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ORIGINAL ARTICLE

Adherence to the 10 steps for a healthy diet in pregnant women in Southeast Brazil

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Abstract

Introduction: nutritional guidelines in prenatal care can influence the pregnant woman's eating behavior, reducing the risks for the mother-baby binomial.

Objective: to analyze adherence to the 10 steps for healthy eating during pregnancy and its association with maternal and socioeconomic factors in pregnant women in Espírito Santo, Brazil.

Methods: data were obtained through an electronic questionnaire widely publicized on social networks. Socioeconomic, prenatal and eating behavior data were collected from 368 participants. The 10 Steps to Healthy Eating during pregnancy, adapted from the Brazilian Ministry of Health, using the Praise-Guide-Recommend System (EOR) were used as evaluation criteria. Pearson's chi-square test and Fisher's exact test were used to analyze differences between proportions. The binary logistic regression model was used to investigate the association between independent variables and steps towards healthy eating. A significance level of 5% and a confidence interval of 95% were adopted.

Results: most pregnant women reported adherence of 3 to 5 steps (78.5%), fitting into the O-Orientation category. It was observed that receiving nutritional guidance during prenatal care increased adherence in step 4 (Limit consumption of processed foods; OR: 1.99; 95%CI: 1.26-3.15), in step 5 (Avoid consuming ultra-processed foods and fast snacks; OR: 2.02; 95%CI: 1 .26-3.24) and step 9 (Plan food shopping, organize the domestic pantry and define the week's menu in advance; OR: 1.66; 95%CI: 1.66-2.58).

Conclusion: access to nutritional guidelines during prenatal care influenced the eating habits of pregnant women. The results suggest the need to strengthen prenatal actions, mainly related to guidelines on encouraging healthy and adequate eating habits.

Keywords: pregnant women, prenatal nutrition, technology, health promotion.

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Authors summary

Why was this study done?
The gestational period is a peculiar moment of human existence, and the food choices of pregnant women can influence the health of the mother-baby binomial. There are few publications that provide guidance on healthy eating habits specific to this population. Therefore, this study aimed to investigate, through a proposal of guidance adapted to pregnant women, adherence to healthy eating and associated socioeconomic and maternal factors.

What did the researchers do and find?
The questionnaire of this study was developed based on the recommendations of the Brazilian Ministry of Health and adapted for pregnant women. The findings of this study suggest the need for improvements in nutritional assistance during prenatal care.

What do these findings mean?
Access to educational activities in prenatal care and socioeconomic characteristics influence the healthy eating habits of pregnant women. With these findings, it is expected to contribute to public policymakers and professionals involved in the care of pregnant women, in order to qualify nutritional guidelines in the health care of the mother-baby binomial during prenatal care.

INTRODUCTION

Inadequate eating habits are strongly associated with an increase in the prevalence and mortality from non-communicable chronic diseases in the general population[1], and may result from social, cultural and economic influences, such as accessibility, availability, advertising and price[2,3]. Thus, healthy eating can be considered multidimensional[4].

In this scenario, diet can influence pregnancy outcomes, and play a vital role in maternal and child health and in the occurrence of diseases in adult life[5,6]. Evidence indicates that inadequate food consumption during pregnancy can lead to harmful nutritional consequences, such as gestational weight gain above recommended levels and neonatal adiposity[7,8]. Such consequences can increase the risk of maternal morbidity and mortality, and harm to the health and nutrition of the fetus and newborn[9,10].

In order to guide healthy eating, the Brazilian Ministry of Health developed the new Food Guide for the Brazilian Population, and the proposal of the ten steps for healthy eating. According to the guide[11], healthy eating is based on the consumption of varied foods in accordance with individual nutritional needs, based on the golden rule of giving preference to in natura or minimally processed foods, and in harmony with the cultural and social environment in which the individual is inserted[11].

However, in Brazil, studies have identified a low consumption of fresh or minimally processed foods in the diet of pregnant women and[12,13] an increase in the consumption of ultra-processed foods[14], and this signals the need for improvements in the quality of the diet. In this sense, the incorporation of nutritional guidelines during prenatal care becomes essential, as it has the potential to affect the eating behavior of pregnant women[15,10].

Thus, considering the risks associated with inadequate nutrition for the mother-baby binomial and the need for studies on this topic in pregnant women, the present study aimed to analyze adherence to the 10 steps for healthy eating during pregnancy and its association with maternal factors. and socioeconomic factors in pregnant women in Espírito Santo, Brazil.

METHODS

Study design and period

This is a cross-sectional study, carried out with pregnant women residing in the state of Espírito Santo, Brazil, from June to September 2021, using a self-administered electronic instrument.

Population and eligibility criteria

The study sample was obtained considering the sample size formula to estimate the proportion of pregnant women who use social networks to participate in a group, considering the population of live births of 53,569 in 2020 in Espírito Santo, according to the Live Birth Information System (SINASC)[16]. An expected proportion equal to 62% of adherence to 1 or 2 steps of the 10 steps for healthy eating was established, based on a previous study[17], with a confidence interval of 95% and a sampling error of 5%. These calculations were performed using the WinPepi© program, version 3.18, and resulted in a required sample size of 360 responding pregnant women.

The population of this study consisted of pregnant women who met the following inclusion criteria: (1) pregnant women in any period of pregnancy; (2) who had access to the internet; (3) and who responded to the full questionnaire. During the completion of the questionnaire, if items 1 and 2 were answered negatively, it was automatically closed. Pregnant women under 20 years of age were excluded from the study.

Data collect

Data were collected through an online questionnaire built on the Research Electronic Data Capture (REDCap) platform and hosted at https://redcap.ufes.br/[18,19]. The survey was disseminated through an invitation with the access link on social networks (Facebook and Instagram), including an online conversation application (WhatsApp). All information was self-reported by the pregnant women participating in the study.

Data analysis

Variables

The following socioeconomic characteristics were investigated: age (20 to 34 years, 35 years or older), education (≤8 years, >8 years), race/color (white, black, brown, yellow, indigenous), marital status (with partner, no partner), female head of the family (yes, no), human occupation at home (up to 2 people, >2 people) and family income (less than 1 to 3 minimum wages, more than 3 to 5 minimum wages, more than 5 minimum wages). The

following maternal factors were also evaluated: gestational period (first trimester, second trimester and third trimester), follow-up (yes, no), difficulty in accessing prenatal care during the COVID-19 pandemic (yes, no) and nutritional guidelines (yes, no).

The outcome investigated was adherence to each step towards a healthy diet, using as a reference the 10 Steps to Healthy Eating during pregnancy, which were adapted from the Brazilian Ministry of Health[11]. Adapted steps include:

1. Prioritize the consumption of in natura foods (such as fruits, vegetables, vegetables, eggs and meats) that are minimally processed (such as milk, flour, dried fruits, nuts) in daily consumption or food preparation;
2. Eat frequently, that is, at least three meals (breakfast, lunch and dinner) and two smaller meals a day, avoiding going many hours without eating;
3. Use oil, salt and sugar in moderation;
4. Limit consumption of processed foods;
5. Avoid consuming ultra-processed foods and fast snacks;
6. Seek to buy food in markets, fairs and fairs of producers and other places that sell varieties of in natura or minimally processed foods;
7. If you have culinary skills, try to develop them and share them, especially with children and young people of all ages and genders. If you don't know how to cook, try to learn;
8. Consume iron-rich foods daily to avoid anemia (lack of iron in the blood), such as red meat, offal, beans, lentils, chickpeas, soy, dark green leaves, among others;
9. Plan food shopping, organize the domestic pantry and define the week's menu in advance;
10. Be critical of food advertising.

In addition to adherence to each step, the frequency of adherence to the 10 steps was investigated, considering the Praise-Advise-Recommend System (EOR)[20]. For this, the questions were structured with response options and values, as follows: follows the recommendation (value=0) and does not follow the recommendation (value=1). The EOR score was calculated considering the sum of each item, ranging from 0 to 10 points.

The EOR score seeks to assess the different dimensions of the individual and serves to value or reinforce some care, being then directed to the promotion of improvements in the professional's clinical practice and greater autonomy of the family in the care process[20]. For this study, E-Praise was considered when the resulting score was less than or equal to 1; O-Guide when the resulting score is between 1 and 5; and R-Recommend when the result was above 5, indicating low adherence to the steps.

Statistical methods

The collected data were stored in the REDCap platform and exported to the statistical program IBM SPSS Statistics for Windows, version 22.0. Descriptive statistics were performed using frequency and proportion, and statistical associations using Pearson's chi-square test, and when the expected values in the table cells were less than five, Fisher's exact test was used. All variables met the assumptions of absence of multicollinearity. The binary logistic regression model was used to test associations between adherence to steps and independent variables (sociodemographic variables and maternal factors). The independent variables that showed association with the outcome from the chi-square test, with p-value less than 20%, were included in the binary logistic regression model. A significance level lower than 5% and a confidence interval (CI) of 95% were considered, with calculation of the Odds Ratio (OR).

Ethical and legal aspects of research

The study was approved by the Research Ethics Committee (CEP) of the Health Sciences Center (CCS) of the Federal University of Espírito Santo (UFES), under protocol CAAE: 45314921.8.0000.5060 and opinion Nº 4,692,710. All participants had access to the electronic consent form.

RESULTS

The research link had 568 hits (100%), however, 200 (35.21%) were excluded, according to pre-established inclusion and exclusion criteria. A total of N=368 (64.78%) pregnant women were included in the research.

Table 1: Socioeconomic and maternal factors of pregnant women, Espírito Santo, 2021

Variales	n(%)
Age	
20 to 34 years	292(79.3)
35 years or older	76(20.7)
Race/color	
White	181(49.2)
Black	37(10.1)
Brown	142(38.6)
Yellow	6(1.6)
Indigenous	2(0.5)
Household Human Occupation	
Up to 2 people	288(78.3)
> 2 people	80(21.7)
Marital status	
Don't have a partner	11(3.0)
Have a partner	357(97.0)
Education	
≤ 8 years	28(7.6)
> 8 years	340(92.4)
Female head of the family	
Yes	89(24.2)
No	279(75.8)
Family income	

Continuation - Table 1: Socioeconomic and maternal factors of pregnant women, Espírito Santo, 2021

Variales	n(%)
Less than 1 to 3 minimum wages	149(40.5)
More than 3 to 5 minimum wages	110(29.9)
More than 5 minimum wages	109(29.6)
Gestational Period	
First trimester	74(20.1)
Second trimester	173(47)
Third quarter	121(32.9)
Carrying out prenatal care	
Yes	364(98.9)
No	4(1.1)
Difficulty in prenatal access during the COVID-19 pandemic	
Yes	70(19.0)
No	298(81.0)
Nutritional guidelines in prenatal care	
Yes	229(62.2)
No	139(37.8)

N=368

Most pregnant women were between 20 and 34 years old (79.3%), had a family income of up to 3 minimum wages (40.5%), were white (49.2%), had a with more than 8 years of schooling (92.4%), was not considered the main source of family income (75.8%) and lived with a partner (89.1%).

Most of the participants surveyed were in the second trimester of pregnancy and were undergoing prenatal care (47%). As for the provision of nutritional guidance, 229 (62.2%) pregnant women reported that they received guidance, and that the COVID-19 pandemic made access to prenatal care difficult for 19%.

Table 2 shows adherence to each step of healthy eating. Note that only steps 4 and 9 show an adherence frequency lower than 60%.

Regarding the EOR score, 78.5% of the pregnant women were classified in the O-Orientar. Regarding the binary testing of the EOR System, with the other variables investigated, no significant differences were observed. In this case, adherence to each step of healthy eating was analyzed individually.

Table 2: Adherence to the 10 Steps to Healthy Eating in Pregnancy and classification of the EOR score of pregnant women, Espírito Santo, 2021

Variables	Adherence
Steps	n(%)
(Step 1) Prioritize the consumption of fresh foods	322(87.5)
(Step 2) Eat meals frequently and regularly	322(87.5)
(Step 3) Use spices sparingly	319(86.7)
(Step 4) Avoid consuming processed foods frequently	163(44.3)
(Step 5) Avoid consuming ultra-processed foods frequently	227(61.7)
(Step 6) Buying food at the fair	222(60.3)
(Step 7) Cooking the meals	326(88.6)
(Step 8) Consume foods rich in iron	296(80.4)
(Step 9) Plan shopping and meal preparation	205(55.7)
(Step 10) Disregard food advertising	256(69.6)
EOR score	
Praise (Membership 9 to 10 steps)	45(12.2)
Guide (Adherence 5 to 8 steps)	289(78.5)
Recommend (Up to 4 steps membership)	34(9.2)

N=368

The frequency of adherence to the steps was categorized and analyzed according to socioeconomic variables and maternal factors (table 3). In relation to step 1, the results showed statistical significance in the variable's education (p=0,004) and income (p=0,026). In steps 3, 4 and 5, age (p=0.007; p=0.031; p=0,001 respectively) was significantly associated. Regarding step 5, greater adherence was associated with race/color (p=0.008) and family income (p<0.001).

The variable "nutritional guidelines during prenatal care" was associated with six of the ten steps. Thus, pregnant women who received guidance had a higher frequency of adherence to step 2 (p=0.031), step 3 (p=0.040), step 4 (p=0.003), step 5 (p<0.001), step 8 (p=0.17) and step 9 (p=0.013).

Table 4 shows the variables associated with the binary logistic regression, carried out with the aim of identifying the factors associated with adherence to the steps for healthy eating during pregnancy. No independent variables remained associated with step 1 and step 2.

Table 3: Frequencies of adherence to the 10 steps for healthy eating according to prenatal and socioeconomic variables, Espírito Santo, 2021

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Socioeconomic										
Age [p value#]	0.846	0.846	0.007*	0.031*	0.001*	0.407	0.895	0.489	0.864	0.381
20 to 34 years	87.3	87.7	84.2	41.4	57.2	59.2	88.7	81.2	55.5	68.5
35 years or older	88.2	86.8	96.1	55.3	78.9	64.5	88.2	77.6	56.6	73.7
Race/color [p value#]	0.124	0.378	0.431	0.438	0.008*	0.350	0.118	0.051	0.407	0.933
White	91.2	90.1	86.7	47.5	69.1	57.5	85.1	84.5	58.6	69.1
Black	83.8	86.5	81.1	48.6	45.9	70.3	91.9	67.6	48.6	67.6
Brown	84.5	85.2	88.7	40.8	56.3	59.9	92.3	79.6	52.8	70.4
Household Human Occupation [p value#]	0.252	0.445	0.539	0.690	0.056	0.006*	0.041*	0.138	0.157	0.650
Up to 2 people	86.5	88.2	86.1	43.8	64.2	56.6	86.8	78.8	57.6	70.1
> 2 people	91.3	85.0	88.8	46.3	52.5	73.8	95.0	86.3	48.8	67.5
Marital status [p value#]	0.635	0.147	1	1	0.346	0.759	0.119	0.236	0.226	0.321
Don't have a partner	81.8	72.7	90.9	45.5	45.5	54.5	72.7	63.6	36.4	54.5
Have a partner	87.7	88.0	86.6	44.3	62.2	60.5	89.1	81.0	56.3	70.0
Education [p value#]	0.004*	0.066	0.399	0.579	0.084	0.040*	0.228	0.813	0.813	0.290
≤ 8 years old	67.9	75.0	82.1	39.3	46.4	78.6	96.4	82.1	53.6	60.7
> 8 years old	89.1	88.5	87.1	44.7	62.9	58.8	87.9	80.3	55.9	70.3
Female head of the family [p value#]	0.747	0.290	0.259	0.116	0.202	0.674	0.064	0.271	0.279	0.194
Yes	86.5	84.3	83.1	37.1	67.4	58.4	83.1	76.4	60.7	64
No	87.8	88.5	87.8	46.6	59.9	60.9	90.3	81.7	54.1	71.3
Family income [p value#]	0.026*	0.729	0.082	0.104	<0.001*	0.657	0.003*	0.149	0.169	0.394
Less than 1 to 3 minimum wages	81.9	85.9	81.9	40.9	49.7	61.1	92.6	76.5	51.0	65.8
More than 3 to 5 minimum wages	91.8	89.1	90.0	52.7	67.3	62.7	91.8	80.0	62.7	70.9
More than 5 minimum wages	90.8	88.1	89.9	40.4	72.5	56.9	79.8	86.2	55.0	73.4
Maternal factors										
Gestational period [p value#]	0.115	0.695	0.118	0.829	0.535	0.188	0.815	0.462	0.633	0.427
1st quarter	94.6	85.1	82.4	41.9	66.2	58.1	86.5	81.1	56.8	74.3
2nd quarter	86.1	87.3	85	43.9	59	56.6	89	82.7	53.2	66.5
3rd quarter	85.1	89.3	91.7	46.3	62.8	66.9	89.3	76.9	58.7	71.1
Carrying out prenatal follow-up [p value#]	1	1	1	0.633	1	1	0.385	0.173	1	0.233
No	100	100	100	25	75	75	75	50	50	100
Yes	87.4	87.4	86.5	44.5	61.5	60.2	88.7	80.8	55.8	69.2
Difficulty in prenatal access during the COVID-19 pandemic [p value#]	0.88	0.269	0.791	0.592	0.823	0.452	0.096	0.57	0.788	0.031*
No	88.9	86.6	86.9	45	61.4	59.4	87.2	79.9	55.4	72.1
Yes	81.4	91.4	85.7	41.4	62.9	64.3	94.3	82.9	57.1	58.6
Nutritional guidelines in prenatal care [p value#]	0.239	0.031*	0.040*	0.003*	<0.001*	0.286	0.77	0.017*	0.013*	0.183
No	84.9	82.7	82	34.5	48.9	56.8	89.2	74.1	47.5	65.5
Yes	89.1	90.4	89.5	50.2	69.4	62.4	88.2	84.3	60.7	72.1

#Chi-square or Fisher exact. *Statistically significant values (p<0.05). Percentage described regarding adherence at each step. Caption: S1: Step 1, Prioritize the consumption of fresh foods; S2: Step 2, Eat meals frequently and regularly; S3: Step 3, Use spices sparingly. S4: Step 4, Avoid consuming processed foods frequently; S5: Step 5, Avoid consuming ultra-processed foods frequently; S6: Step 6, Buy food at fairs; S7: Step 7, Cooking meals; S8: Step 8, Consume foods rich in iron; S9: Step 9, Plan shopping and meal preparation; S10: Step 10, Disregard food advertising. CI: Confidence Interval. OR: Odds ratio.

Table 4: Binary logistic regression, considering the variables associated with adherence to the 10 steps for healthy eating in pregnant women, Espírito Santo, 2021

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
	p value	p value	p value	p value	p value	p value	p value	p value	p value	p value
	OR (CI95%)	OR (CI95%)	OR (CI95%)	OR (CI95%)	OR (CI95%)	OR (CI95%)	OR (CI95%)	OR (CI95%)	OR (CI95%)	OR (CI95%)
					Age					
20 to 34 years	-	-	1	1	1	-	-	-	-	-
35 years or older	-	-	0.019	0.038	0.006	-	-	-	-	-
			4.26	1.74	2.41					
			(1.27-14.30)	(1.03-2.93)	(1.29-4.52)					
					Race/color					
White	1	-	-	-	1	-	1	1	-	-
Black	0.346	-	-	-	0.081	-	0.368	0.046	-	-
	0.59				0.5		1.85	0.42		
	(0.20-1.74)				(0.23-1.08)		(0.48-7.06)	(0.18-0.98)		
Brown	0.233	-	-	-	0.333	-	0.246	0.525	-	-
	0.64				0.78		1.58	0.82		
	(0.30-1.33)				(0.47-1.28)		(0.72-3.43)	(0.45-1.50)		
					Household Human Occupation					
Up to 2 people	-	-	-	-	1	1	1	1	1	-
> 2 people	-	-	-	-	0.074	0.012	0.122	0.048	0.229	-
					0.6	2.07	2.37	2.13	0.73	
					(0.34-1.05)	(1.17-3.65)	(0.79-7.08)	(1.00-4.53)	(0.44-1.21)	
					Family income					
Less than 1 to 3 minimum wages	1	-	1	1	1	-	1	1	1	1
More than 3 to 5 minimum wages	0.11	-	0.204	0.251	0.116	-	0.917	0.762	0.158	0.651
	2.06		1.66	1.35	1.58		1.05	1.1	1.44	1.13
	(0.84-5.03)		(0.76-3.62)	(0.80-2.26)	(0.89-2.79)		(0.40-2.71)	(0.58-2.10)	(0.86-2.42)	(0.65-1.96)
More than 5 minimum wages	0.278	-	0.255	0.302	0.058	-	0.044	0.193	0.917	0.364
	1.63		1.58	0.75	1.79		0.42	1.62	0.97	1.3
	(0.67-3.97)		(0.71-3.5)	(0.44-1.28)	(0.98-3.29)		(0.18-0.97)	(0.78-3.38)	(0.57-1.63)	(0.73-2.29)
					Gestational period					
1st quarter	1	-	1	-	-	1	-	-	-	-
2nd quarter	0.215	-	0.47	-	-	0.772	-	-	-	-
	0.49		1.32			0.92				
	(0.16-1.51)		(0.62-2.80)			(0.52-1.61)				

Continuation - Table 4: Binary logistic regression, considering the variables associated with adherence to the 10 steps for healthy eating in pregnant women, Espírito Santo, 2021

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
	p value OR (CI95%)	p value OR (CI95%)	p value OR (CI95%)	p value OR (CI95%)	p value OR (CI95%)	p value OR (CI95%)	p value OR (CI95%)	p value OR (CI95%)	p value OR (CI95%)	p value OR (CI95%)
3rd quarter	0.098 0.38 (0.12-1.19)	-	0.039 2.58 (1.04-6.38)	-	-	0.178 1.52 (0.82-2.79)	-	-	-	-
Conclusion										
Difficulty in prenatal access during the COVID-19 pandemic										
No	-	-	-	-	-	-	1	-	-	1
Yes	-	-	-	-	-	-	0.186 2.08 (0.70-6.21)	-	-	0.041 0.56 (0.32-0.97)
Nutritional guidelines in prenatal care										
No	-	1	1	1	1	-	-	1	1	1
Yes	-	0.64 1.81 (0.96-3.41)	0.186 1.54 (0.81-2.93)	0.003 1.99 (1.26-3.15)	0.003 2.02 (1.26-3.24)	-	-	0.109 1.59 (0.90-2.80)	0.025 1.66 (1.06-2.58)	0.358 1.25 (0.77-2.01)

Binary logistic regression. Cases of statistical significance less than 20% in the univariate analysis were included in the analyses. Caption: S1: Step 1, Prioritize the consumption of fresh foods; S2: Step 2, Eat meals frequently and regularly; S3: Step 3, Use spices sparingly. S4: Step 4, Avoid consuming processed foods frequently; S5: Step 5, Avoid consuming ultra-processed foods frequently; S6: Step 6, Buy food at fairs; S7: Step 7, Cooking meals; S8: Step 8, Consume foods rich in iron; S9: Step 9, Plan shopping and meal preparation; S10: Step 10, Disregard food advertising. CI: Confidence Interval. OR: Odds ratio.

In step 3, being 35 years of age or older (p value: 0.019; OR: 4.26; 95%CI: 1.27-14.30) and being in the 3rd trimester of pregnancy (p value: 0.019; OR: 2.58; 95%CI: 1.04-6.38), increased the chance of pregnant women adhering to the recommendation.

Regarding step 4, being ≥35 years old (p value: 0.038; OR: 1.74; 95%CI: 1.03-2.93) and receiving nutritional guidance during prenatal care (p value: 0.003; OR: 1.99; 95%CI: 1.26-3.15) were associated with an increased chance of pregnant women adhering to the recommendation, limiting the consumption of processed foods.

Regarding the consumption of ultra-processed foods (step 5), age ≥35 years (p value: 0.006; OR: 2.41; 95%CI: 1.29-4.52) and nutritional guidelines during prenatal care (p value: 0.003; OR: 2.02; 95%CI: 1.26-3.24) increased the chance of adherence to the recommendations that indicate a reduction in the consumption of this type of food.

Having more than two people living in the same household increased the chance of adherence to step 6 by twice (p value: 0.012; OR: 2.07; 95%CI: 1.17-3.65) and to step 8 (p value: 0.048; OR: 2.13; 95%CI: 1-4.53). Pregnant women of black race/color were 58% less likely to not consume foods rich in iron (p value: 0.046; OR: 0.42; 95%CI: 0.18-0.98), as recommended in step 8. At step 7, having an income greater than 5 minimum wages increased the probability of the pregnant woman not cooking meals by 58% (p value: 0.044; OR: 0.42; 95%CI: 0.18-0.97).

Pregnant women who received nutritional guidance were 66% more likely to plan shopping and prepare meals (p value: 0.025; OR: 1.66; 95%CI: 1.66-2.58), that is, adherence to step 9. Regarding step 10, pregnant women with difficult access to prenatal care during the COVID-19 pandemic were 44% more likely to not follow the recommendations (p value: 0.041; OR: 0.56; 95%CI: 0.32-0.97).

DISCUSSION

In the present study, associations were identified between adherence to the recommendations and access to prenatal care and socioeconomic characteristics, such as age ≥35 years and the greater number of people in the same household. Among our findings, pregnant women who received nutritional guidance during prenatal care were less likely to prefer the consumption of processed and ultra-processed foods.

Adherence to steps differs between age groups, and greater adherence to the recommendations of steps 3, 4 and 5 was identified among pregnant women aged 35 years or older. This finding corroborates the scientific literature, as older women tend to have a healthier and more conscious pattern compared to younger women[21].

It should be noted that being a pregnant woman aged 35 years or older is characterized as advanced maternal age and thus may reveal social differences, since women who delay pregnancy tend to have better social and economic characteristics[22]. Therefore, through higher

education, better access to education and information, these pregnant women tend to be more concerned about obstetric outcomes, and may be more careful with their own health and food[21,23].

Socioeconomic factors tend to reflect on the eating habits of pregnant women6. In this study, pregnant women of black race/color reported low adherence to step 8, and this may mean a concern about the nutritional needs of the mother and baby in this period[24]. A study carried out with pregnant women in the 3rd trimester found that women of black race/color tended to eat more inadequately, when compared to white race/color[25]. Additionally, a study by Victora *et al*.[26] found a low number of prenatal consultations in black women compared to white women, emerging problems in prenatal access and the need for interventions to promote nutritional health for this public[24].

Another issue raised, related to this finding, is that black women may present greater social vulnerability, with low educational and socioeconomic levels, which can lead to food insecurity and influence poor nutritional indicators[27,28].

Regarding socioeconomic characteristics, the greater number of people in the same household contributed to the chance of adhering to step 6, which indicates a preference for buying food at fairs, and to step 8, which indicates consuming foods rich in iron. This finding suggests that family support in household chores helps the family to have time to organize meals and consequently buy food at fairs, and corroborates the hypothesis that family structure can influence the food consumption of pregnant women[29].

As for the habit of cooking their own meals (Step 7), pregnant women with higher incomes indicated non-adherence to this recommendation. Given the influence of economic factors, higher social status may allow the pregnant woman to hire someone to prepare the family's meals[2]. Another possible explanation is the high purchasing power, including ready-to-eat foods[30].

In this study, the data reveal that receiving nutritional guidance during prenatal care directly influences the choices and eating behavior of pregnant women. Those who received nutrition advice followed 3 out of 10 healthy eating recommendations. Participants who received information about healthy eating during prenatal care were more likely to adhere to steps 4 and 5, which correspond to a reduction in the consumption of processed and ultra-processed foods, following the recommendations that pregnant women should seek to have a diet rich in foods. natural and low in processed foods, in favor of maternal and fetal well-being[11]. As recommended by the Brazilian food guide, processed foods should be consumed moderately and ultra-processed foods should be avoided, as they are nutritionally unbalanced, induce excessive consumption and interfere with the population's cultural eating habits[11]. Our finding was similar to the study by Pereira *et al*.[31] in which pregnant women who received prenatal guidance were more likely to consume minimally processed foods, and this highlights the importance of educational activities in prenatal care in changing behavior, mainly in relation to food knowledge and practices[32].

Pregnant women who received nutritional guidance during prenatal care were also more likely to plan shopping and meals (step 9). Related to this finding, we can highlight that such prenatal guidelines contribute beyond food choices, in the organization of family food, and evidenced the relevance of food and nutrition education in prenatal care carried out by a trained multiprofessional team[12].

It is noteworthy that this study was conducted during the COVID-19 pandemic in Brazil, and the difficulty in accessing prenatal care, caused by the advance of the pandemic, resulted in low adherence to step 10. The COVID-19 pandemic caused overload in health services, leading to a decrease in prenatal coverage, such as consultations and examinations[33]. In addition to access, a study carried out with postpartum women in the South region of Brazil, in the first year of the COVID-19 pandemic, found a percentage of 17.4% of inadequate prenatal care[34].

With these findings, the importance of coverage and quality of the service provided in prenatal care is verified, since greater access allows a better opportunity for care and transmission of qualified information to pregnant women[35]. However, despite the high coverage of prenatal care in Brazil[36], problems related to the provision of educational activities are still found[37-39], which makes it inadequate in some of its geographic regions[40].

It is also worth noting that the EOR score is considered a guideline for possible clinical conducts[21]. The use of this score can be considered innovative and easy to apply in educational actions of nutritional guidance in prenatal care and conducting research.

The limitations of this study are related to the possibility of occurrence of biases in memory and self-report, since the research was self-applied. It is important to note that the sample of this study was composed of pregnant women with access to the internet and of a higher socioeconomic level. Although the sample may not be representative of the Brazilian population, understanding new factors to meet recommended guidelines for healthy eating can help guide future interventions. Another possible limitation was related to the inclusion of pregnant women of any gestational trimester, however, during prenatal actions, the pregnant woman must receive nutritional guidance from the first consultation. In addition, our study was based on cross-sectional data, and causal attributions were waived.

CONCLUSION

Most pregnant women adhered to three to five steps, falling into the O-Orientation category. Access to nutritional guidelines during prenatal care influenced the eating habits of pregnant women. In the present study, age ≥35 years and the greater number of people in the same household influenced adherence to the steps towards a healthy diet and, as well as black race/color, income greater than 5 minimum wages and the difficulty of accessing services. prenatal actions in the COVID-19 pandemic were associated with non-adherence.

The data indicated that receiving information about healthy eating during prenatal care contributes to reducing the consumption of processed and ultra-processed foods,

giving pregnant women a healthier diet and reinforcing the importance of nutritional interventions in prenatal care.

It is noteworthy that the adaptation of the ten steps for healthy eating during pregnancy used in conjunction with the EOR System can serve as a useful tool in the guidance and dietary assessment of pregnant women.

Finally, the results of the present study can guide future research on the eating habits of pregnant women, considering the Brazilian and specific recommendations for this population.

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Conflicts of interest

The authors declare that they have no conflicts of interest regarding the authorship and publication of this article.

REFERENCES

1. GBD 2017 Diet Collaborators (2019). Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet (London, England), 393(10184), 1958–1972. DOI: https://doi.org/10.1016/S0140
2. Sato PM, Couto MT, Wells J, Cardoso MA, Devakumar D, Scagliusi FB. Mothers' food choices and consumption of ultra-processed foods in the Brazilian Amazon: A grounded theory study. Appetite. 2020; 148:104602. DOI: https://doi.org/10.1016/j.appet.2020.104602
3. Oliveira M, Santos L. Dietary guidelines for Brazilian population: Ananalys is from the cultural and social dimensions of food. Ciênc. saúde coletiva. 2020; 25(7): 2519-2528. DOI: http://dx.doi.org/10.1590/1413-81232020257.22322018
4. Gabe KT, Tramontt CR, Jaime PC. Implementation of food-based dietary guidelines: conceptual framework and analysis of the Brazilian case. Public Health Nutr. 2021; 24(18): 6521-6533. DOI: https://doi.org/10.1017/S1368980021003475
5. Department of Agriculture and U.S. Department of Health and Human Services [Internet]. [Dietary Guidelines for Americans, 2020-2025]. 9nd ed. 2020. Available from: https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary_Guidelines_for_Americans_2020-2025.pdf
6. Hoffmann JF, Camey S, Olinto MTA, Schmidt MI, Ozcariz SGI, Melere C, et al. Dietary patterns during pregnancy and the association with sociodemographic characteristics among women attending general practices in southern Brazil: the ECCAGe Study. Cad. Saúde Pública. 2013; 29 (5) 970-980. DOI: https://doi.org/10.1590/S0102-311X2013000500014
7. Araújo ES, Santana JM, Brito SM, Santos DB. Consumo alimentar de gestantes atendidas em Unidades de Saúde. O Mundo da Saúde. 2016; 40(1): 28-37. DOI: http://dx.doi.org/10.15343/0104-7809.201640012837
8. Rohatgi KW, Tinius RA, Cade WT, Steele EM, Cahill AG, Parra DC. Relationships between consumption of ultra-processed foods, gestational weight gain and neonatal outcomes in a sample of US pregnant women. PeerJ. 2017; 5: e4091. DOI: https://doi.org/10.7717/peerj.4091
9. Raghavan R, Dreibelbis C, Kingshipp BL, Wong YP, Abrams B, Gernand AD, et al. Dietary patterns before and during pregnancy and birth outcomes: a systematic review. Am J Clin Nutr. 2019 Mar 1; 109(Suppl_7): 729S-756S. DOI: http://dx.doi.org/10.1093/ajcn/nqy353
10. McMillen IC, MacLaughlin SM, Muhlhausler BS, Gentili S, Duffield JL, Morrison JL. Developmental origins of adult health and disease: the role of periconceptional and foetal nutrition. Basic Clin Pharmacol Toxicol. 2008 Feb; 102(2): 82-9. DOI: http://dx.doi.org/10.1111/j.1742-7843.2007.00188.x
11. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica [Internet]. [Food guide for the Brazilian population]. 2nd ed. Brasília (DF): Ministério da Saúde; 2014. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/guia_alimentar_populacao_brasileira_2ed.pdf
12. Gomes CB, Vasconcelos LG, Cintra RMGC, Dias LCGD, Carvalhaes MABL. Hábitos alimentares das gestantes brasileiras: revisão integrativa da literatura. Ciênc. saúde coletiva. 2019; 24(6): 2293-2306. DOI: https://doi.org/10.1590/1413-81232018246.14702017
13. Graciliano NG, Silveira JACD, Oliveira ACM. The consumption of ultra-processed foods reduces overall quality of diet in pregnant women. Cad Saude Publica. 2021; 37(2): e00030120. DOI: https://doi.org/10.1590/0102-311X00030120
14. Miele MJ, Souza RT, Calderon IM, Feitosa FE, Leite DF, Rocha Filho EA, et al. The food patterns of a multicenter cohort of Brazilian nulliparous pregnant women. Sci Rep. 2021; 11(1): 15554. DOI: http://dx.doi.org/10.1038/s41598-021-95185-2

15. Malta MB, Carvalhaes MA, Takito MY, Tonete VL, Barros AJ, Parada CM et al. Educational intervention regarding diet and physical activity for pregnant women: changes in knowledge and practices among health professionals. BMC Pregnancy Childbirth. 2016 Jul 20; 16(1): 175. DOI: https://doi.org/10.1186/s12884-016-0957-1
16. Secretaria de Estado de Saúde do Espírito Santo. Tabulação de dados [Internet]. [Nascidos Vivos segundo Ano do Nascimento. Período: 2020]. Vitória (ES): Secretaria de Estado de Saúde do Espírito Santo; 2021. Available from: http://tabnet.saude.es.gov.br/cgi/tabcgi.exe?tabnet/sinasc/sinasc2006/sinasc2006.def
17. Couto SF, Madruga SW, Neutzling MB, Silva MC. Frequência de adesão aos "10 Passos para uma Alimentação Saudável" em escolares adolescentes. Ciênc. saúde coletiva. 2014; 19(5): 1589-1599. DOI: http://dx.doi.org/10.1590/1413-81232014195.21392013
18. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009; 42(2): 377-381. DOI: http://dx.doi.org/10.1016/j.jbi.2008.08.010
19. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: Building an international community of software platform partners. J Biomed Inform. 2019; 95: 103208. DOI: http://dx.doi.org/10.1016/j.jbi.2019.103208
20. Secretaria Municipal da Saúde de São Paulo. Programa da Saúde da Família [Internet]. [Toda hora é hora de cuidar – Caderno da equipe]. São Paulo. Available from: http://www.ee.usp.br/site/dcms/app/webroot/uploads/arquivos/caderno_equipe.pdf
21. McGowan CA, McAuliffe FM. Maternal dietary patterns and associated nutrient intakes during each trimester of pregnancy. Public Health Nutr. 2013; 16(1): 97-107. DOI: https://doi.org/10.1017/S1368980012000997
22. Martinelli KG, Gama SGN, Santos ET. The role of parity in the mode of delivery in advanced maternal age women. Rev. Bras. Saude Mater. Infant. 2021; 21(1): 65-75. DOI: https://doi.org/10.1590/1806-93042021000100004
23. Aldrighi JD, Wal ML, Souza SRRK, Cancela FZV. The experiences of pregnant women at an advanced maternal age: an integrative review. Rev Esc Enferm USP. 2016; 50(3): 509-518. DOI: http://dx.doi.org/10.1590/S0080-623420160000400019
24. Myles M, Gennaro S, Dubois N, O'Connor C, Roberts K. Nutrition of Black Women During Pregnancy. J Obstet Gynecol Neonatal Nurs. 2017; 46(3): e83-e94. DOI: http://dx.doi.org/10.1016/j.jogn.2017.01.007
25. Gennaro S, Biesecker B, Fantasia HC, Nguyen M, Garry D. Nutrition profiles of African [corrected] American women in the third trimester [published correction appears in MCN Am J Matern Child Nurs. 2011 May-Jun;36(3):168]. MCN Am J Matern Child Nurs. 2011; 36(2): 120-126. DOI: http://dx.doi.org/10.1097/NMC.0b013e3182057a13
26. Victora CG, Matijasevich A, Silveira MF, Santos IS, Barros AJD, Barros FC. Socio-economic and ethnic group inequities in antenatal care quality in the public and private sector in Brazil. Health Policy Plan. 2010 Jul; 25(4): 253-61. DOI: http://dx.doi.org/10.1093/heapol/czp065
27. Flynn AC, Begum S, White SL, et al. Relationships between Maternal Obesity and Maternal and Neonatal Iron Status. Nutrients. 2018; 10(8): 1000. DOI: https://doi.org/10.3390/nu10081000
28. Desyibelew HD, Dadi AF. Burden and determinants of malnutrition among pregnant women in Africa: A systematic review and meta-analysis. PLoS One. 2019; 14(9): e0221712. DOI: https://doi.org/10.1371/journal.pone.0221712
29. Coelho NLP, Cunha DB, Esteves APP, Lacerda EMA, Theme Filha MM. Dietary patterns in pregnancy and birth weight. Rev. Saúde Pública. 2015; 49. DOI: https://doi.org/10.1590/S0034-8910.2015049005403
30. Canuto R, Fanton M, Lira PIC. Social inequities in food consumption in Brazil: a critical review of the national surveys. Cienc Saude Colet 2019; 24(9): 3193-3212
31. Pereira MT, Cattafesta M, Santos-Neto ET, Salaroli LB. Maternal and Sociodemographic Factors Influence the Consumption of Ultraprocessed and Minimally-Processed Foods in Pregnant Women. Rev. Bras. Ginecol. Obstetrícia. 2020; 42(07):380-389. DOI: http://dx.doi.org/10.1055/s-0040-1712996
32. Oliveira SC, Fernandes AFC, Vasconcelos EMR, Ximenes LB, Leal LP, Cavalcanti AMTS, et al. Efeito de uma intervenção educativa na gravidez: ensaio clínico randomizado em cluster. Acta Paul Enferm. 2018; 31(3): 291-298. DOI: http://dx.doi.org/10.1590/1982-0194201800041

33. Kotlar B, Gerson E, Petrillo S, Langer A, Tiemeier. The impact of the COVID-19 pandemic on maternal and perinatal health: a scoping review. Reprod Health. 2021; 18(10). DOI: https://doi.org/10.1186/s12978-021-01070-6
34. Martin MM, Knobel R, Nandi V, Pereira JG, Trapani Junior A, Andreucci CB. Adequacy of Antenatal Care during the COVID-19 Pandemic: Observational Study with Postpartum Women. Rev Bras Ginecol Obstet. 2022. DOI: https://doi.org/10.1055/s-0041-1741450
35. Schwab FCBS, Ferreira L, Martinelli KG, Esposti CDD, Pacheco KTS, Oliveira AE, et al. Fatores associados à atividade educativa em saúde bucal na assistência pré-natal. Ciênc. saúde coletiva. 2021; 26(3): 1115-1126. DOI: https://doi.org/10.1590/1413-81232021263.12902019
36. Viellas EF, Domingues RMSM, Dias MAB, da Gama SGN, Theme Filha MM, Costa JV, et al. Prenatal care in Brazil. Cad Saúde Pública. 2014; 30(1): 85-100. DOI: https://doi.org/10.1590/0102-311X00126013
37. Flores TR, Neves RG, Mielke GI, Bertoldi AD, Nunes BP. Desigualdades na cobertura da assistência pré-natal no Brasil: um estudo de abrangência nacional. Ciênc. saúde coletiva. 2021; 26(02): 593-600. DOI: https://doi.org/10.1590/1413-81232021262.26792019
38. Esposti CDD, Santos Neto ET, Oliveira AE, Travassos C, Pinheiro RS. Desigualdades sociais e geográficas no desempenho da assistência pré-natal de uma Região Metropolitana do Brasil. Ciênc. saúde coletiva. 2020; 25(5): 1735-1750. DOI: https://doi.org/10.1590/1413-81232020255.32852019
39. Martinelli KG, Santos Neto ET, Gama SGN, Oliveira AE. Adequação do processo da assistência pré-natal segundo os critérios do Programa de Humanização do Pré-natal e Nascimento e Rede Cegonha. Rev. Bras. Ginecol. Obstet. 2014; 36(02): 56-64. DOI: https://doi.org/10.1590/S0100-72032014000200003
40. Leal MC, Esteves-Pereira AP, Viellas EF, Domingues RMSM, Gama SGN. Prenatal care in the Brazilian public health services. Rev. Saúde Pública. 2020; 54(8). DOI: https://doi.org/10.11606/s1518-8787.2020054001458

Resumo

Introdução: orientações nutricionais no pré-natal podem influenciar no comportamento alimentar da gestante e reduzir os riscos para o binômio mãe-bebê.

Objetivo: analisar a adesão aos 10 passos para alimentação saudável na gestação e sua associação com fatores maternos e socioeconômicos em gestantes do Espírito Santo, Brasil.

Método: os dados foram obtidos por meio de um questionário eletrônico amplamente divulgado em redes sociais. Foram coletados dados socioeconômicos, do pré-natal e do comportamento alimentar de 368 participantes. Utilizou-se como critério de avaliação os 10 Passos para Alimentação Saudável na gestação, adaptados do Ministério da Saúde do Brasil, com utilização do Sistema Elogiar-Orientar-Recomendar (EOR). O teste Qui-quadrado de Pearson e o exato de Fisher foram usados para analisar as diferenças entre as proporções. O modelo de regressão logística binária foi utilizado para investigar a associação entre as variáveis independentes e os passos para uma alimentação saudável. Adotou-se o nível de significância de 5% e o intervalo de confiança de 95%.

Resultados: a maioria das gestantes referiu adesão de 3 a 5 passos (78.5%), enquadrando-se na categoria O-Orientar. Observou-se que receber orientações nutricionais no pré-natal aumentou a adesão no passo 4 (Limitar o consumo de alimentos processados; OR: 1.99; IC95%: 1.26-3.15), no passo 5 (Evitar consumir alimentos ultraprocessados e lanches rápidos; OR: 2.02; IC95%: 1.26-3.24) e no passo 9 (Planejar as compras de alimentos, organize a despensa doméstica e defina com antecedência o cardápio da semana; OR: 1.66; IC95%: 1.66-2.58).

Conclusão: o acesso às orientações nutricionais durante a assistência pré-natal influenciou nos hábitos alimentares das gestantes. Os resultados sugerem a necessidade de fortalecimento das ações do pré-natal, principalmente relacionadas às orientações quanto ao incentivo aos hábitos alimentares saudáveis e adequados.

Palavras-chave: gestantes, nutrição pré-natal, tecnologia, promoção da saúde.