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ORIGINAL ARTICLE

Factors associated with mode of delivery in puerperal women assisted by Primary Health Care

Fatores associados às vias de partos em puérperas assistidas pela Atenção Primária à Saúde

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ABSTRACT

Objectives: To analyze the factors associated with mode of delivery in puerperal women assisted by Primary Health Care in a municipality in the north of Minas Gerais. **Methods:** This is a cross-sectional study, conducted with 188 puerperal women in the city of Montes Claros, state of Minas Gerais, Brazil. Data were obtained with a structured questionnaire about the sociodemographic profile and obstetric history. Descriptive analysis was performed and, for the analysis of factors associated with the mode of delivery, the Pearson's chi-square test was used. **Results:** The prevalence of vaginal deliveries was 56.4% (n=106) and 43.6% (n=82) of cesarean sections. Of the 82 (43.6%) women who were subjected to cesarean section, the main reasons for cesarean section reported by the puerperal women were: cephalopelvic disproportion (40.2%; n=33), elevated blood pressure levels (13.4%; n=11), and previous cesarean section (12.2%; n=10). A significant association was found between choice of cesarean delivery and higher maternal age (p=0.031), skin color (p=0.045), high income (p=0.015), and public financing of delivery (p=0.041). **Conclusion:** Vaginal route prevailed among puerperal women, but a high prevalence of cesarean sections was observed, which showed that higher maternal age, skin color, high income, and public financing of childbirth influence the mode of delivery. The information obtained in this study can be used to improve the assistance to pregnant women and puerperal women, especially in pregnant women more susceptible to unnecessary cesarean sections.

Keywords: Cesarean section; Natural childbirth; Primary Health Care.

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RESUMO

Objetivos: Analisar os fatores associados às vias de parto em mulheres puérperas assistidas pela Atenção Primária à Saúde em município no norte de Minas Gerais. **Métodos:** Trata-se de um estudo transversal, realizado com 188 puérperas da cidade de Montes Claros/MG. Os dados foram obtidos por meio de questionário estruturado acerca do perfil sociodemográfico e história obstétrica. Realizou-se análise descritiva e, para a análise dos fatores associados às vias de parto, utilizou-se o teste estatístico qui-quadrado de Pearson. **Resultados:** A prevalência de partos vaginais foi de 56,4% (n=106) e 43,6% (n=82) de cesarianas. Das 82 (43,6%) mulheres que foram submetidas à cesárea, os principais motivos da realização da cesárea relatados pelas puérperas foram: desproporção cefalopélvica (40,2%; n=33) elevação de níveis pressóricos (13,4%; n=11) e cesárea prévia (12,2%; n=10). Houve associação significativa entre escolha do parto cesariano e maior idade materna (p=0,031), cor da pele (p=0,045), renda elevada (p=0,015) e financiamento público do parto (p=0,041). **Conclusão:** Entre a maioria das puérperas, a via vaginal foi majoritária, porém obteve-se uma alta prevalência de cesáreas que mostrou que a maior idade materna, cor da pele, renda elevada e financiamento público do parto influenciam a via de parto. As informações obtidas neste estudo podem ser usadas para melhorar a assistência a gestantes e puérperas, sobretudo, nas gestantes mais suscetíveis a cesarianas desnecessárias.

Palavras-chave: Cesárea; Parto normal; Atenção Primária à Saúde.

Introduction

During the puerperal-pregnancy cycle, physiological changes occur that ensure a conducive means for the development of the fetus. Pregnancy is also a time of psychological changes that generate expectations, fears, and anxieties to pregnant women[1], which involve numerous cultural and social meanings, influencing specific care at this stage, as the choice of mode of delivery[2]. The improvement of new techniques, respect for women's autonomy, and correct clinical indications directly imply the choice of the mode of delivery, and has caused controversy in different discursive fields. The excessive increase in surgical deliveries has become a public health problem due to the magnitude of maternal and neonatal mortality and the costs derived for health services[3,4].

The World Health Organization (WHO) encourages normal delivery and the reduction of unnecessary cesarean section, estimating a rate of 10-15% as the ideal rate[5]. However, Brazil has one of the highest rates of this mode of delivery in the world, reaching 56.7% of the births performed, 85% in private maternity hospitals and 40% in the public network[6]. In addition to improving surgical techniques that made cesarean section a less dangerous surgery, this increase can be justified by fear of pain in vaginal delivery, the possibility of choosing the day of delivery, fear of lesions in the anatomy and physiology of the vagina, among others[7].

Excessive rise in cesarean surgery rates is associated with higher socioeconomic status, higher education, and private sector funding. The users of this sector feel more receptive to the doctor's request about the surgical delivery route but are not adequately informed about the advantages and disadvantages of normal delivery. Lower income women, assisted in the public system, perceive themselves as less autonomous and more victims of unnecessary interventions[4,8]. Moreover, the obstetric history of women and the type of previous delivery has been shown to be associated with the current mode of delivery desired by them[2] since their satisfaction concerning previous delivery experience can play an important role in the woman's current desire.

Primary Health Care (PHC) is the gateway for pregnant women to the Unified Health System (UHS), providing care and comprehensive monitoring by health professionals involved in pregnancy and postpartum care. However, in the public health system, the disarticulation between prenatal care and childbirth is frequent, resulting in the pilgrimage of the pregnant woman seeking hospitalization at the

beginning of labor. Subsidizing and planning actions based on scientific evidence are necessary to redirect practices and conduct the professional who provides assistance to this public during the pregnancy-puerperal cycle[9].

The process of choosing the mode of delivery is complex and controversial and is influenced by health professionals, pregnant women, family members, health system, among others. The preference of the pregnant woman over the ways of childbirth is built from her self-knowledge, her previous experiences and the knowledge that transits between her and the community, and access to the information she will have during pregnancy. High rates of cesarean section in Brazil and its association with high mortality rates motivate the importance of identifying factors associated with the mode of delivery of women followed by primary health care. Identifying these factors will allow the development of strategies to improve delivery care in the municipality[9,10]. This study aimed to analyze the factors associated with mode of delivery in puerperal women assisted by Primary Health Care in a municipality in the north of Minas Gerais.

Methods

Study characterization and ethical aspects

This study is part of the research: "Evaluation of health conditions of postpartum women in Montes Claros-MG: Longitudinal study" (ALGE in Portuguese). This is a cross-sectional, analytical study conducted in the city of Montes Claros, state of Minas Gerais, submitted and approved by the Research Ethics Committee of the State University of Montes Claros, under opinion number 2,483,623.

Population and sample

The "ALGE study" was carried out in three moments. The first moment (baseline) included pregnant women registered in the Family Health Strategy (FHS) and who were not pregnant with twins (n=1,661). Those who were in the 1st trimester of pregnancy (n=448) were invited to participate in the second and third moments, when they were in the 3rd trimester of pregnancy (Figure 1). This study refers to the 3rd moment (n=188).

The baseline survey was conducted with a target population consisting of pregnant women registered in the FHS teams in the urban area of the municipality of Montes Claros. The sample size was established to estimate population parameters with a prevalence of 50% (to maximize the sample size and due to the project contemplating several events), 95% confidence interval (95%CI), and accuracy level of 2.0%. The correction was performed for the finite population (n=1,661 pregnant women) establishing a 20% increase to compensate for possible non-answers and losses. The calculations showed the need for participation of at least 1,180 pregnant women.

The ALGE Study aimed to analyze a series of outcome variables with several independent variables; it was impossible to calculate a measure of association previously. The population was 1,661 women and the sample interviewed included 1,279 (higher than the minimum amount indicated in the sample calculation), thus most of the population was analyzed.

For the selection of the baseline sample, all the FHS centers of the city were considered, which totaled 15 in the period of this research, and among which were distributed 125 family health teams. The number of pregnant women sampled in each center was proportional to its representativeness in relation to the total population of registered pregnant women. All those registered in the poles were invited to participate in the project.

Procedures and Instruments

The research was conducted from the contact with the managers of the PHC coordination of the municipality, to raise awareness and explain the purpose of the research.

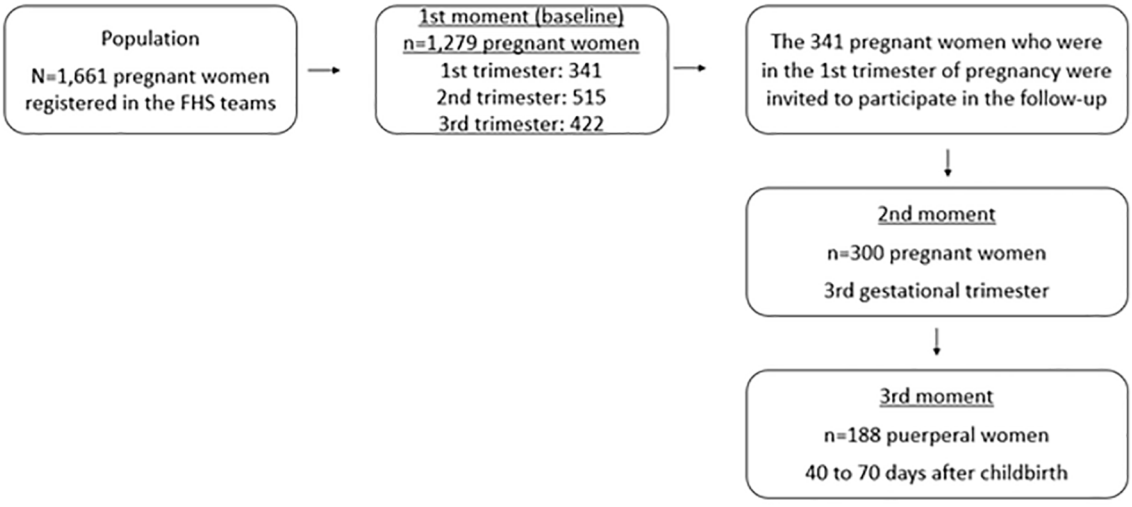

Figure 1. Flowchart of the selection of participants of the ALGE study 2018-2020.

After their consent, the FHS teams were also visited by the researchers for clarification on the study. The professionals of these teams responsible for prenatal care provided a list of the puerperal women in their area of coverage. With these lists, a team of interviewers made initial telephone contact with the women, approaching with the invitation and sensitization about the study, so that data collection could then be scheduled and carried out.

The collection took place between 2018 and 2020, in the FHS health units or in the homes of the participants, according to their availability. A trained multidisciplinary team formed by health professionals and scientific initiation students was responsible for the interviews, which took place face-to-face, with an average duration of one hour per interview. In 2020, due to the COVID-19 pandemic, data collection was performed with an online form. Initially, a telephone contact was made, an approach explaining the longitudinal continuity of the research, and a link to fill out the questionnaire online (Google Forms form) was sent. The puerperal women were interviewed in the interval of 50 to 70 days in the postpartum period. Telephone contacts were obtained during the first collection (baseline) when the participant was pregnant. In this longitudinal stage of the study, those women who had been interviewed in the first phase (cross-sectional – when they were pregnant) and who agreed to continue as a participant in the research were potential participants.

In this study, the variables relevant to the characteristics of the sociodemographic profile and obstetric history were evaluated. The participants' sociodemographic variables were collected regarding age, skin color (white; non-white), schooling (primary school; high school; higher education/graduate degree), monthly income (up to 1,000.00 BRL; 1,001.00 BRL to 2,000.00 BRL; above 2,000.00 BRL) and marital status (with partner; without partner). Regarding obstetric history, the puerperal women were asked about the mode of delivery (normal; caesarean section), in case of cesarean section, the reason for performing cesarean section, place of delivery (public hospital; private hospital) gestational age at birth (premature; term), primiparous (yes; no), previous miscarriages (yes; no).

Data analysis

The data were analyzed with the aid of the Statistical Package for the Social Sciences (SPSS®) version 22.0. Descriptive analysis of the variables was performed with the measures of absolute and relative frequency. Pearson's chi-square test was used to analyze the factors associated with mode of delivery. The significance level adopted was $p \leq 0.05$.

Results

The participants were 188 puerperal women (Figure 1). The prevalence of vaginal deliveries was 56.4% and of cesarean sections was 43.6%. Most of the women interviewed were up to 30 years of age (67.4%), self-reported as non-white (87.6%), had high school education (68.2%), had gross family income between 1,001.00 BRL and 2,000.00 BRL (39.3%), and lived with a partner (76.6%). A total of 89.4% of women reported public financing of childbirth, with just over half (55.3%) not primiparous, with full term birth (92.6%), and without any previous miscarriage (84.6%) (Table 1).

Of the 81 (43.6%) women who underwent cesarean section, the main reasons for performing this procedure reported by the puerperal women were: the cephalopelvic disproportion (40.7%; n=33), hypertension (13.5%; n=11), and previous cesarean section (12.3%; n=10). The puerperal women also cited: performing cesarean section by choice (8.6%; n=7), oligohydramnios (7.4%; n=6), comorbidities (4.9%; n=4), fetal suffering (4.9%; n=4), gestational diabetes (4.9%; n=4), and gestational time (2%; n=2) (Table 2).

When assessing the factors associated with the mode of delivery, there was an association with the following variables: higher maternal age (p=0.031), skin color (p=0.045), high income (p=0.015), and public financing of delivery (p=0.041) (Table 3).

Discussion

This study showed that most puerperal women had their children vaginally. The prevalence of vaginal deliveries is similar to a study conducted in the municipality of Belo Horizonte, Minas Gerais, which found a prevalence of 55.1%[11], lower than that found in a study in southern Brazil, with 69%. Even with vaginal delivery rates surpassing 50% in this study, the amount of cesarean delivery is well above the rate considered ideal (10% to 15%) by WHO[5]. Studies in Nepal also found lower cesarean rates (34.4% and 36.8%)[12,13]. The rates of cesarean section and consequently those of normal delivery vary depending on the economic development of the country and the region. The cesarean rate in Latin America in 2015 was 47%, the highest in the world, and is close to the one found in this study, showing the severity of this situation in Brazil and the municipality of the study. The cesarean rate in Western Europe and North America was 32% and 27.6%, respectively[14].

Cesarean section is an invasive procedure introduced in obstetric practice to preserve maternal and child lives, placed at risk due to complications in the prenatal period and during childbirth. The high prevalence of cesarean section in Brazil and worldwide has generated growing concerns about the indiscriminate use of this surgery, especially elective cesarean sections, contributing to the increase in maternal mortality rates[15,16].

Among the determining factors of the mode of delivery are the pre-existing clinical complications, the clinical conditions that can arise during pregnancy, the characteristics of the pregnant woman, and the socioeconomic and cultural conditions[17]. Among the clinical and/or obstetric indications to justify the performance of cesarean section, the cephalopelvic disproportion was the most frequent in reports of the puerperal women, agreeing with another study in Brazil[8,18]. Belo Horizonte study found

Table 1. Frequency of mode of delivery, sociodemographic and obstetric variables of postpartum women. Montes Claros, Minas Gerais, Brazil.

Variables	Total
	n (%)
Age (years)	
Up to 30	116 (67.4)
Over 30	56 (32.6)
Skin color	
White	22 (12.4)
Non-white	156 (87.6)
Education	
Primary School	22 (12.3)
High School	122 (68.2)
Higher Education/Post-Graduation	35 (19.6)
Family income	
≤1,000.00 BRL	67 (38.7)
1,001.00 – 2,000.00 BRL	68 (39.3)
≥2,000.00 BRL	38 (22.0)
Marital status	
With a partner	144 (76.6)
Without a partner	44 (23.4)
Childbirth financing	
Public	168 (89.4)
Private	20 (10.6)
Primiparous	
No	104 (55.3)
Yes	84 (44.7)
Term birth	
Yes	174 (92.6)
No	14 (07.4)
Previous miscarriages	
No	159 (84.6)
Yes	29 (15.5)
Mode of delivery	
Vaginal	106 (56.4)
Cesarean	80 (43.6)

cephalopelvic indication in 42.3% of women undergoing cesarean section[19]. Rates lower than 12% and 10.7% were observed in a study conducted in Kathmandu, Nepal[12] and Sergipe[20], respectively. In the last study, no indication for cesarean section was recorded[20].

A study in Belo Horizonte with 1088 interviewed puerperal women showed 42.7% of them underwent cesarean section. Of these, 75% did not even go into labor. The report of the puerperal woman that the "baby was too big", which represents an indication for cephalopelvic disproportion, was found in 28.2%, and this diagnosis was recorded in the medical record in 13.7%[19].

Table 2. Reason for cesarean section according to postpartum women's report. Montes Claros, Minas Gerais, Brazil (n=82).

Reason for cesarean	n (%)
Cephalopelvic disproportion	33 (40.7)
Arterial hypertension	11 (13.5)
Previous cesarean	10 (12.3)
Choice	07 (08.6)
Oligohydramnios	06 (07.4)
Comorbidities	04 (04.9)
Fetal distress	04 (04.9)
Gestational diabetes	04 (04.9)
Gestation time	02 (02.4)
TOTAL	81(100)

The diagnosis of cephalopelvic disproportion can only be closed during labor with adequate monitoring by the partogram[21]. Delay in labor can lead to an inadequate diagnosis of cephalopelvic disproportion. The wide dissemination and solidification in the minds of women of this indication may be a sign of the prevailing cesarean section culture in Brazil, since true cephalopelvic disproportion is not common. In a country with a hegemonic culture of cesarean sections and cesarean rates that exceed 80.0% in private services, it is not questioned that approximately 17.5% of the women who participated in the present study had a clinical condition that would make it impossible to give birth through natural means. The culture of cesarean section in Brazil was consolidated under the discourse of the primacy of technology that is convenient with the organization of the professionals' agenda[22].

Hypertension was the second most reported indication by the puerperal women in this study. International and national studies also cover hypertensive syndromes as an indication for cesarean sections; however, with lower rates[1,12,13]. Study conducted in São Paulo, with hypertensive pregnant women, showed that most patients evolved to cesarean section (59.9%) compared to vaginal delivery (16.0%)[23]. However, hypertensive syndromes do not represent an absolute indication for cesarean section surgery and vaginal delivery is the most indicated mode of delivery, since it avoids the additional stress of surgery in a situation that already leads to severe multiple physiological changes[24]. Moreover, hypertensive syndromes are the main cause of maternal mortality in Brazil and contribute significantly for the increase of cesarean sections rates[5].

The presence of previous cesarean section was the third most reported reason for repeating this procedure and is in agreement with similar studies[1,12,13,25]. The risks of vaginal delivery after previous cesarean section are few, but with serious adverse results when uterine rupture occurs, it is

Table 3. Frequency of mode of delivery, according to sociodemographic and obstetric variables of postpartum women. Montes Claros, Minas Gerais, Brazil.

Variables	Cesarean section	Vaginal	*p*-value
	n (%)	n (%)	
Age (years)			
Up to 30	44 (37.9)	72 (62.1)	**0.031**
Over 30	31 (55.4)	22 (44.6)	
Skin color			
White	14 (63.6)	08 (36.4)	**0.045**
Non-white	64 (41.0)	92 (59.0)	
Education			
Primary School	08 (36.4)	14 (63.6)	0.100
High School	50 (41.0)	72 (59.0)	
Higher Education/Post-Graduation	21 (60.0)	14 (40.0)	
Family income			
≥1,000.00 BRL	26 (38.8)	41 (61.2)	**0.015**
1,001.00 – 2,000.00 BRL	27 (39.7)	41 (60.3)	
≥ 2,000.00 BRL	25 (65.8)	12 (34.2)	
Marital status			
With a partner	60 (43.5)	78 (56.5)	0.864
Childbirth financing	18 (45.0)	22 (55.0)	
Financiamento do parto			
Public	69 (41.1)	99 (58.9)	**0.041**
Private	13 (65.0)	7.3 (05.0)	
Primiparous			
No	40 (38.5)	64 (61.5)	0.113
Yes	42 (50.0)	42 (50.0)	
Term birth			
Yes	74 (42.5\0	100 (57.5)	0.289
No	08 (57.1)	06 (42.9)	
Previous miscarriages			
No	68 (42.8)	91 (57.2)	0.582
Yes	14 (48.3)	15 (51.7)	

Legend: *p*-value: <0.05.

a possible explanation for the indication of new cesarean section. At the same time, the risks of repeat cesarean section are more frequent, however, less serious[26]. Among the benefits of a vaginal delivery after cesarean section are: faster recovery, lower intensity of pain in the postpartum, reduction in hospitalization time, and lower future risk of another cesarean section[1].

The WHO proposes that the Robson classification be used as a standard instrument worldwide to assess, monitor, and compare cesarean rates over time. This classification groups pregnant women according to their obstetric characteristics, thus allowing to compare cesarean section rates in a health institution. It is expected that implementing this strategy leads to knowing not only the rates of cesarean sections, but specific groups, and, thus, to proposing intervention strategies for their reduction, based on the guarantee of the quality of excellence in maternal and neonatal care[27]. In addition to the motives for carrying out the cesarean section according to the report of the puerperal women, this parameter could be useful in future investigations.

This study showed that the puerperal women over 30 years old, with white skin color, high monthly income, and who had their children in a private hospital were associated with cesarean section. The occurrence of cesarean section among women over 30 years is significantly higher than in younger women. One study, conducted with the Live Birth

Information System (SINASC), and another conducted with low-income pregnant women recruited from public primary care clinics in São Paulo also found an association for the older age group[16,28]. The higher percentage of caesarean sections as a woman's age increases should be related to both the higher frequency of complications, such as hypertension, diabetes and other chronic diseases, and the increase in the percentage of those who no longer wish to have more children and request tubal ligation[29].

A significant positive association was also observed between white-skinned women and cesarean sections[30]. White women generally have higher purchasing power, which is associated with cesarean section surgery[28,31]. This finding may be justified by the greater use of health insurance by women in this group and the lower purchasing power of non-white women. Also, women with high monthly income tend to directly assume the expenses for the medical professional who usually does both prenatal and childbirth, which favors the planning and execution of elective cesarean section[16].

When assessing the mode of delivery according to the financing of delivery, we found a higher prevalence of cesarean sections in the private service, when compared with those performed in the public service. Similarly, a study conducted in a public and private hospital, in the municipality of Bento Gonçalves and region, in the state of Rio Grande do Sul, indicates that 83.9% of deliveries in the private sector are cesarean sections[32], in which births by cesarean section represent almost two times the percentage of births when compared with in the UHS[33]. In Brazil, from 2000 to 2018, 51.3% of births were vaginal and 48.7%, cesarean sections[17].

Identifying factors associated with mode of delivery can contribute to developing strategies to improve childbirth care in the city with actions of the public system, especially in Primary Health Care. The provision of care and comprehensive follow-up by health professionals involved in pregnancy and puerperium care can act together to mitigate the effect of these factors, and how relevant it is to avoid a disarticulation between prenatal care and childbirth[10]. Providing more information about the risk and negative consequences of cesarean section and the benefits of vaginal delivery can decrease unfavorable maternal-fetal outcomes. In addition, including educational actions for health professionals is necessary to improve the skills of welcoming, maternal and child health care and, thus, reducing the number of cesarean sections performed unnecessarily[32].

This study has limitations. One limitation was the recall bias, since the questionnaire was applied only after delivery, which may have changed the report of some women, for not remembering the real reasons for indicating cesarean sections, along with the stress issues inherent in the immediate puerperium. Another bias was the participation of UHS users only, thus belonging to a specific demographic group. Furthermore, the sample size also stands out, which limits generalizations. Other studies with more generous samples in the puerperal assisted by PHC should be carried out.

Conclusion

In this study, most puerperal women had their children vaginally; however, the prevalence of cesarean section was high, exceeding that recommended by WHO. Cephalopelvic disproportion, hypertension, and previous cesarean section were the most common indications for the surgical procedure. Higher maternal age, white skin color, high income, and private financing of childbirth were associated with non-vaginal route. The PHC professionals should consider these findings as scientific basis for adequate and consistent actions to redirect practices and behaviors of health professionals who provide prenatal care during the pregnancy-puerperal cycle.

Thus, the applicability of the findings evidenced in this study, by the entire health team, will significantly improve assistance to women, reducing the number of unnecessary cesarean sections.

Copyright

Authors' Contribution

We describe contributions to the papers using the taxanomy (CRediT) provide above: *Conceptualization, Investigation, Methodology, Visualization & Writing – review & editing*: SANTOS FJF; MATOS LRO, SILVA LSR, MARQUES LO, QUEIROZ MP, NARCISO PP, BRITO MFSF, VOGT SE, PINHO L.

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