

Factors associated with excess weight, hypertension and gestational diabetes in northern Brazil in 2021

Fatores associados ao excesso de peso, hipertensão e diabetes gestacionais no norte Brasileiro em 2021

Factores asociados al exceso de peso, hipertensión y diabetes gestacional en el norte de Brasil en 2021

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ABSTRACT

Objective: To estimate the prevalence and factors associated with excess weight, hypertension and diabetes among pregnant women in the northern region of Brazil.

Method: This is a cross-sectional, retrospective study with secondary data conducted with pregnant women living in the northern region of Brazil who took part in the Telephone Survey for Surveillance of Risk and Protective Factors for Chronic Diseases. The chi-square and Kruskal-Wallis tests were used for analysis, as well as the Binomial Logistic Regression model.

Results: A total of 21,652.1 women self-reported being pregnant. The prevalence rates were: 42.4% excess weight, 2.65% hypertension and 9% diabetes. The variables associated with the outcomes were: for overweight, watching television and using a computer/tablet/cell phone for up to 3 hours a day, for hypertension, watching television for 3 hours a day or more and using a computer/tablet/cell phone for more than 6 hours a day, for diabetes, 29 years old, 13 years of schooling, and consumption of more than 4 glasses/cans of soda daily.

Conclusion: The prevalence rates found in this study are similar to those found in other contexts. The unfavorable outcomes are associated with age, years of schooling, dietary habits, and maternal lifestyle.

Descriptors: Hypertension. Diabetes mellitus. Overweight. Obesity. Pregnancy. Health surveys.

RESUMO

Objetivo: Estimar as prevalências e fatores associados ao excesso de peso, hipertensão e diabetes entre as gestantes da região norte do Brasil.

Método: Estudo transversal e retrospectivo, com dados secundários, realizado com gestantes residentes da Região Norte do Brasil participantes do Inquérito Telefônico de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas. Para análise, foram realizados os testes Qui-quadrado e Kruskal-Wallis, além do emprego do modelo de Regressão Logística Binomial.

Resultados: 21.652,1 mulheres autorreferiram estar gestantes. As prevalências foram: 42,4% de excesso de peso, 2,65% de hipertensão e 9% de diabetes. As variáveis associadas aos desfechos foram: para excesso de peso, assistir televisão e usar computador/tablet/celular por até 3 horas diárias, para hipertensão, assistir televisão por 3 horas diárias ou mais e usar computador/tablet/celular por mais de 6 horas diárias, para diabetes, foram 29 anos idade, 13 anos de estudo e consumo de mais de 4 copos/latinhas de refrigerante diariamente.

Conclusão: As prevalências encontradas neste estudo se assemelham aos achados de outras realidades. Os desfechos desfavoráveis estão associados à idade, anos de estudo, hábitos alimentares e estilo de vida maternos.

Descritores: Hipertensão. Diabetes mellitus. Sobrepeso. Obesidade. Gravidez. Inquéritos epidemiológicos.

RESUMEN

Objetivo: Estimar la prevalencia y los factores asociados al exceso de peso, la hipertensión y la diabetes en gestantes de la región norte de Brasil.

Método: Se trata de un estudio transversal, retrospectivo, con datos secundarios, realizado con gestantes residentes en la región norte de Brasil que participaron de la Encuesta Telefónica de Vigilancia de Factores de Riesgo y Protección para Enfermedades Crónicas. Para el análisis de los datos se utilizaron las pruebas de Chi-cuadrado y Kruskal-Wallis, así como el modelo de Regresión Logística Binomial.

Resultados: 21.652,1 mujeres declararon estar embarazadas. Las tasas de prevalencia fueron: 42,4% exceso de peso, 2,65% hipertensión y 9% diabetes. Las variables asociadas a los resultados fueron: para el sobrepeso, ver la televisión y utilizar el ordenador/tableta/móvil hasta 3 horas al día; para la hipertensión, ver la televisión 3 horas al día o más y utilizar el ordenador/tableta/móvil más de 6 horas al día; para la diabetes, 29 años de edad, 13 años de estudio y consumo de más de 4 vasos/latas de refrescos al día.

Conclusión: Las tasas de prevalencia halladas en este estudio son similares a las de otros países. Los resultados desfavorables se asociaron con la edad, los años de escolarización, los hábitos alimentarios de la madre y el estilo de vida.

Descriptores: Hipertensión. Diabetes mellitus. Sobrepeso. Obesidad. Embarazo. Encuestas epidemiológicas.

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INTRODUCTION

The reduction of the maternal mortality ratio (MMR) is still a challenge for improving maternal indicators in Brazil. In 2019, it was estimated that there were 57.9 deaths for every 100,000 live births in the country. In 2020, there was a sharp increase to 74.7 deaths, with the COVID-19 pandemic contributing to this rise. These numbers are above the target set by the Sustainable Development Goals, an international pact to which Brazil is part, which aims for an MMR equal to or less than 70 deaths per 100,000 live births⁽¹⁾.

In the northern region of Brazil, this challenge is greater since there are difficulties in prenatal care due to limited access to health services in rural and riverside regions, in addition to this region having a large population density. Epidemiological data show that from 2009 to 2020, in this region, the MMR increased by 20.5% and the linear trend indicates an increase compared to other regions of the country⁽¹⁾.

In 2020, the North region had an MMR of 98.9 deaths for every 100 thousand live births, higher than the national average, with the highest rates observed in Pará (107.1), Roraima (146.4), Amazonas (101.8) and Amapá (102.5)⁽¹⁾.

In this context, Hypertensive Syndromes stand out as the top cause of death responsible for 14% in 2020 and configuring as the main cause of maternal and perinatal mortality in Brazil and the most common clinical complication during pregnancy, as well as Gestational Diabetes which, despite not having a direct impact on the maternal mortality rate, is the most common metabolic problem during pregnancy⁽²⁻⁴⁾.

Furthermore, the 2021 Vigitel survey found that some capitals in the North region had the highest frequencies of women with overweight and obesity, such as Manaus (61.8% for overweight and 26.6% for obesity), Porto Velho (61.1% overweight and 26.2% for obesity) and Belém (61% for obesity). Nutritional disorders during pregnancy and the pre-gestational period deserve to be highlighted as aspects that contribute to the development of Arterial Hypertension and Diabetes during pregnancy, as well as being related to other unfavorable maternal and neonatal outcomes⁽⁵⁾.

In view of the above, this study was justified by the fact that the northern Brazil has the worst indicators of maternal morbidity and mortality, with hypertensive syndromes at the top of the causes of death and diabetes, overweight during pregnancy as risk factors for maternal and perinatal morbidity in Brazil, and worldwide. Furthermore, studies related to the subject are necessary for a better understanding of these phenomena in this region.

Thus, the objective of this article is to estimate the prevalence and associated factors of overweight, hypertension

and diabetes among pregnant women in the northern region of Brazil.

METHOD

This is a cross-sectional, retrospective, population-based study, with secondary data from the Telephone Survey for Surveillance of Risk and Protective Factors for Chronic Diseases (VIGITEL). The survey was conducted between September 2021 and February 2022.

The data in this study are secondary, public domain, collected and disseminated by the Health Surveillance Secretariat and the Ministry of Health, through the VIGITEL Survey, used by the Ministry of Health in the composition of the Surveillance System for Risk Factors for chronic non-communicable diseases (NCDs), allowing the expansion of knowledge about NCDs in the country⁽⁵⁾.

For this study, a subset of data was taken from women who participated in the VIGITEL 2021 survey and who reported being pregnant at the time of the interview. It is worth noting that the women were residents of the seven Brazilian capitals of the Northern Region. The population of VIGITEL (2021) and this study was composed of adult women aged ≥ 18 years.

VIGITEL uses probabilistic population samples based on the registration of landline telephones in cities, where telephone interviews are conducted by a company hired specifically for this purpose. In 16 years of VIGITEL data collection, approximately 784,479 interviews have been conducted with Brazilians, of which 486,929 were women, corresponding to 62% female participation.

The VIGITEL questions that were of interest to this study refer to: sociodemographic characteristics of individuals (socioeconomic factors, anthropometry, dietary habits from the weekly food consumption record and from the day prior to the interview, lifestyle and self-assessment of health status).

The following outcomes were considered as dependent variables: Hypertension, Diabetes Mellitus and Overweight.

The outcome variables were defined based on the responses of adult women who answered "yes" to question Q14: "Are you currently pregnant?" It is important to note that from question Q14, the outcomes of this study were identified when the pregnant woman, during the survey, self-reported positive responses to the questions: Q75. "Has a doctor ever told you that you have hypertension?" or to question Q76. "Has a doctor ever told you that you have diabetes?" As for excess weight in pregnant women, this outcome was obtained by calculating the Body Mass Index from the questions: Q9. "Do you know your weight (even if it is an approximate value)?" and Q11. "Do you know your height (even if it is an approximate

value)"The cut-off point for overweight was a result between 25.0 to 29.9 kg/height², and for obesity, ≥ 30.0 kg/height².

As independent variables, those present in the instrument used in the VIGITEL survey were utilized, with only those

considered relevant to the present study being included, as they are discussed as potentially associated with the outcomes in the main Brazilian guidelines on the subject⁽¹⁻⁴⁾, described in the Chart 1:

Chart 1 – Independent variables of the Vigitel questionnaire. Manaus, Amazonas, Brazil, 2021

Question number	Variable
Q6	How old are you?
Q8	Up to which grade did you study?
Q15	How many days a week do you usually eat beans?
Q16	How many days a week do you usually eat at least one type of vegetable?
Q17	How many days a week do you usually eat lettuce and tomato salad or a salad of any other RAW vegetables?
Q19	How many days a week do you usually eat COOKED vegetables with your meal or in soup?
Q25	How many days a week do you usually drink natural fruit juice?
Q27	How many days a week do you usually eat fruit?
Q31	How many glasses/cans of soda or artificial juice do you usually drink per day?
Q42	In the last three months, have you practiced any kind of physical exercise or sport?
Q44	Do you exercise at least once a week?
Q45	How many days per week do you usually exercise or play sports?
Q46	On the days you exercise or play sports, how long does this activity usually last?
Q55	Who usually does the cleaning in your house?
Q56	The heaviest part of the cleaning stays with:
R149	In a normal week, how many days do you clean your house?
R150	How long does the cleaning usually take?
Q59a	On average, how many hours per day do you usually watch TV?
Q59b	In your FREE TIME, do you usually use a computer, tablet, or cellphone to participate in social media like Facebook, watch movies, or play games?
Q59c	On average, how many hours of your free time (excluding work) is spent using a computer, tablet, or cellphone each day?

Source: Prepared by the authors based on the Vigitel 2021 questionnaire.

The data were downloaded from the original website⁽⁶⁾, tabulated and analyzed using R: The R Project for Statistical Computing, where the variables were described by absolute and relative frequencies.

A bivariate analysis of the data was performed, with proportions for categorical variables and median and interquartile range (IQR) for continuous variables, due to the abnormal distribution of the data assessed by the Shapiro-Wilk test. The Chi-square test was used for categorical variables and the Kruskal-Wallis test for continuous variables. To control for confounding factors, variables with a p-value ≤ 0.20 were inserted into the Binomial Logistic Regression model. Furthermore, the Odds Ratio (OR) and its respective 95% Confidence Intervals (95% CI) were calculated to verify the strength of association. In all analyses, the weight of each individual in the sample, calculated by the Rake method (rake-weight) according to the design of the Vigitel survey, was considered.

The secondary data used in this study are for public use and access, are publicly available by the Ministry of Health without restrictions and with no nominal identification,

making submission to a Research Ethics Committee for approval unnecessary. The VIGITEL 2021 study was approved by the National Research Ethics Committee on Human Beings, of the Ministry of Health, under opinion no. 2,100,213, Certificate of Presentation for Ethical Consideration (CAAE) 65610017,1,0000,0008.

RESULTS

In 2021, VIGITEL interviewed a total of 3,821,561.3 adults living in the Northern Region of Brazil. Among them, 21,652.1 were women who self-reported being pregnant at the time of the interview. The prevalence of excess weight among pregnant women in the Northern region was 42.4% (n=9,195), with 57.8% of women being overweight and 42.2% being obese. Hypertension was reported by 2.65% (n=575) of pregnant women, while diabetes indicated a prevalence of 9% (n=1,949).

Table 1 presents the characterization of the sociodemographic variables for overweight and obesity, hypertension

Table 1 – Sociodemographic characterization for self-reported excess weight, hypertension and diabetes in pregnant women, Northern Region, Brazil. Manaus, Amazonas, Brazil, 2021

Variables	Excess weight (n=9,195)			Hypertension (n=575)		Diabetes (n=1,949)	
	Overweight n=5,316 (%)	Obesity n=3,879 (%)	p-value	n= 575 (%)	p-value	n= 1,949 (%)	p-value
Age (years)							
Median (IQR)	28 (12)	28 (11)	<0.001†	39 (15)	<0.001†	29 (8)	<0.001†
Education (years)							
Years of study							
Median (IQR)	11 (4)	15 (4)	<0.001†	11 (11)	<0.001†	13 (5)	<0.001†
Never Studied	0 (0)	229 (5.9)	< 0.001*	229 (39.8)	< 0.001*	0 (0)	< 0.001*
Elementary School I	0 (0)	0 (0)		0 (0)		0 (0)	
Elementary School II	0 (0)	0 (0)		0 (0)		0 (0)	
High School	3,887 (73.2)	619 (15.8)		346 (60.2)		855 (43.9)	
Higher Education	1,429 (26.8)	3,032 (78.1)		0 (0)		1,094 (56.1)	
Postgraduate							
Studies Lato and	0 (0)	0 (0)		0 (0)		0 (0)	
Stricto Sensu							

Source: Vigitel, 2021.

*Chi-Square Test/†Kruskal-Wallis test

and diabetes self-reported in pregnant women in the Northern region.

Regarding excess weight, the median age was 28 years, while the median years of education was 11 years for overweight and 15 years for obesity. Among the pregnant women who were overweight, 73.2% had completed high school, while among those who were obese, 78.1% had higher education.

Regarding pregnant women with hypertension, the median age was 39 years, and the median education level was 11 years, with 60.2% having completed high school.

Among women with diabetes, the median age was 29 years and with a median of 13 years of education, just over half had higher education (56.1%).

All sociodemographic variables presented significant differences ($p < 0.05$).

Regarding dietary habits, it was observed that most pregnant women with excess weight (overweight and obesity) did not regularly consume beans, vegetables, fruits, or fruit juices. However, more than half reported drinking at least three glasses/cans of soda per day.

Pregnant women with hypertension reported not consuming beans, vegetables, or raw vegetables. Just over half consumed fruits and fruit juice, and 60.2% indicated they drank more than 4 glasses/cans of soda daily.

Among those with diabetes, just over half consumed beans regularly, no pregnant women consumed vegetables, and most did not regularly consume raw vegetables. More than half did not consume fruit juice, but all consumed fruits periodically, with 73.9% drinking more than 4 glasses/cans of soda per day.

Table 2 – Characterization of dietary habits for self-reported overweight, hypertension, and diabetes in pregnant women. Northern Region, Brazil. Manaus, Amazonas, Brazil, 2021

Variables	Excess weight (n=9,195)			Hypertension (n=575)		Diabetes (n=1,949)	
	Overweight n=5,316 (%)	Obesity n=3,879 (%)	p-value	n= 575 (%)	p-value	n= 1,949 (%)	p-value
Bean Consumption (≥ 5 Times a Week)		<0.001*		<0.001*		<0.001*	
No	4,355 (81.9)	1,878 (48.4)		575 (100)		901 (46.2)	
Yes	961 (18.1)	2,001 (51.6)		0 (0)		1048 (53.8)	
Vegetable Consumption (≥ 5 Times a Week)		<0.001*		<0.001*		<0.001*	
No	4,087 (76.9)	3,879 (100)		575 (100)		1949 (100)	
Yes	1,229 (23.1)	0 (0)		0 (0)		0 (0)	
Raw Vegetable Consumption (≥ 5 Times a Week)		<0.001*		<0.001*		<0.001*	
No	4,404 (82.8)	2,387 (61.5)		575 (100)		1410 (72.3)	
Yes	912 (17.2)	1,492 (38.5)		0 (0)		539 (27.7)	

Table 2 – Cont.

Variables	Excess weight (n=9,195)			Hypertension (n=575)		Diabetes (n=1,949)	
	Overweight n=5,316 (%)	Obesity n=3,879 (%)	p-value	n= 575 (%)	p-value	n= 1,949 (%)	p-value
Fruit Juice Consumption (≥ 5 Times a Week)		<0.001*		0.083*		<0.001*	
No	4,072 (76.6)	2,837 (73.1)		229 (39.8)		1094 (56.1)	
Yes	1,244 (23.4)	1,042 (26.9)		346 (60.2)		855 (43.9)	
Fruit Consumption (≥ 5 Times a Week)		<0.001*		0.006*		<0.001*	
No	3,580 (67.3)	1,878 (48.4)		229 (39.8)		0 (0)	
Yes	1,736 (32.7)	2,001 (51.6)		346 (60.2)		1,949 (100)	
Soda Consumption		<0.001*		<0.001*		<0.001*	
1 to 3 glasses/cans per day	3,541 (66.6)	1,271 (32.8)		229 (39.8)		509 (26.1)	
More than 4 glasses/cans per day	1,775 (33.4)	2,608 (67.2)		346 (60.2)		1,440 (73.9)	

Source: Vigitel, 2021

*Chi-Square Test

The other characteristics of the sample are described in Table 2.

Regarding lifestyle variables (Table 3), there is generally a low prevalence of physical activity among pregnant women with excess weight, as well as those who reported having diabetes.

It is noteworthy that among overweight pregnant women who practiced physical activity, more than half exercised weekly for at least one hour, 81.2% did housework, with a median duration of 8 hours. Half of the pregnant women with diabetes used to watch more than 3 hours of television, and the majority used screens (laptop, tablet or cell phone), with a duration of more than 6 hours.

On the other hand, obese pregnant women reported practicing physical activity between 3 and 4 days a week, with a duration of less than 50 minutes. The majority also did housework. More than half watched television for over 3

hours, 80.2% used audiovisual and communication screens, and for half of them the duration was between 1 and 3 hours.

More than half of the pregnant women who reported having hypertension regularly practiced physical activity lasting at least one hour. None of the pregnant women with hypertension reported cleaning the house. Regarding the habit of watching television for more than 3 hours, more than half reported having this habit, as well as using a notebook, cell phone or tablet for more than 6 hours a day.

Pregnant women with diabetes who already practiced exercises regularly did so for at least 1 hour. These pregnant women reported spending more than 3 hours watching television and more than 6 hours a day using notebooks, cell phones and tablets.

Table 4 presents the adjusted binomial logistic regression model indicating the variables associated with excess weight, hypertension, and diabetes in the studied population.

Table 3 – Characterization of the lifestyle of pregnant women among the investigated outcomes. Northern Region of Brazil. Manaus, Amazonas, Brazil, 2021

Variables	Excess weight (n=9,195)			Hypertension (n=575)		Diabetes (n=1,949)	
	Overweight n=5,316 (%)	Obesity n=3,879 (%)	p-value	n= 575 (%)	p-value	n= 1,949 (%)	p-value
Physical activity in the last 3 months		<0.001*		<0.001*		<0.001*	
No	3,515 (66.1)	3,459 (89.2)		229 (39.8)		1603 (82.2)	
Yes	1,801 (33.9)	420 (10.8)		346 (60.2)		346 (17.8)	
Weekly exercise practice		<0.001*		<0.001*		<0.001*	
1 to 2 days	898 (49.9)	0 (0)		0 (0)		0 (0)	
3 to 4 days	259 (14.4)	420 (100)		0 (0)		0 (0)	
5 to 6 days	644 (35.8)	0 (0)		346 (100)		346 (100)	
Exercise Duration		<0.001*		<0.001*		<0.001*	
30 to 39 minutes	763 (42.4)	0 (0%)		0 (0)		0 (0)	
40 to 49 minutes	0 (0)	420 (100)		0 (0)		0 (0)	
60 minutes or more	1038 (57.6)	0 (0)		346 (100)		346 (100)	
Housecleaning		<0.001*		<0.001*		<0.001*	
Other person	999 (18.8)	339 (8.7)		575 (100)		346 (17.8)	
Yes	4,317 (81.2)	3,540 (91.3)		0 (0)		1,603 (82.2)	
Cleaning Hours Median (IQR)	8 (2)	1 (4)	<0.001†	0	-	8 (5)	<0.001†
Time usually spent watching television		<0.001*		<0.001*		<0.001*	
1 to 3 hours	2,606 (49.0)	1,298 (33.5)		229 (39.8)		539 (27.7)	
More than 3 hours	2,710 (51.0)	2,581 (66.5)		346 (60.2)		1,410 (72.3)	
Does not watch television	0 (0)	0 (0)		0 (0)		0 (0)	

Table 3 – Cont.

Variables	Excess weight (n=9,195)			Hypertension (n=575)		Diabetes (n=1,949)	
	Overweight n=5,316 (%)	Obesity n=3,879 (%)	p-value	n= 575 (%)	p-value	n= 1,949 (%)	p-value
Use of computer, tablet or cell phone to social media such as Facebook, to watch movies or to play games		<0.001*		<0.001*		<0.001*	
No	220 (4.1)	768 (19.8)		229 (39.8)		539 (27.7)	
Yes	5,096 (95.9)	3,111 (80.2)		346 (60.2)		1,410 (72.3)	
Time spent using a computer, tablet or cell phone to participate in social media such as Facebook, to watch movies or to distract with games		<0.001*		<0.001*		<0.001*	
1 to 3 hours	2,538 (47.7)	1,959 (50.5)		0 (0)		555 (28.5)	
More than 6 hours	2,558 (48.1)	1,152 (29.7)		346 (60.2)		855 (43.9)	
Does not use	220 (4.1)	768 (19.8)		229 (39.8)		539 (27.7)	

Source: Vigitel, 2021.

*Chi-Square Test/TKruskal-Wallis

When analyzing the results, it is indicated that for excess weight, the associated variables that decrease the exposure to this outcome were: age (OR 0.63; 95% CI = 0.61-0.64) and the use of computers, tablets and cell phones for more than 6 hours a day (OR 0.02; 95% CI = 0.01 – 0.03). However, the variables watching television for more than 3 hours a day increase the exposure to excess weight by 2 times (OR 2.24; 95% CI = 1.01 – 3.81) and the use of computers, tablets and cell phones for 1-3 hours a day increases the risk of weight gain by 4 times (OR 4.22; 95% CI = 3.48 – 5.14).

Regarding hypertension, the variable that reduces exposure to the outcome is years of study (OR 0.92; 95% CI=0.91 – 0.94), while the variable watching television increases exposure to hypertension by 7 times when this time is up to 3 hours per day (OR 7.54; 95% CI=2.39 – 9.58) and by 1 time if the time increases to more than 3 hours (OR 1.29; 95%

CI=1.21 – 4.26), as well as the use of computers, tablets and cell phones for more than 6 hours per day increases the risk of having hypertension by 1 time (OR 1.42; 95% CI=1.24 – 1.63).

Regarding diabetes, among the variables studied, none was shown to be a factor that reduced exposure to this outcome. However, the variables that increased exposure by one time more were: age (OR 1.49; 95% CI = 1.44 – 1.54) and years of study (OR 1.37; 95% CI = 1.30 – 1.45), while the variable consumption of more than 4 glasses/cans of soda per day increased the risk of having diabetes by 2 times (OR 2.36; 95% CI = 1.92 – 2.89).

DISCUSSION

This study aimed to estimate the prevalence and factors associated with excess weight, hypertension and diabetes

Table 4 – Logistic Regression Model for Self-reported Excess weight, Hypertension and Diabetes according to sociodemographic characteristics, dietary habits and lifestyle of pregnant women. Northern Region of Brazil. Manaus, Amazonas, Brazil, 2021.

Variables	Excess weight		Hypertension		Diabetes	
	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
Age (years)	0.63 (0.61 – 0.64)	<0.001	–	–	1.49 (1.44 – 1.54)	<0.001
Education	–	–	0.92 (0.91 – 0.94)	<0.001	1.37 (1.30 – 1.45)	<0.001
Drinks more than 4 glasses/ cans of soda per day	–	–	–	–	2.36 (1.92 – 2.89)	<0.001
Time spent watching television between 1 and 3 hours	1.76 (0.39 – 3.06)	>0.05	7.54 (2.39 – 9.58)	>0.05	–	–
Time spent watching television more than 3 hours	2.24 (1.01 – 3.81)	>0.05	1.29 (1.21 – 4.26)	>0.05	–	–
Use of computer, tablet or cell phone to participate in social media such as Facebook, to watch movies or to distract with games between 1 and 3 hours	4.22 (3.48 – 5.14)	<0.001	–	–	–	–
Use of computer, tablet or cell phone to participate in social media such as Facebook, to watch movies or to distract with games more than 6 hours	0.02 (0.01 – 0.03)	<0.001	1.42 (1.24 – 1.63)	<0.001	–	–

in pregnant women in the northern region of Brazil. The prevalence rates found corroborate the scientific literature, which describes prevalence rates of excessive weight gain during pregnancy ranging from 21-65%, 0.9-1.5% of hypertension during pregnancy and 3-25% of hyperglycemia during pregnancy^(2,7).

When observing the sociodemographic characteristics, we can see pregnant women in an age group closer to the advanced maternal age (over 35 years) and with more years of education, which would lead us to think about women who work, have a better income and who have already had other pregnancies. However, the Vigitel survey does not

include these questions in the interview. These findings are in line with other realities, which show a higher frequency of hypertension and excess weight in more mature pregnant women and with education up to high school. For diabetic pregnant women, in addition to older age group, they also have education up to the university level⁽⁸⁻¹⁷⁾.

Studies suggest that advanced maternal age and low education (0-8 years of study) are gestational risks due to the increased frequency of chronic pre-gestational diseases in this age group and greater stress, poor nutrition, less access to information and limited understanding of the importance of prenatal care^(10,14).

In this sense, better results were expected regarding the dietary habits of pregnant women, as it is assumed that older pregnant women with higher education have a greater understanding of the risks of unhealthy eating. However, the majority do not regularly consume beans, vegetables, and fruits, but have a high consumption of ultra-processed foods, such as soft drinks. The findings of this study are worrying, this aspect may be related to greater access to ultra-processed foods and work/study routines that predispose neglect in nutrition.

Overall, there is evidence showing a tendency for a less healthy diet among pregnant women with high consumption of ultra-processed foods, carbohydrates and sodium and diet quality that needs improvement^(13,18,19).

Even in research indicating that pregnant women consume less soft drinks and more fruits, natural juices and vegetables when compared to Brazilian women, in general, both pregnant and non-pregnant women have a high consumption of ultra-processed foods and do not reach the percentages recommended by the World Health Organization and the Ministry of Health^(20,21).

A 2021 study with high-risk pregnant women showed that women who did not have hypertensive syndromes during pregnancy had healthier eating habits than those who did have the disease⁽²²⁾.

The maternal nutritional status before and during pregnancy influences the prognosis of pregnancy. Inadequate maternal nutritional status has a great impact on the growth and development of the newborn. Nutritional guidance is important to motivate women toward healthy eating habits during pregnancy⁽²³⁾.

When assessing lifestyle, it was observed that women have little habit of practicing physical activity and spend much of their free time watching television and using screens, which characterizes long periods of inactivity. Becoming more "sedentary" during pregnancy seems to be a culture of thinking that pregnancy is synonymous with rest, compounded by the fact that physical exercise is not a habit widely practiced by the population.

A Spanish study that applied the International Physical Activity Questionnaire to pregnant women found that the frequency and intensity of physical exercise decreased as pregnancy progressed, except for recreational activities, in addition to the home sphere having a greater contribution to total metabolic expenditure. Furthermore, a significant association was observed between low physical exercise and greater weight gain in the third trimester of pregnancy⁽²⁴⁾.

There is evidence that pregnant women enrolled in a nutritional care and physical activity program have significantly lower gestational weight gain⁽²⁵⁾. A study published

in 2022 with pregnant women, which evaluated data from the Vigitel survey, showed that there was a reduction in domestic physical activity, an increase in leisure-time physical activities, and a stable tendency to perform occupational exercises (work)⁽²⁶⁾.

High-risk pregnant women show a preference for a sedentary lifestyle and a very low prevalence of physical exercise during pregnancy, with greater energy expenditure in domestic activities, such as housecleaning⁽²⁷⁾, as did pregnant women who self-reported being overweight and having diabetes in this study.

There is a high influence of long periods of inactivity in front of screens, age, years of education, and consumption of sugary beverages on the chances of a pregnant woman in the North of Brazil developing NCD. It is important to reflect on the fact that the physiological changes that occur in the maternal organism already predispose the woman to develop these conditions.

The variables associated with the outcomes studied were: for excess weight, watching television and using a computer/tablet/cell phone for up to 3 hours a day; for hypertension, watching television for 3 hours a day or more and using a computer/tablet/cell phone for more than 6 hours a day; for diabetes, they were age 29 years, 13 years of education and consumption of more than 4 glasses/cans of soda daily.

As for excess weight, these findings are not align with the literature regarding maternal age, since in this study the median age of 28 years was observed as a factor that reduces exposure, while in a previous study maternal age of 20 to 35 years or more was observed as a risk factor for excessive gestational weight gain⁽²⁸⁾.

In this study, no association was found between education level and excessive weight gain during pregnancy, however another study points to this phenomenon in which women with 0 to 8 years of education were 1 times more likely to be overweight or obese during pregnancy⁽⁸⁾.

Years of education as a factor associated with unfavorable outcomes during pregnancy corroborates the findings of other cross-sectional and correlational studies, since the higher the education level, the better the self-care, understanding of the importance of prenatal care and health care, nutrition and physical exercise. In addition, it may reflect a better socioeconomic status with access to health services and adequate nutrition^(10,12). There are few studies addressing the habits related to screen time among pregnant women; however, the findings of this research may reflect the level of sedentariness among the participants due to physical inactivity.

The results regarding factors associated with diabetes in the study population align with the scientific literature, since

age over 25 years is considered by the Ministry of Health as a risk factor for Gestational Diabetes⁽³⁾, while education level as an exposure factor shows that women with more years of schooling become pregnant at a later age, and increasing age is related to increased glycemic changes during pregnancy⁽¹⁴⁾.

As a limitation of the study, it cannot be definitively stated whether the studied outcomes were associated with gestational condition (excessive gestational weight gain, gestational diabetes mellitus and gestational hypertension), since the Vigitel survey does not have an obstetric focus, and it is not possible to access other prenatal data to assess the diagnostic criteria. The Vigitel database provided by the Health Surveillance Secretariat and the Ministry of Health had some missing data (blank spreadsheet cells) which may interfere with the frequencies obtained. Additionally, it is possible that some pregnant women with any of the diseases studied did not participate, since currently younger women simply do not answer the phone, preferring contact via messages or do not answer calls from unknown numbers, so as they were left out, the data related to them were no longer considered in the research.

■ CONCLUSION

The prevalence rates found by the study were: 42.4% of excess weight, 2.65% of hypertension and 9% of diabetes. Regarding the risk factors found, we have: for excess weight, watching television and using a computer/tablet/cell phone for up to 3 hours a day; for hypertension, watching television for 3 hours a day or more and using a computer/tablet/cell phone for more than 6 hours a day; for diabetes, they were age 29 years, 13 years of education and consumption of more than 4 glasses/cans of soda daily.

Therefore, this study can contribute to the adoption of strategic actions with the planning of public policies and the implementation of interventions in the Unified Health System with a focus on the population and territorial peculiarities of northern women.

Additionally, it highlighted the importance of multidisciplinary care during pregnancy to assess biological aspects, social vulnerabilities, and providing nutritional and physical activity guidance to implement interventions, especially in modifiable gestational risk factors.

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