

Prenatal and perinatal care in Governador Valadares, Minas Gerais state, Brazil

Assistência pré-natal e perinatal em Governador Valadares, Minas Gerais, Brasil

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Abstract

Introduction: Prenatal care and the procedures adopted during childbirth are essential to ensure a healthy pregnancy and delivery and prevent complications, without affecting the health of the mother and newborn.

Objective: To analyze the prenatal and perinatal care provided in Governador Valadares, Minas Gerais state, Brazil, and to determine whether there is an association between adequate prenatal care and socioeconomic, demographic, behavioral and reproductive factors.

Methods: Cross-sectional study with a pre-existing database. The adequacy of prenatal care was analyzed based on three criteria: 1) onset up to the 16th week and a minimum number of checkups according to gestational age; 2) professional practices during prenatal checkups; 3) counseling given to the pregnant women by healthcare professionals. Multivariate logistic regression was used for data analysis. **Results:** Participants were 437 postpartum women. Prenatal care was considered adequate for 72.5, 93.1 and 50.1% of the participants based on criteria 1, 2 and 3, respectively. The pregnant women who were most likely to receive inadequate prenatal care in relation to criterion 1 were those with the lowest schooling level (OR = 1.68; p = 0.046), who were single (OR = 2.18; p = 0.002), did not work during their pregnancy (OR = 2.18; p = 0.003) and whose pregnancy was unplanned (OR = 1.76; p = 0.023). With respect to perinatal care, the presence of a birth companion and skin-to-skin contact were adequate, but breastfeeding in the first hour of life was not. **Conclusion:** There is a need to improve the counseling provided by healthcare professionals and include breastfeeding in the first hour of life. The results could contribute to optimizing maternal and child health services in Governador Valadares.

Keywords: Childbirth. Humanizing childbirth. Perinatal care. Pregnancy. Prenatal Care.

Resumo

Introdução: O acompanhamento pré-natal e as condutas adotadas durante o parto são essenciais para garantir o bom desenvolvimento da gestação, prevenir complicações e proporcionar um parto saudável, sem impacto na saúde da puérpera e do recém-nascido. **Objetivo:** Analisar a assistência pré-natal e perinatal oferecida em Governador Valadares, Minas Gerais, e verificar se há associação entre a adequação do pré-natal e os fatores socioeconômicos, demográficos, comportamentais e reprodutivos. **Métodos:** Estudo transversal com base de dados pré-existente. Para a análise da adequação do pré-natal foram utilizados três critérios: 1) início até 16ª semana e número mínimo de consultas de acordo com a idade gestacional; 2) práticas dos profissionais nas consultas de pré-natal; 3) orientações oferecidas às gestantes pelos profissionais. Para a análise dos dados foi utilizada regressão logística multivariada. **Resultados:** Participaram do estudo 437 puérperas. A assistência pré-natal foi considerada adequada para 72,5%, 93,1% e 50,1% das puérperas, considerando os critérios 1, 2 e 3, respectivamente. As gestantes que apresentaram maior chance de terem o pré-natal inadequado, com relação ao critério 1, foram as com menor escolaridade ($RC = 1,68$; $p = 0,046$), que não possuíam companheiro ($RC = 2,18$; $p = 0,002$), que não trabalharam durante a gestação ($RC = 2,18$; $p = 0,003$) e as que não planejaram a gravidez ($RC = 1,76$; $p = 0,023$). Com relação à assistência perinatal, a presença de acompanhante e contato pele a pele foram apropriados, mas a amamentação na primeira hora de vida foi inadequada. **Conclusão:** Observou-se a necessidade de aprimorar as orientações fornecidas pelos profissionais e incluir a amamentação na primeira hora de vida. Os resultados podem contribuir para otimizar os serviços de saúde materno-infantil em Governador Valadares.

Palavras-chave: Parto. Parto humanizado. Cuidado pré-natal. Gravidez. Assistência perinatal.

Introduction

Controlling maternal and perinatal mortality depends on monitoring by health services, especially in prenatal and postpartum care.¹ Prenatal care and procedures adopted during labor are essential in preventing perinatal complications.²

Prenatal care is defined as a set of preventive and health promotion services aimed at ensuring a healthy pregnancy for both the mother and baby.³ The Brazilian Ministry of Health (MS in Portuguese) recommends at least six prenatal checkups, one in the first trimester, two in the second and three in the third.⁴ The risk of mortality in newborns whose mothers had no prenatal care or only three checkups was four times greater than those whose mothers had six appointments. Additionally, when care is not provided at the appropriate times during pregnancy preterm birth may occur.^{5,6}

Adequate perinatal care requires that the mother be treated within the health system. In order to improve maternal and child health care, the MS created the so-called Stork Network (*Rede Cegonha* in Portuguese)⁷ to reduce mortality in this population, safeguard the health and quality of life of women during pregnancy, childbirth and postpartum, and to ensure better child development.^{7,8}

The MS advocates for the humanization of both prenatal care and childbirth based on the following strategies: using evidence-based practices; organizing the healthcare network; classifying the risk of pregnant women and newborns; creating a bond between expectant mothers and maternity services; early identification of possible gestational risks; developing educational initiatives to prevent unnecessary interventions; facilitating access to quality health services from basic outpatient care to specialist hospital treatment; and providing quality humanized perinatal care, including the right to have a birth companion present.^{2,4,8}

National research highlights shortfalls in prenatal care, including difficult access, late onset of care, insufficient prenatal checkups and noncompletion of recommended procedures, negatively affecting the quality and effectiveness of this care.^{2,9,10} In addition to quantitative analysis of the aspects included in prenatal care, it is important to identify the factors associated with poor quality care.² Pregnant women treated in public health services who had low schooling levels and household income, were single, smoked, consumed alcohol or used drugs during their pregnancy showed higher percentages of inadequate prenatal care.^{11,12}

In light of the above, and because this topic is little investigated in Governador Valadares, considered a healthcare hub in the Vale do Rio Doce microregion of Minas Gerais state, there is a need to assess the

prenatal and perinatal care provided in the city. This study aimed to analyze the prenatal and perinatal care of mothers who gave birth at the Governador Valadares Municipal Hospital and determine whether there is an association between adequate care and socioeconomic, demographic, behavioral and reproductive factors.

Methods

This is a cross-sectional study that used a pre-existing database from a doctoral thesis entitled *Fatores associados à prematuridade e ao baixo peso ao nascer em Governador Valadares, Minas Gerais: estudo caso-controle* (Factors associated with prematurity and low birth weight in Governador Valadares, Minas Gerais: a case-control study),¹³ approved by the Research Ethics Committee of Universidade Federal de Juiz de Fora in November 2016 (CAAE: 61055716.4.0000.5174).

The sample in the original study¹³ was consecutive and consisted of 771 infants born at the Governador Valadares Municipal Hospital between May 2017 and July 2018, whose mothers resided in Governador Valadares or neighboring municipalities. The hospital is considered a reference center for municipalities in the Vale do Rio Doce region because it treats patients under the National Health System (Sistema Único de Saúde in Portuguese) and is the only facility in the region with a Neonatal Intensive Care Unit. The present study included only postpartum women who participated in the aforementioned research¹³ and received prenatal care in Governador Valadares, and excluded those treated in other municipalities, resulting in a sample of 437 individuals.

In regard to data collection in the original study,¹³ an active daily search was conducted at the maternity wing of the Governador Valadares Municipal Hospital and data from the previous day's births were analyzed, consisting of information on the gestational age, birth weight, sex and date of birth of the newborns. The women were approached 24 to 48 hours after childbirth, while still hospitalized, and the procedures and objectives of the study explained. Those who agreed to participate provided written informed consent. Participants were subsequently submitted to a semi-structured interview and complementary information was obtained by analyzing the prenatal checkup records and medical charts of the women and newborns.

Three criteria were used to assess the adequacy of prenatal care. The first criterion covered the onset of prenatal care and number of checkups. Beginning prenatal care by the 16th week of gestation was considered adequate. The adequacy of the number of checkups was analyzed based on the calendar recommended by the MS,⁴ which stipulates a minimum of six prenatal checkups over a gestational period of 37 weeks or more. Since the gestational age at birth varied among participants, assessment was also based on the model developed by Domingues et al.,¹⁰ thereby mitigating the possibility of reverse causality between the variables "number of checkups" and "preterm birth". This adjustment was important because the prenatal care of mothers with a preterm birth could have been deemed inadequate because they were unable to achieve the recommended minimum number of checkups. As such, for the present study prenatal care was considered adequate when the mother had at least one prenatal checkup by the 16th week of pregnancy; two by 17 to 21 weeks; three by 22 to 27 weeks; four by 28 to 33 weeks; five by 34 to 37 weeks; and a total of six visits after 37 weeks.^{4,10}

The second criterion, based on a study by Coutinho et al.,⁹ evaluated the following professional practices during prenatal checkups: 1) taking the patient's blood pressure; 2) weighing the patient; 3) measuring the fundal height; and 4) assessing the fetal heart rate. This information was obtained from participants via direct questions. Care was deemed adequate when all four items had been checked during prenatal visits.

The third criterion covers counseling given to pregnant women by healthcare professionals during prenatal checkups, considering the following variables: signs of labor, breastfeeding and maternal vaccines.^{2,10} Information on the signs of labor and breastfeeding were collected directly from participants and vaccines were checked in their medical records and vaccination cards. If the healthcare professional advised the participants on these three variables at least once, prenatal care was considered adequate. Perinatal care was assessed based on type of delivery, presence of a birth companion during labor, skin-to-skin contact between mother and baby and breastfeeding in the first hour of life.

The data were input into the Statistical Package for the Social Sciences (SPSS) 14.0 for statistical analysis. Descriptive analysis of the variables was carried out to characterize the participants, with the results presented in tables as absolute frequencies and percentages. The

analysis of prenatal care based on the three criteria was presented in graph format, with percentages for each group. The association between the variables studied and the three criteria for adequate prenatal care was assessed using the chi-squared test, and the significant variables were used in a multivariate logistic regression model, with significance set at $p < 0.05$.

Results

Participants were 437 postpartum women. The gestational history and characterization of the population studied based on socioeconomic, demographic and behavioral variables are presented in Table 1.

The variables related to the prenatal period, childbirth and postpartum are described in Table 2. With respect to the newborns, 110 were preterm (25.2%), 102 had low birth weight (23.3%) and the vast majority whose medical records or newborn health card contained a 5-minute APGAR score obtained values greater than or equal to 7 (92.9%). It is important to note that 26 newborns did not obtain this score and were therefore excluded from analysis. Among the postpartum participants, 158 (36.1%) used health services for emergencies during their pregnancy.

Based on the first criterion (number of checkups and early-onset care), 116 (26.5%) received inadequate care, while for the second criterion, (professional practices), only 15 (3.4%) reported they were not properly assessed, indicating inadequate care. For the final criterion (counseling given to expectant mothers), 203 (46.5%) indicated they were given no instructions on the signs of labor, breastfeeding or vaccination, which is considered inadequate care (Figure 1).

All the variables studied were analyzed considering the three criteria adopted, with only the first criterion exhibiting a significant association. The factors significantly associated with adequate prenatal care based on the number of checkups and onset of care (criterion 1) were: maternal schooling level ($p < 0.001$), maternal age ($p < 0.001$), marital status ($p < 0.001$), employment ($p < 0.001$), planned pregnancy ($p < 0.001$), previous miscarriage ($p = 0.026$), smoking ($p = 0.001$), drug use ($p = 0.017$) and prenatal care location ($p = 0.014$). Due to the large number of variables, only those with a statistically significant association ($p < 0.05$) are presented in Table 3.

Table 1 - Characterization of the population studied

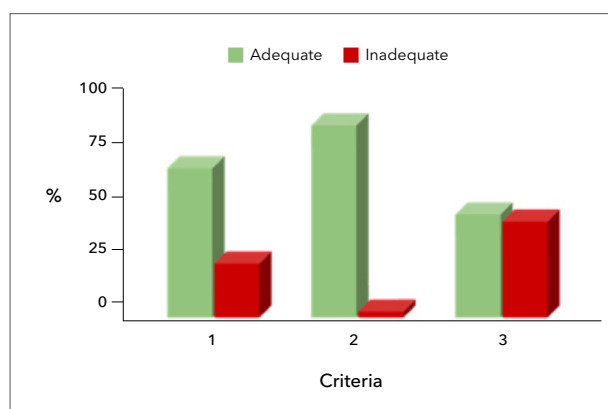
Variables	n	%
Schooling Level		
Incomplete high school or less	199	45.5
Secondary diploma or higher	238	54.5
Age		
Adolescent (12 to 18 years)	58	13.3
Young adult (19 to 34 years)	324	74.1
Older adult (≥ 35 years)	55	12.6
Race		
White	62	14.2
Black or brown	375	85.8
Marital status		
In a relationship	337	77.1
Single	100	22.9
Employment during pregnancy		
Worked	178	40.7
Did not work	259	59.3
Number of children		
First child	224	51.3
Second child or more	213	48.7
Household income^a		
< 2 monthly minimum wages	213	48.7
≥ 2 monthly minimum wages	202	46.2
Alcohol dependent		
No	408	93.4
Yes	29	6.6
Smoker		
No	403	92.2
Yes	34	7.8
Drug user		
No	430	98.4
Yes	7	1.6
Violence during pregnancy		
No	396	90.6
Yes	41	9.4
Previous miscarriage		
No	357	81.7
Yes	80	18.3
Previous PMT/LBW child^b		
No	189	43.2
Yes	24	5.5

Note: PMT = premature; LBW = low birth weight. ^aSome participants were unable or unwilling to provide information on household income ($n = 22$) and these were considered missing data for the analysis. ^b224 participants were excluded from this analysis as primipara.

Table 2 - Variables related to the prenatal period, childbirth and postpartum

Variables	n	%
Planned pregnancy		
No	246	56.3
Yes	191	43.7
Number of prenatal checkups^a		
< 6	120	27.5
≥ 6	313	71.6
First prenatal checkup^{a,b}		
≤ 16 weeks	363	83.1
> 16 weeks	60	13.7
Weight assessed^c		
No	6	1.4
Yes	416	95.2
Blood pressure taken^c		
No	3	0.7
Yes	419	95.9
Fundal height measured^c		
No	8	1.8
Yes	414	94.7
Fetal heart beat^c		
No	6	1.4
Yes	416	95.2
Counseling on signs of labor^c		
No	145	33.2
Yes	277	63.4
Vaccine counseling		
No	30	6.9
Yes	407	93.1
Breastfeeding counseling^c		
No	159	36.4
Yes	263	60.2
Type of delivery		
Vaginal	266	60.9
Cesarean section	171	39.1
Birth companion		
No	186	42.6
Yes	251	57.4
Skin-to-skin contact		
No	109	24.9
Yes	328	75.1
Breastfeeding in the first hour of life		
No	246	56.3
Yes	191	43.7
Prenatal care location^b		
Public	354	81.0
Private	73	16.7

Note: ^aFour postpartum participants could remember neither the date of their first prenatal checkup nor the number of checkups and this information was not in their records, precluding them from analysis for the variables "number of prenatal checkups" and "first prenatal checkup". ^bTen postpartum participants had no prenatal care and were therefore excluded from analysis for the variables "first prenatal checkup" and "prenatal care location". ^cFifteen postpartum participants were considered absent for analysis of these variables, ten for having no prenatal care and five for having only one prenatal checkup, thereby precluding assessment of professional practices.

**Figure 1** - Adequacy of prenatal care based on criteria 1, 2 and 3.

Note: ^aPostpartum participants without the necessary information or who had no prenatal care were excluded from these analyses, as described in the notes for Table 2. Criteria: 1 - Early onset care and number of checkups in line with gestational age; beginning prenatal care by the 16th week of gestation was considered adequate. 2 - Professional practices during prenatal checkups: taking the patient's blood pressure, weighing the patient, measuring the fundal height, and assessing the fetal heart rate. Care was deemed adequate when all four items had been checked during prenatal visits. 3 - Counseling given to pregnant women by healthcare professionals during prenatal checkups, considering the following variables: signs of labor, breastfeeding and maternal vaccines. If the healthcare professional advised the participants on these three variables at least once, prenatal care was considered adequate.

The significant variables in Table 3 were included in a multivariate logistic regression model and the following factors maintained a significant association with adequate prenatal care: maternal schooling level (OR = 1.68; $p = 0.046$), marital status (OR = 2.18; $p = 0.002$), employment (OR = 2.18; $p = 0.003$) and planned pregnancy (OR = 1.76; $p = 0.023$). The p -value for previous miscarriage was close to significance ($p = 0.053$) and therefore remained in the model for discussion (Table 4).

Table 3 - Association between the variables studied and adequacy of prenatal care based on the number of checkups and early-onset care (criterion 1)

Variables	Adequate prenatal		Inadequate prenatal		p-value
	n	%	n	%	
Maternal schooling level					
Incomplete high school or less	127	40.1	69	59.5	< 0.001
Secondary diploma or higher	190	59.9	47	40.5	
Maternal age					
≤ 18 years	30	9.5	27	23.3	< 0.001
>19 years	287	90.5	89	76.7	
Marital status					
In a relationship	261	82.3	72	62.1	< 0.001
Single	56	17.7	44	37.9	
Employment					
Unemployed	169	53.3	88	75.9	< 0.001
Employed	148	46.7	28	24.1	
Planned pregnancy					
No	161	50.8	82	70.7	< 0.001
Yes	156	49.2	34	29.3	
Previous miscarriage					
No	252	79.5	103	88.8	0.026
Yes	65	20.5	13	11.2	
Smoker					
No	300	94.6	99	85.3	0.001
Yes	17	5.4	17	14.7	
Drug user					
No	315	99.4	111	95.7	0.017
Yes	2	0.6	5	4.3	
Prenatal care location					
Public	254	80.1	96	90.6	0.014
Private	63	19.9	10	9.4	

Table 4 - Multivariate logistic regression results for factors associated with adequate prenatal care based on the number of checkups and early-onset care (criterion 1)

Variables	OR	95%CI	p-value
Maternal schooling level			
Incomplete high school or less	1.68	1.00 - 2.56	0.046*
Secondary school diploma or higher	Ref	-	
Marital status			
Single	2.18	1.32 - 3.60	0.002*
In a relationship	Ref	-	
Employment			
Unemployed	2.18	1.31 - 3.61	0.003*
Employed	Ref	-	
Planned pregnancy			
No	1.76	1.08 - 2.85	0.023*
Yes	Ref	-	
Previous miscarriage			
No	Ref	-	
Yes	0.51	2.64 - 1.00	0.053

Note: OR = odds ratio; CI = confidence interval; Ref = reference category; *p < 0.05.

Discussion

This study analyzed the prenatal and perinatal care provided in Governador Valadares and the association between adequate prenatal care and socioeconomic, demographic, behavioral and reproductive factors. Prenatal care was considered adequate for 72.5, 93.1 and 50.1% of the participants based on criteria 1, 2 and 3, respectively. In relation to the presence of a birth companion, it was deemed adequate for 57.4% of participants, 75.1% for skin-to-skin contact and only 43.7% for breastfeeding in the first hour of life.

In regard to the profile of the postpartum participants, most were brown or black, between 19 and 34 years old, primiparous, had a secondary school diploma or higher, resided with a romantic partner and had an income below two monthly minimum wages. Similar results were obtained by Mendes et al.¹⁴ and Marques et al.¹⁵ in studies conducted in the states of Sergipe and Santa Catarina, respectively.

Almost 40% of participants in the present study underwent a cesarean section, as observed by Queiroz et al.¹⁶ in a rural area of Ceará state. The C-section rate

remains high, despite the ideal rate of approximately 15% recommended by the World Health Organization (WHO). It is important for expectant mothers to be properly prepared for childbirth and receive counseling and clarification on the advantages of a vaginal birth, since many view a cesarean as a means of escaping the suffering of physiological pain. This counseling is believed to be important in reducing C-section rates.¹⁶

A study on reproductive and maternal health over the 30 years of the National Health System (SUS)¹⁷ found a C-section rate of 55% in 2015. Leal et al.³ recorded a rate of 43.3% between 2011 and 2012, corroborating the findings of the present study. Of the live births in Governador Valadares in 2019, 59.6% were cesarean sections, a very high rate considering WHO recommendations. The growing rates of this surgical procedure in recent years should serve as a warning to healthcare professionals and managers because unnecessary cesareans increase the risk of maternal death.^{17,18}

Analysis of prenatal care (criterion 1) indicated that more than 70% of participants received adequate care. Those whose care was classified as inadequate started prenatal checkups late and/or did not reach the recommended minimum number of visits for their gestational age. Establishing the ideal number of checkups is a valuable tool in planning healthcare services and care protocols for pregnant women, promoting health and preventing possible risks, since the assumption is that the larger the number of checkups, the greater the opportunity for prevention and the more counseling received.¹⁰

The result obtained here for criterion 1 was better than that reported by Coutinho et al.⁹ for users of the SUS in Juiz de Fora (MG), with only 27.6% receiving adequate care. It is important to underscore that the present study used a different criterion to evaluate the adequacy of prenatal care. Additionally, the study by Coutinho et al.⁹ was conducted before the Stork Network was implemented,^{7,8} which may explain the different results. Another study that evaluated pregnant women treated at SUS health units in the city of Rio de Janeiro between 2007 and 2008, used only the Program for Humanization of Prenatal Care and Childbirth (PHPN) criterion and obtained worse results than those found here (38.5%).¹⁰

Leal et al.³ assessed the prenatal care of 19,117 women in the Brazilian public health network and found

that 69% had sufficient prenatal checkups and received care early, with the most adequate provided in the Southeast (77.3%). Thus, the high number of women who received inadequate care ($n = 116$) in the present study should serve as a warning for municipal health services to create new strategies aimed at better coverage and building bonds with expectant mothers, since the result obtained for care adequacy in the municipality studied was worse than that recorded for the state as a whole. It should be noted that in some cases, starting prenatal care late affected the number of checkups, making it impossible for the women to reach the recommended minimum number, which contributed to inadequate care. Other national studies also demonstrated the negative effect of starting checkups late on the adequacy of the prenatal care provided.^{10,19}

According to the second criterion, more than 90% of participants in the present study received adequate prenatal care, indicating that they were properly assessed for blood pressure, weight, fundal height and fetal heartbeat. It is important to underscore that other assessment items and tests were not considered because these data were not collected. It should also be noted that information in the present study was collected via direct questions in questionnaires applied to the participants, and that some of the women may not have known what types of tests and assessments had been done. Another study that evaluated technical procedures and tests performed during prenatal visits showed that most women had their blood pressure and weight checked, fundal height measured and were fully vaccinated, which corroborates our findings and makes it possible to infer that these practices are part of the everyday routine of healthcare professionals.²⁰

By contrast, in relation to criterion 3, prenatal care was considered inadequate for almost half of the participants. To assess the quality of the counseling provided to pregnant women, two aspects must be considered: ability to interpret the information and the bond between the healthcare professional and the patient. While on the one hand professionals are seen as knowledgeable, they are also unfamiliar to the patient and directly involved in her pregnancy and her life at the time. In conjunction with this are her family and community, who are also part of her history and have empirical knowledge about pregnancy.

The challenge in ensuring that counseling is in fact understood seems to be a combination of the

lack of connection between patient and doctor and how the latter conveys the information, added to the abundance of inaccurate information passed on by friends and family members.²¹ In order to overcome this challenge, healthcare professionals must provide humanized care, understand that health education should consider the individual needs of each patient and provide more assertive care. The results of the present study corroborate those of another cross-sectional quantitative investigation with 3,111 postpartum SUS users from Santa Catarina state who received prenatal care in 2019. The researchers applied a questionnaire up to 48 hours postpartum, within the hospital setting, and analyzed the adequacy of counseling received during prenatal checkups. The prevalence of instructions about breastfeeding was 45.9% and the adequacy of counseling provided was rated at only 18.4%.¹⁵

In regard to humanization practices during and immediately after childbirth, the results demonstrated that more than half of the postpartum women had a companion present during labor and most had skin-to-skin contact with their baby immediately after birth. However, more than half did not breastfeed their baby in the first hour of life. This last result corroborates the findings of another study,² which indicates that 64% of mothers did not breastfeed in the first hour of life.

The pregnant women who were most likely to receive inadequate prenatal care in relation to criterion 1 were those with the lowest schooling level (OR = 1.68; $p = 0.046$), who were single (OR = 2.18; $p = 0.002$), did not work during their pregnancy (OR = 2.18; $p = 0.003$) and whose pregnancy was unplanned (OR = 1.76; $p = 0.023$). Research by Pedraza²² and Viellas et al.² corroborates our findings, suggesting that starting prenatal care early is associated with maternal schooling level. Another Brazilian study¹⁹ also observed an inverse association between the mother's schooling and inadequate prenatal care. According to Ramos and Cuman,²³ poor schooling is linked to low socioeconomic status, which may predispose mother and baby to potential risks by preventing access to professional counseling and information. It is important to underscore that the results obtained here for schooling level should be interpreted with caution, since 13.3% of participants were adolescents (12 to 18 years) and may not have finished high school.

Marital status was also a significant variable, indicating that pregnant women with a romantic partner

received better prenatal care. The study by Viellas et al.² reinforces the results obtained by demonstrating a significant difference when comparing single pregnant women to those with a partner. Personal problems were also more common among single participants and were one of the reasons the authors² used to justify failure to attend prenatal checkups and late-onset care. As such, having a romantic partner seems to function as a support system, ensuring favorable results in monitoring the pregnancy and making it important for healthcare professionals providing prenatal care to be mindful of the marital status of expectant mothers who use healthcare services.

Paid work during pregnancy was also significantly associated with adequate prenatal care. This corroborates the findings of Córrea et al.,²⁴ who demonstrated that unemployed pregnant woman began prenatal care late and as such, 73.9% received inadequate care.

Women who planned their pregnancy started prenatal checkups early and therefore exhibited a higher level of adequate care. In a national hospital-based study, 44.6% of expectant mothers planned their pregnancy and 84.7% of these began attending prenatal checkups early, with 63.7% starting by the 16th week when compared to those whose pregnancy was unplanned.²

In the present study, previous miscarriage was considered a protective factor for inadequate prenatal care. This result was close to being significant and therefore should be discussed in future research to ensure healthcare professionals pay greater attention to this factor. Pregnant women who had experienced a miscarriage were more concerned about their pregnancy and therefore took better care of themselves to prevent this from recurring. Thus, they tend to start prenatal care early and reach the minimum number (or more) of checkups recommended for their gestational age. In order to conduct a more detailed assessment of this topic, bibliographic searches were conducted using the keywords "miscarriage, prenatal adequacy, spontaneous abortion" (in Portuguese and English); however, no studies were found that discussed the relationship between adequate prenatal care and a previous miscarriage.

It is also important to discuss the factors that did not remain in the final logistic regression model: maternal age, drug use, smoking and prenatal care location. Among the pregnant adolescents, 47% of them received

inadequate care. Adolescents are more likely to have fewer than four prenatal checkups because of lack of information or fear of their family's reaction to news of the pregnancy, thereby compromising perinatal outcomes.²⁵ Expectant mothers who use drugs show poor adherence to prenatal care due to their fear of losing custody of their child.^{26,27} Nonsmokers and those who abstain from smoking while pregnant have more prenatal checkups than expectant mothers who smoke ($p = 0.025$).²⁸ According to Domingues et al.,²⁹ the prenatal care provided by public health services was around 10% less adequate when compared to private health care. Another study demonstrated that only two of every three pregnant women treated in the public sector had six or more prenatal checkups and began prenatal care in the first trimester, whereas nine of every ten women treated in the private sector received adequate prenatal care.³⁰

A limitation of the present study was the recall bias of postpartum participants and missing or incomplete data in their medical or prenatal records. In addition, being a local study with a sample from a single facility precludes generalizing the results.

Conclusion

Prenatal care in Governador Valadares was considered adequate for most participants in terms of when care began, the number of checkups, and assessment of the pregnant women. However, analysis of the counseling provided by healthcare professionals showed that care was inadequate for almost half the study population. Perinatal care was found to be adequate regarding the presence of a birth companion and skin-to-skin contact, but inadequate for breastfeeding in the first hour of life.

The pregnant women most likely to receive inadequate prenatal care in relation to the number of checkups and the onset of care were those with the lowest schooling level, who were single, did not work during their pregnancy and whose pregnancy was unplanned. There is therefore a need to improve the care provided in Governador Valadares.

This study could contribute to optimizing the prenatal and perinatal services offered to expectant mothers in the municipality and to early identification of the factors associated with inadequate prenatal care.

Authors' contributions

All the authors participated in the study design, data analysis and interpretation, writing the manuscript and approving the final version.

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