education and socioeconomic conditions that demonstrate social vulnerability. These factors, already recognized as determinants of food and nutritional insecurity, directly influence the quantity and quality of food consumed and tend to reduce dietary diversity, favoring the consumption of ultra-processed products over unprocessed foods¹³. These conditions help to contextualize the observed dietary patterns.

The scores given to factors influencing food choices indicated that pregnant women are very concerned about the health and well-being of their baby. On the other hand, although half of the pregnant women were in a situation of social vulnerability, most of them did not highlight the importance of receiving basic food baskets or donated food. This finding may have several possible explanations, such as a perception of stigma associated with receiving donations or prior access to other forms of social assistance; however, such interpretations should be considered as hypotheses, since they were not directly evaluated in the study. On the other hand, the lower importance attributed to "having time to eat peacefully" may reflect daily challenges faced by pregnant women, such as an overload of tasks and lack of support, factors that hinder more conscious eating practices.

The high frequency of consumption of beans and other legumes among the pregnant women evaluated represents a positive finding for the quality of maternal nutrition. Consuming beans and other legumes during pregnancy contributes to better diet quality during gestation¹⁴. Legumes are important sources of protein, fiber, folate, iron, zinc, and antioxidants, essential nutrients for fetal development and maternal health¹⁵. Regarding maternal metabolism, high consumption of legumes is associated with lower levels of total cholesterol and LDL in overweight pregnant women¹⁶. This dietary

pattern, therefore, reveals a potential for nutritional protection that should be valued and strengthened in prenatal care strategies.

On the other hand, the high frequency of consumption of sweetened beverages observed in the sample is a cause for concern, since this dietary pattern is associated with poorer diet quality, higher caloric intake, and a negative impact on maternal metabolism¹⁷. The literature shows that frequent consumption of sugary or artificially sweetened beverages increases the risk of gestational diabetes and hypertension, excessive weight gain, and premature birth, in addition to being related to macrosomia and the birth of large-for-gestational-age infants¹⁸. Furthermore, maternal consumption of this type of beverage during pregnancy has been associated with greater childhood adiposity, including increased BMI, abdominal circumference, and skinfolds¹⁹. In this sense, the high frequency of intake identified in the study reinforces the need for nutritional interventions aimed at reducing the consumption of this food group.

The absence of a significant difference in the frequency of food consumption between pregnant women who received professional guidance and those who did not receive it or sought information independently may be related to multiple factors. It is possible that healthcare professionals are not yet sufficiently aware of the importance of healthy eating during pregnancy, or that the guidance provided has been generic, lacking individualized focus, and therefore less effective. Previous studies indicate that more effective interventions are those conducted by nutritionists with personalized advice, but such approaches are not part of the routine of low-risk prenatal care²⁰. On the other hand, aspects related to the pregnant women themselves may also influence this outcome. Qualitative research with pregnant women revealed dissatisfaction with the quality of information received, frequently perceived as vague and poorly adapted to individual realities, which limits the adoption of effective changes in eating habits²¹. In addition, limited access to healthy foods due to social restrictions.

Conclusions

The sample analyzed in this study revealed that, despite high concern for the baby's health, the food choices and consumption of pregnant women are marked by significant challenges. Socioeconomic factors proved to be potentially determining factors, since higher age, education level, and income were associated with better diet quality. Legume consumption showed positive results, in accordance with current dietary recommendations. On the other hand, the consumption of sweetened beverages presented itself as a risk factor, since most pregnant women reported consuming them every day of the week. Another important factor found in the study was the low impact generated by the information provided by health professionals, since it did not affect or generate significant changes in the participants' food consumption. However, it is necessary to look beyond those who provide such information, as those who receive it may have various barriers that prevent them from following it.

Given these results, the need to strengthen interventions through public policies and nutritional food education actions, combined with continuing education for health professionals, is highlighted. These strategies should prioritize raising awareness about the importance of healthy eating during pregnancy and developing educational practices adapted to the socioeconomic reality of the pregnant women served.

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