Assessment of prenatal care performed in primary care: a cross-sectional study linked to a pregnancy cohort

Avaliação da assistência pré-natal realizada na atenção primária: estudo transversal aninhado a uma coorte gestativas

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ABSTRACT

Objectives: assess the adequacy of prenatal care in primary care, classify prenatal care with the parameters of adequacy, and determine the factors associated with prenatal care in the studied pregnant women. **Methodology:** cross-sectional analytical study conducted with 205 pregnant women in 10 Primary Health Units, divided into different health districts in São Luís, MA, from January 2020 to May 2021. For data collection, a semi-structured questionnaire and the pregnant woman's health booklet were used. Descriptive statistics included the calculation of absolute and relative frequencies (percentages), and qualitative variables were presented by means of absolute and percentage frequencies. **Results:** in the variable age, there was a predominance of the age group between 21 and 30 years (49.44%), (p=0.16), with a lower prevalence for six consultations performed. As for the variable race/color, the highest prevalence was for pregnant women who declared themselves as brown/others, 99 (55.62%) (p=0.05), with a lower prevalence for six consultations performed. In the variable government benefits, the highest prevalence, 110 (61.80%), was for pregnant women who received them, with (p = 0.21). Regarding marital status, (76.97%) were pregnant women who had a partner, with a lower prevalence for six consultations performed, 137 (76.97%), (p ≤ 0.01). As for schooling, there was a predominance of pregnant women with high school education (68.18%), with a lower prevalence for six consultations. Regarding the start of prenatal care, 66.85% started prenatal care in a timely manner, with a lower prevalence for six consultations performed, 119 (66.85%), (p=0.25). Regarding the prescription of iron after the start of prenatal care, there was a higher prevalence in pregnant women who used it, 124 (69.66%), (p ≤ 0.01). Higher prevalence was also presented for pregnant women who had the following tests: cervical cancer screening test, 147 (82.58%), (p=0.05), ABO-Rh system, 129 (72.47%), (p=0.16), complete blood count, 121 (68.75%), (p=0.05), and fasting blood glucose in the first trimester, 107 (60.11%), (p=051). As for the anti-HIV test, the highest prevalence was for pregnant women who did not undergo the test, 103 (57.87%), (p=0.10). Concerning the venereal disease research laboratory test, the highest prevalence was for the pregnant women who did it, 120 (67.42%), (p=0.93). Regarding the test for abnormal sediment elements, a higher prevalence was observed in pregnant women who performed it, 122 (68.54%), (p=0.05). As for Influenza vaccination in pregnant women, the higher prevalence was for those who were not vaccinated, 104 (58.43%), (p=0.05). For previous Tetanus vaccination, the highest prevalence was for pregnant women who did not receive the immunization, 108 (60.67%), (p ≤ 0.01). Hepatitis B vaccine presented a higher prevalence for pregnant women who received the immunization, 95 (53.37%), (p=0.35). It was more prevalent for pregnant women who did not present symptoms, with diagnosis and without a negative diagnosis for COVID-19, 117 (65.73%), (p=0.03). **Conclusion:** the study allowed analyzing that the quality of prenatal care in the health units where the study was held was unsatisfactory for some indicators since the prevalence was lower than six consultations performed and did not meet the other criteria recommended by the Brazilian Ministry of Health (MS), such as immunization, compulsory tests, and early start of prenatal care, thus making the indicators unsatisfactory.

Keywords: Pregnant women, Prenatal care, Primary health care.

RESUMO

Objetivos: avaliar a adequação da assistência pré-natal na atenção primária, classificar o pré-natal com os parâmetros de adequabilidade e determinar os fatores associados à assistência pré-natal das gestantes estudadas. **Método:** estudo analítico transversal realizado com 205 gestantes em dez unidades básicas de saúde, divididas entre diferentes distritos sanitários de São Luís- MA, no período de janeiro 2020 a maio de 2021. Para coleta de dados foi utilizado questionário semiestruturado e a caderneta da gestante. A estatística descritiva incluiu cálculo de frequências absolutas e relativas (percentuais), as variáveis qualitativas foram apresentadas por meio de frequências absolutas e percentuais. **Resultados:** Na variável idade, houve predomínio da faixa etária entre 21-30 anos (49,44%), (p=0,16), com prevalência menor para seis consultas realizadas. Na variável raça/cor, a maior prevalência foi para as gestantes que se autodeclararam pardas/outros 99 (55,62%) (p=0,05), com prevalência menor para seis consultas realizadas. Na variável benefícios pagos pelo governo, a maior prevalência, 110 (61,80%) deu-se para gestantes que os recebiam, com (p=0,21). Em relação ao estado civil, (76,97%) eram gestantes que possuíam companheiro, com prevalência menor para seis consultas realizadas, 137 (76,97%) (p ≤ 0,01). Quanto à escolaridade, houve predomínio de gestantes com ensino médio (68,18%) com prevalência menor para seis consultas. Em relação ao início do pré-natal, (66,85%) iniciaram o pré-natal em tempo oportuno, com prevalência menor para seis consultas realizadas, 119 (66,85%) (p=0,25). A prescrição do ferro após início do pré-natal houve maior prevalência em gestantes que faziam uso 124 (69,66%) (p ≤ 0,01). Maior prevalência também se apresentou para as gestantes que realizaram os seguintes exames: exame preventivo do câncer de colo uterino, 147 (82,58%) (p=0.05), sistema ABO-RH 129 (72,47%) (p=0,16), hemograma completo 121 (68,75%) (p=0,05), e glicemia em jejum no primeiro trimestre, 107 (60,11%) (p=051). Quanto ao exame anti-HIV, a maior prevalência foi para as gestantes que não realizaram o exame 103 (57,87%) (p=0,10). Ao exame *veneral disease research laboratory*, a maior prevalência foi para as gestantes que o realizaram 120 (67,42%) (p=0.93). Ao exame dos elementos anormais de sedimento, maior prevalência foi observada em gestantes que o realizaram 122 (68,54%) (p=0.05). Quanto à vacinação de influenza nas gestantes, maior prevalência foi para as que não foram vacinadas 104 (58,43%) (p=0.05). Para a vacina antitetânica prévia, a maior prevalência foi para as gestantes que não receberam o imunizante 108 (60.67%) (p ≤ 0.01). Vacina contra hepatite B, apresentou maior prevalência para as gestantes que receberam o imunizante 95 (53,37%) (p=0,35). Foi mais prevalente as gestantes que não apresentaram sintomas, com diagnóstico e sem diagnóstico negativo para Covid-19, 117 (65,73%) (p=0.03). **Conclusão:** O estudo permitiu analisar que a qualidade da assistência pré-natal nas unidades de saúde onde foram realizadas o estudo foi insatisfatória para alguns indicadores, visto que a prevalência foi menor que seis consultas realizadas e não atendeu aos outros critérios preconizados pelo MS, como a imunização, exames obrigatórios e início precoce do pré-natal, tornando, assim, indicadores insatisfatórios.

Palavras-chave: Gestantes, Cuidado pré-natal, Atenção primária à saúde.

INTRODUCTION

Pregnancy is a delicate time of many changes in a woman's life. In addition to family support, she needs professional follow-up that is welcoming and conveys confidence because feelings of anxiety, joy, and fear arise at the same time during this period. Prenatal care is the health service capable of meeting the needs of this phase and bringing security to the pregnant woman when performed with quality[1].

Prenatal care can be defined as specialized care by health professionals for pregnant women and adolescents, with a view to ensuring better health conditions for the mother/child binomial and favoring the reduction of morbidity and mortality for both. The components of this care must include risk identification, management of related diseases, as well as health education and health promotion.

This follow-up is essential for a healthy pregnancy and corresponds to the period when women are welcomed, from the start of their pregnancy until the postpartum time. It constitutes a set of clinical and educational procedures with the objective of monitoring the evolution of the pregnancy and promoting the health of the pregnant woman and the child.

In this path, the availability of routine protocols regarding prenatal care are developed in adequate time, so that pregnant women can be followed up in the units, but there is a need for improvement in terms of the quality and effectiveness of the actions developed by the multidisciplinary teams[2-4].

Therefore, the importance of these teams to provide health promotion and prevention care to

women during the pregnancy cycle should be highlighted, so that they can have a healthy pregnancy and, if necessary, it is possible to diagnose, in an agile and treatable way, the causes of complications during the pregnancy-puerperal cycle, avoiding maternal and infant morbidity and mortality[5].

Observational studies suggest that adequate prenatal care is associated with lower rates of prematurity, low birth weight, and maternal death. In this sense, it becomes necessary to assess the assistance to collaborate toward the improvement of practices[2-4].

In Brazil, quality care for the mother-child group is still a challenge, and, consequently, health education actions must be considered a priority in primary care.

Tomasi et al.[7] emphasize the importance of the quality of maternal health care and point out the need to think about work processes and the organization of networks, as well as reflect on what care is being discussed.

METHODOLOGY

The study "*Avaliação da Assistência Pré--Natal, segundo os critérios de adequabilidade na atenção primária, no município de São Luís*" has a cross-sectional analytical design, which is part of a cohort project developed by the CEUMA University, in partnership with the Health Secretariat of the State of Maranhão (SES, as per its Portuguese acronym), with the approval of the National Council for Scientific and Technological Development (CNPQ, as per its Portuguese acronym), entitled "*COORTE GESTATIVAS*", which has the authorized and consubstantiated opinion nº 3.258.471.

The city of São Luís has a population of 1,091,868, with an area of 831.7 Km². Of the total area of the State of Maranhão, 157,656 km² are in the urban perimeter. The Human Development Index of the city is 0.778, which in comparison with the Human Development Index (HDI) of Maranhão, is considered high[8].

This study used a non-probability sample (convenience) of pregnant women between 14 and 41 years old who live and are assisted through the municipal public system in the Primary Health Units (PHU) listed in the Primary Care Program and divided by health districts. The collection was carried out in 10 Primary Health Units, corresponding to the following health districts in São Luís (MA): Cohab District (PHU Turu and PHU Cohab); Central District (PHU São Francisco and PHU Liberdade); Bequimão District (PHU Amar); Tirirical District (PHU São Bernardo, PHU Fabiciana de Moraes and PHU Jardim São Cristovão) and Vila Esperança District (PHU Pedrinhas and PHU Coquilho).

STATA 15.0 software (Stata Corp College Station, Texas, USA) was used to calculate the sample size. First, the sample size calculation determined that 384 pregnant women were necessary, an adequate number of pregnant women in each of the categories of the study variables to achieve statistical significance. Due to the COVID-19 pandemic, 205 (n = 205) pregnant women were assessed, a value lower than the original sample size calculation for each of the categories of the study variables. The care provided in PHU during the COVID-19 pandemic to pregnant and puerperal women was defined in guidelines advocated by the Brazilian Ministry of Health with recommendations for the management of COVID-19 to avoid maternal morbidity and mortality since they were considered a risk group, especially vulnerable to infections[9]. Pregnant women between 14 and 41 years old participated in the study. Pregnant women who declared themselves unable to respond to the questionnaire questions were excluded from the study.

For the final calculation, a population sample was used considering the significance level (α) of 5%, test power of 80%, and tolerable error of 4%, with an additional 10% of possible losses.

The greater demographic and socioeconomic homogeneity of the population being assessed represents an advantage for the study by decreasing the likelihood of confounding variables.

The collected variables were distributed in data with identification, age group, race, education, marital status, benefit, physical activity, pap smear, iron use, number of consultations during prenatal care, the start of prenatal care, VDRL, EAS, fasting glucose, ABO-Rh, blood count (CBC), anti-HIV, Influenza, Hepatitis b vaccine, Tetanus and COVID-19 vaccine.

Statistical analysis was performed using the STATA 15.0 software (Stata Corp., College Station,

Medicina (Ribeirão) 2023;56(4):e-211324

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Texas, USA). Qualitative variables were presented by means of absolute and relative frequencies. Descriptive statistics included absolute and relative frequency calculations (percentages). In order to assess the association between the explanatory variable (Prenatal Care of Pregnant Women assisted in Primary Care) and the response variable (Adequacy of Prenatal Care), the Chi-square Test for independent samples was used.

Inferential analytical statistics were first performed by Poisson logistic regression to assess the Prevalence Ratio (PR) with robust variance adjustment, for the events that presented $p < 0.20$ in the univariate analysis; and, for the events that presented $p < 0.10$, they were included in the final multivariate model with the respective Prevalence Ratios (PR), Confidence Intervals of 95% (95% CI), and statistical significance with $p < 0.05$.

RESULTS

Table 1 displays the results obtained in a convenience sample that consisted of 205 pregnant women.

In the results, the variable **age group (21 to 30 years)** presented the highest prevalence, 88 (49.44%); however, without statistical significance, presenting $p=0.16$.

The variable **race/color** presented a higher prevalence in pregnant women who declared themselves as brown/others, 99 (55.62%), presenting statistical significance, with $p=0.05$. The

Table 1

Distribution of socioeconomic, demographic, and clinical variables related to the assessment of prenatal care in primary care in the city of São Luís, MA, 2021.

Variables	N (205) %	Adequacy Of Prenatal Care		p-value
		Adequate	Inadequate	
Age group				0.16
14-20	39(19.02)	37(20.79)	2(7.41)	
21-30	106(51.71)	88(49.44)	18(66.67)	
31-41	60(29.27)	53(29.78)	7(25.93)	
Race/color				0.05
White	41(20.00)	38(21.35)	3(11.11)	
Black	44(21.46)	41(23.03)	3(11.11)	
Brown/others	120(58.54)	99(55.62)	21(77.78)	
Marital status				≤ 0.01
With partner	152(74.15)	137(76.97)	15(55.56)	
Without partner	53(25.85)	41(23.03)	12(44.44)	
Education				0.70
Elementary School	25(12.20)	22(12.36)	3 (11.11)	
High School	159(77.56)	139(78.09)	20(74.07)	
Higher Education	21(10.24)	17(9.55)	3 (14.81)	
Government benefits				0.21
Yes	130(63.41)	110(61.80)	20(74.07)	
No	75(36.59)	68(38.20)	7(25.93)	
Iron after prenatal start				≤ 0.01
Yes	150(73.17)	124(69.66)	26(96.30)	
No	55(26.83)	54(30.34)	1(3.70)	
COVID-19				0.03
With symptoms and with diagnosis/with symptoms and without diagnosis	76(37.07)	61(34.27)	15(55.56)	
Without symptoms and with diagnosis/without symptoms and with a negative diagnosis	129(62.93)	117(65.73)	12(44.44)	

(Continuação)

Table 1
Continuation.

Variables	N (205) %	Adequacy Of Prenatal Care		p-value
		Adequate	Inadequate	
Pap smear				0.05
Performed	165(80.49)	147(82.58)	18(66.67)	
Not Performed	40(19.51)	31(17.42)	9(33.33)	
Prenatal start in the 1st trimester				0.25
Performed	65(31.71)	59(33.15)	6(22.22)	
Not Performed	140(68.29)	119(66.85)	21(77.78)	
ABO-Rh test in the 1st trimester				0.16
Performed	152(74.15)	129(72.47)	23(85.19)	
Not Performed	53(25,85)	49(72,53)	4(14,81)	
blood count in the 1st trimester				0.05
Performed	144(70.94)	121(68.75)	23(85.19)	
Not Performed	59(29.06)	55(31.25)	4(14.81)	
Blood glucose test in the 1st trimester				0.51
Performed	125(60.90)	107(60.11)	18(66.67)	
Not Performed	80(39.02)	71(39.89)	9(33.33)	
Anti-HIV test in the 1st trimester				0.10
Performed	82(40.00)	75(42.13)	7(25.93)	
Not Performed	123(60.00)	103(57.87)	20(74.07)	
VDRL test in the 1st trimester				0.93
Performed	138(67.32)	120(60.42)	18(66.67)	
Not Performed	67(32.68)	58(32.58)	9(33.33)	
Influenza vaccination				0.05
Performed	90(43.90)	74(41.57)	16(59.26)	
Not Performed	115(56.10)	104(58.43)	11(40.74)	
EAS test in the 1st trimester				0.33
Performed	143(69.76)	122(68.54)	21(77.78)	
Not Performed	62(30.24)	56(31.46)	6(22.22)	
Previous Tetanus vaccination				≤ 0.01
Performed	88(42.93)	70(39.33)	18(66.67)	
Not Performed	117(57.07)	108(60.67)	9(33.33)	
Previous Hepatitis vaccination				0.35
Performed	112(54.63)	95(53.37)	17(62.96)	
Not Performed	93(45.37)	83(46.63)	10(37.04)	

ABO-Rh = Blood group; EAS = Urine test.

variable **marital status** presented a higher prevalence of pregnant women with partners, 137 (76.97%), showing statistical significance, with **p≤ 0.01**. As for pregnant women receiving **government benefits** (state and federal), the frequency was higher in pregnant women receiving government benefits, 110 (61.80%), without statistical significance, with p=0.21. As for the **start of prenatal care in the 1st trimester**, the highest prevalence was in pregnant women who did not start prenatal care in the first three months of pregnancy, 119 (66.85%), without statistical significance, with **p=0.25.** Regarding prenatal care, the use of **iron** after the start of follow-up, the highest prevalence was observed for those who used it, 124 (69.66%), presenting statistical significance, with **p≤ 0.01**.

Regarding the **Pap smear**, the highest prevalence was for those who performed the test, 147 (82.58%), presenting statistical significance, with **p=0.05**. As for the **ABO- Rh** test performed in the 1st trimester, the highest prevalence was

129 (72.47%), but without statistical significance, p=0.16. Concerning the **Blood count**, performed in the 1st trimester, the highest prevalence was for those who underwent the test, 121 (68.75%), presenting statistical significance, with **p=0.05**. In the **fasting blood glucose** test, performed in the 1st trimester, the highest prevalence was 107 (60.11%) for the pregnant women who underwent the test, without statistical significance, **p=0.51**. Regarding the accomplishment of the **anti-HIV** test in the 1st trimester, the highest prevalence was for pregnant women who did not undergo the test, 103 (57.87%), without statistical significance, with p=0.10. The **VDRL** test performed in the 1st trimester indicated a higher prevalence for pregnant women who underwent the test, 120 (67.42%), without statistical significance, **p=0.93**. In the **EAS** test, the highest prevalence was for pregnant women who underwent the test 122 (68.54%); however, it did not present statistical significance, with **p=0.33**.

As for immunization during prenatal care, previous **Influenza** immunization presented a higher prevalence in pregnant women who did not receive the immunization, 104 (58.43%), presenting statistical significance, with **p=0.05**. With respect to previous **Tetanus** immunization, the highest prevalence was observed in pregnant women who did not receive the immunization, 108 (60.67%), presenting statistical significance, with **p≤ 0.01**. As for previously performed **Hepatitis B** vaccination, the highest prevalence was in pregnant women who received the immunization, 95 (53.37%), without statistical significance, with **p=0.35**.

In the present study, the variable **COVID-19** was included considering the global epidemiological scenario. The frequency was higher for pregnant women without symptoms, with diagnosis/without symptoms, and with negative diagnosis, 117 (65.73%), presenting statistical significance, with **p=0.03**.

This paper used modeling techniques in the epidemiological analysis through the prevalence ratio. The non-adjusted Prevalence Ratio (PR) analysis of the associated factors, referring to the variables that were included in the final model and that presented (p≤0.20), are displayed in Table 2.

The **age group** did not show statistical significance (p=0.20), being that, for the **age between 21 and 30 years**, it presented statistical significance, with (PR=3.31; CI=0.80-13.66; **p=0.05**); in the **age between 31 and 41 years**, it did not present statistical significance (PR=2.27; CI=0.49-10.42; **p=0.29**); **race/color** presented statistical significance (**p=0.05**); and, for the pregnant women who declared themselves **black**, it presented statistical significance, with (PR=1.72 CI=0.93-3.16; **p=0.05**). As for pregnant women who declared themselves as **others** (indigenous and yellow), there was also statistical significance (PR=1.72, CI=2.68-9.18; **p≤ 0.01**).

Regarding the marital status of pregnant women, there was statistical significance (**p≤ 0.01**), **with pregnant women with partners** (PR=2.29; CI=1.14- 4.58). Regarding pregnant women receiving government **benefits** (state and federal), it did not show statistical significance (PR= 0.60; CI= 0.26-1.36; **p=0.22**).

Concerning prenatal care, the use of **iron** after the start of follow-up showed statistical significance (PR=9.53; CI=1.31- 68.91; **p=0.02**).

The variable **performed Pap smear** showed statistical significance (PR=2.06; CI= 1.00-4.25; **p=0.04**), while the accomplishment of the ABO test in the 1st trimester did not present statistical significance (PR=0.49; CI=0.18-1.37; **p=0.18**). The **Blood count** test in the 1st trimester was statistically significant (PR=0.49; CI=0.15-1.17; **p=0.05**), while the no **anti-HIV** test in the 1st trimester was not statistically significant (PR=1.90; CI=0.84- 4.30; **p=0.12**).

As for immunization during prenatal follow-up, the lack of **Influenza** vaccination presented statistical significance (PR=0.53; CI=0.26-1.10; **p=0.05**) while the lack of **Tetanus** vaccination presented statistical significance (PR=0.37; CI=0.17-0.79; p**≤ 0.01**).

In the present study, the variable **COVID-19** was included, considering the overall epidemiological scenario, with the stratification of the variable into **without symptoms and with diagnosis/without symptoms and with a negative diagnosis for COVID-19,** where it showed statistical significance (PR=0.47; CI=0.23-0.95 **p=0.03**).

Table 2

Logistic regression with non-adjusted and adjusted analyses (PR) of socioeconomic, demographic, and clinical variables referring to the assessment of prenatal care, in primary care, in the city of São Luís, MA, 2021.

Variables	Non-adjusted analysis			Adjusted analysis p ≤ 0,01		
	PR	CI	P	PR	CI	P
Age group			0.20			
14-20	1	1	-	-	-	-
21-30	3.31	0.80-13.66	0.05	-	-	-
31-41	2.27	0.49-10.42	0.29	-	-	-
Race/color			0.10			
White	1	1	-	1	1	-
Black	0.93	0.19-4.37	0.92	0.94	0.18-4.73	0.94
Brown/others	2.39	0.75-7.62	7.14	1.78	0.54-5.81	0.33
Marital status			≤ 0.01			
With partner	1	1	-	1	1	-
Without partner	2.29	1.14-4.58	≤ 0.01	1.54	0.71-3.33	0.26
Benefits			0.22			
No	1	1	-	-	-	-
Yes	0.60	0.26-1.36	0.22	-	-	-
Iron after prenatal start			0.02			
Yes	1	1	-	1	1	-
No	9.53	1.31-68.91	0.02	6.92	0.91-52.64	0.05
COVID-19	1	1	0,03	1	1	-
With symptoms and with diagnosis/with symptoms and without diagnosis	1	1	-	1	1	-
Without symptoms and with diagnosis/ without symptoms and with a negative diagnosis	0.47	0.23-0.95	0.03	0.55	0.27-1.14	0.11
Pap smear			0.04			
Not Performed	1	1	-	1	1	-
Performed	2.06	1.00-4.25	0.05	1.69	0.85-3.35	1.13
ABO-Rh test in the 1st trimester			0.18			
Not Performed	1	1	0.18	-	-	-
Performed	0.49	0.18-1.37	-	-	-	-
Blood count in the 1st trimester			0.12			
Not Performed	1	1	-	-	-	-
Performed	0.42	0.15-1.17	-	1.00	0.32-3.17	0.99
Anti-HIV test in the 1st trimester			0.05			
Not Performed	1	1	-	-	-	-
Performed	1.90	0.84-4.30	0.12	-	-	-
Influenza vaccination			0.05			
Not Performed	1	1	-	1	1	-
Performed	0.53	0.26-1.10	0.05	1.17	0.53-2.29	0.68
Previous Tetanus vaccination			≤0.01			
Not Performed	1	1	-	1	1	-
Performed	0.37	0.17-0.79	≤0.01	0.47	0.2-1.09	0.05

PR = Prevalence Ratio; CI = Confidence Intervals; P = Statistical significance.

DISCUSSION

In the present study, alternative cross-sectional data analysis was used to produce point and interval estimates for prevalence ratios and robust confidence intervals by means of Poisson regression to estimate a relative probability of randomly selecting an individual and having the condition studied in the period.

This study analyzed the quality of prenatal care in a direct relationship with the reduction of infant and maternal mortality, requiring constant actions to achieve the goals and objectives proposed by the Pact for Health 2006 and the Millennium Goals of the United Nations (UN) 2030. According to Nunes et al.[10], adequate prenatal care is necessary to reduce congenital malformations, infections, premature births, and abortions.

The Primary Care Network of the public sector presents good coverage, where prenatal care, when the parameters and technical procedures recommended by the Brazilian Ministry of Health are adopted, tends to present positive outcomes in the health of the pregnant woman and the fetus, resulting in lower rates of maternal and fetal morbidity and mortality. Several validated indexes are used to assess the quality of prenatal care, the most used indicators being the start of prenatal care, number of consultations, and laboratory tests, which were applied in this study to describe the effectiveness of care. The early start of prenatal care can be considered a positive factor in this study, and, on the contrary, the low number of consultations offered to pregnant women constitutes a negative point[10].

In the variables studied in this research, it was observed that the data on age corroborates other studies conducted in Primary Health Units (PHU) registered in the National Registry of Health Establishments, located in urban and rural areas of the 5,565 cities in Brazil, which, like the present study, also showed a higher prevalence of the age group between 20 and 34 years[11].

The findings of this research showed that 74.15% have a partner. These results are similar to those found in another study by Vilela and Pereira[12] with 185 (85.64%) married and 13.89% single, results close to the national data from the Department of Informatics of the Unified Health System (DATASUS, as per its Portuguese acronym), where 70.9% of women have the same profile of marital status.

These results show that most women can count on the presence of their partners during the pregnancy cycle[12]. Different data related to marital status were found in the study conducted by Saavedra and Cesar[13] with 2,395 women in the city of Rio Grande, in the far south of Brazil, where only 27.5% said they did not have a stable marital situation[13].

Marital status is considered an indicator that is among the registered maternal deaths, with a higher percentage for single mothers, since open and/or formalized marital relationships aggravate the breakdown of bonds between the mother and the baby's father and/or inconvenient decision-making upon the discovery of pregnancy. Single or legally separated pregnant women tend to present greater vulnerability, revolving around the lack of affective, emotional, social, and financial support from the baby's father and family, as well as the stimulus for self-care of the future mother[14].

In cross-sectional studies with a quantitative approach, they point out the statistical relevance between the variable number of consultations and the variable race/color, which shows that black and brown women are about twice as likely to be submitted to six or fewer prenatal consultations as white women, with prejudice to prenatal care. This finding, which highlights the importance of prenatal care and the identification of gestational risks, shows that brown and black pregnant women, in addition to starting prenatal care late, may (by not adhering to prenatal coverage and/or resorting to the private system) develop clinical worsening and other complications. In the same survey, the study pointed out that pregnant women assisted by the Brazilian Unified Health System (SUS, as per its Portuguese acronym) had 63% protection compared to those who resorted to the private system[15].

Regarding the behaviors and good practices in the prenatal routine, there was a prevalence of pregnant women who used the prescribed iron after the start of prenatal care in this study, as recommended by the Brazilian Ministry of Health (MS, as per its Portuguese acronym), as one of the good practices during prenatal care.

Due to the high iron requirement, determined by the sudden synthesis of red blood cells and tissue expansion, pregnant women stand out as one of the most susceptible groups to develop anemia. The World Health Organization (WHO) estimates that more than half of all pregnant women are anemic in developing countries, while anemia would affect about a quarter of pregnant women in developed countries. Higher maternal and perinatal mortality rates, increased risk of prematurity and low birth weight, and lower hemoglobin (Hb) concentration in the newborn are deleterious consequences of anemia in pregnancy[16].

According to Souza et al.[17], the WHO and the Brazilian Ministry of Health recommend a daily iron supplementation of 60 mg to all pregnant women in the second half of pregnancy, regardless of the diagnosis of anemia. Nevertheless, despite this recommendation, there is a worldwide tendency to reduce the amount of prophylactic iron, either because of the frequent abandonment due to adverse effects or because of the reduced absorption of iron with daily high-dose regimens. In this sense, clinical trials have compared different dosage regimens for iron supplementation and their responses in the body[18].

In Brazil, the Ministry of Health indicates that there is a prevalence of 30% of pregnant women with anemia. Given this scenario, the reduction of anemia is included among the global nutrition goals for 2025, with the prospect of a 50% decline among women of reproductive age. The high prevalence of anemia during pregnancy is related to the physiological adaptations that include an approximately 50% increase in plasma levels to supply the vascular hypertrophy of the expanding uterus during pregnancy[19].

Despite the reduction in iron depletion due to gestational amenorrhea and concomitant increase in intestinal absorption of this mineral, there is still a great demand for iron in pregnancy, being from 0.8 to 7.5 mg/day between the start and the end of the third trimester. The consequences of anemia in pregnancy, as well as its multifactorial causality, are complex in view of possible deleterious effects on the health and quality of life of the mother-child binomial[1].

Concerning the screening test for cervical cancer, the pregnant women underwent the exam during prenatal care, following the recommendations of MS. Sexually Transmitted Infections (STI) increase by up to 18 times the possibility of being infected by the Human Immunodeficiency Virus (HIV), since the lesions caused in the genital organs promote, besides contact with secretions, contact with blood[20].

According to Batista[21], Sexually-Transmitted Infections originate from dozens of types of viruses and bacteria, being transmitted mainly through sexual contact with an infected person and without the use of condoms. He emphasizes that, during pregnancy, delivery, or breastfeeding, the mother can also transmit STI to the child.

As of 2017, the Brazilian Society of Infectology considers that Chlamydia, Gonorrhea, and Syphilis infections can cause death, fetal malformations, and abortion, thus directly interfering with reproductive and child health, entailing infertility, high-risk pregnancy, and premature birth, in addition to causing fetal death and health problems for the child[22].

The Pap smear test investigates the manifestations of diseases at the cellular level, seeking to identify pathologies in the cervix, such as Sexually-Transmitted Infections and cancerous lesions arising from the influence of precursor factors for oncological lesions. According to Morais et al.[23], a survey conducted in 2018 found that pregnant women under the age of 20 are more likely to acquire syphilis during pregnancy.

The fact is related to the vulnerability of the adolescent population, more exposed to sexually transmitted infections, which may be associated with the high number of congenital syphilis in Brazil. Considering that it is a phase of emotional and cognitive inexperience, in addition to a period of discovery and great influence of social groups[23].

Taking into consideration the current global epidemiological scenario of COVID-19, a scoping study using systematic review made it possible to present a mapping of the production of knowledge about the recommendations for assistance to pregnant women in terms of facing the new Coronavirus. In Brazil, MS classified pregnant women into a risk group, because they tend to have worse outcomes when contaminated, and made recommendations for this group[24].

According to Rasmussen et al.[25], in the diagnostic aspect, there is a concern with early

detection. For this purpose, it is recommended that pregnant women know how to recognize specific signs of COVID-19, with a view to reducing their exposure to health services. It is suggested an early assessment of the clinical status be performed electronically to assess the need or not for a face-to-face consultation.

The most recently published studies have also highlighted that the current scenario requires pregnant women to have more flexible work opportunities, with time off work, when the gestational age is over 28 weeks, or with underlying risk factors or comorbidities[26].

Such precautions should be taken because COVID-19 in pregnancy tends to entail negative outcomes, such as: spontaneous abortion; premature rupture of membranes; intrauterine growth restriction; fetal distress; and premature labor and delivery[27].

In the present study, there was statistical significance for pregnant women who were not vaccinated against Diphtheria, Tetanus, and Influenza. Studies reveal that the vaccination schedule for Brazilian pregnant women has been increasingly expanded and improved, and vaccines are considered minimally necessary for maternal and child health[2].

The Influenza vaccine is widely recommended for pregnant women and is aimed at their personal protection and, indirectly, the protection of newborns (NB), who cannot be immunized during the first six months of life[28].

Pregnant women are at increased risk of developing severe illness, with complications and hospitalizations associated with Influenza virus infection, especially in the third trimester[29].

Although until 2010, the Brazilian National Immunization Program (PNI, as per its Portuguese acronym) did not make the vaccine available for free, Influenza vaccination for pregnant women is strongly recommended by the Brazilian Society of Immunization, as well as being routinely used in other countries, such as the United States, Canada, and most European countries[30].

Currently, despite the principles of universal access to prenatal care, many social, economic, and obstetric inequalities persist in the scope of preventive health actions. In this scenario, the vaccination of pregnant women is also undermined. Vaccination coverage below expectations is evident in certain population subgroups, which is a result of the high social inequality persisting in the country and the sum of social and obstetric inequalities and lower economic and social development[31].

According to Machado Filho et al.[32], in Brazil, Tetanus has been a compulsorily notifiable disease since the 1980s, and its incidence decreased from 291 cases in 1990 to 3 in 2013: 1 in the southeast region and 2 in the north region, a serious failure considering that it is an immuno-preventable disease.

Even though it is a priority strategy for the elimination of neonatal tetanus, the vaccination of pregnant women is still a failure in Brazil. A national study indicated that in 31% of births in the country, the mother had not taken any dose of the vaccine. Like Tetanus, Hepatitis B is a serious disease in the neonatal period. The vertical transmission of Hepatitis B is responsible for 35% to 40% of new cases of the disease because it is through this that the virus is maintained in the population, a fact that justifies the importance of the vaccination of pregnant women[32].

The timely start of prenatal care, as well as the number of consultations, allows access to diagnostic and therapeutic methods for several pathologies with serious repercussions for the health of the woman and the baby.

The assessment of prenatal care, carried out in Primary Care Units in São Luís, using the Kessner and Kotelchuck indexes of the Prenatal and Birth Humanization Program (PHPN, as per its Portuguese acronym), proved to be inadequate, with a prevalence of 86.83%, and strong statistical significance, with p=0.00, representing a higher value when compared to another study carried out nationwide, involving 23,940 women, where 75.8% had started in the first trimester[33].

FINAL CONSIDERATIONS

Prenatal care in the health units where the study took place showed unsatisfactory results in relation to what is proposed by MS, taking into consideration the main criteria for adequacy of prenatal care; early start of follow-up, number of consultations, prenatal tests, and immunization. Results below those recommended by MS were

found, pointing to the need for intervention aimed at improving the assistance to be provided.

The low coverage of the Family Health Strategy in the city may be contributing to these negative indicators. In addition, deficiencies in the assistance were evidenced, such as poor conduction of prenatal care and in the recording of procedures, tests, and immunization, which undermined the quality of the offered prenatal care. Therefore, it is important to underline the importance and need to contemplate the basic standards recommended by PHPN and Stork Network for qualified and humanized care, in order to obtain positive perinatal outcomes.

The results of this assessment have great potential to help health managers by showing the deficient points of the offered perinatal care and can subsidize decision-making to formulate strategies to cope with the problems that affect the quality of care provided to women during this period. In view of the aspects observed, one can perceive that studies assessing the adequacy of prenatal care prove to be excellent tools for the analysis of conditions related to the quality of prenatal care. Accordingly, they contribute as if they were instruments for future studies related to the implementation of new actions, policies, and strategies that promote the improvement of support services for pregnant women.

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Authors' contribution

TTJP – Data collection, data organization, text composition. ASR, AF, FBAA and JMAB – Data collection, data organization, text composition. YAAMS e TLGS – Data collection, data interpretation, text composition. MKNM e WCAF – Study conception and design, text composition. FMMS – Guidance, study conception and design, data analysis and interpretation, text composition. All authors approve the final version to be published.

Funding Source

We declare that the study did not receive any funding.

Conflicting interests

We declare no conflicts of interest.

This article is an excerpt from the dissertation: "*Avaliação da assistência pré-natal realizada na atenção primária: estudo transversal aninhado a uma coorte gestativa*", presented in the Professional Master Course in Management of Health Programs and Services – 2021.

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Editor:
Prof. Dr. Felipe Villela Gomes