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Factors associated with normal and cesarean delivery in public and private maternity hospitals: a cross-sectional study

Fatores associados ao parto normal e cesárea em maternidades públicas e privadas: estudo transversal

Factores asociados con el parto normal y por cesárea en hospitales de maternidad públicos y privados: un estudio transversal

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ABSTRACT

Objectives: to investigate the factors associated with the mode of delivery in pregnant women in the city of Belo Horizonte. **Methods:** cross-sectional study developed with data from the study "Being born in Belo Horizonte: survey on childbirth and birth" carried out in seven maternity hospitals in Belo Horizonte - Minas Gerais. The final sample consisted of 1088 pregnant/postpartum women. In this study, to verify the magnitude of the association between the outcome variable and its possible determinants (exposure variables) logistic regression models were constructed to estimate the Odds Ratio. **Results:** increasing age, the lack of companionship, the hospital's private financing for performing delivery and being a first-time pregnant woman increased the chance of delivery by cesarean section. **Final Considerations:** the knowledge of factors associated with the prevalence of cesarean sections can support reflections among health professionals about this surgical procedure in certain situations, especially when there are no precise clinical indications.
Descriptors: Vaginal Delivery; Cesarean Section; Pregnant Woman; Nursing; Obstetrics.

RESUMO

Objetivos: investigar os fatores associados à via de nascimento em mulheres gestantes do município de Belo Horizonte. **Métodos:** estudo transversal desenvolvido com dados da pesquisa "Nascer em Belo Horizonte: Inquérito sobre o parto e nascimento", realizada em sete maternidades de Belo Horizonte – Minas Gerais. A amostra final constitui-se de 1088 mulheres gestantes/puérperas. Neste estudo, para verificar a magnitude da associação entre a variável desfecho e seus possíveis determinantes (variáveis exposição), foram construídos modelos de regressão logística para estimar a *Odds Ratio*. **Resultados:** o aumento da idade, a ausência de um acompanhante, o financiamento privado do hospital para a realização do parto e ser gestante primigesta aumentaram a chance de se ter a via de nascimento cesárea. **Considerações Finais:** o conhecimento dos fatores associados à prevalência de cesariana pode subsidiar reflexões entre os profissionais de saúde sobre este procedimento cirúrgico em determinadas situações, sobretudo quando não tem indicações clínicas precisas.
Descritores: Parto Normal; Cesárea; Gestante; Enfermagem; Obstetrícia.

RESUMEN

Objetivos: investigar los factores asociados con la ruta de nacimiento en mujeres embarazadas en la ciudad de Belo Horizonte. **Métodos:** estudio transversal desarrollado con datos de la investigación "Nacer en Belo Horizonte: Encuesta sobre el parto y el nacimiento", realizada en siete hospitales de maternidad en Belo Horizonte - Minas Gerais. La muestra final consistió en 1088 mujeres embarazadas/postparto. En este estudio, para verificar la magnitud de la asociación entre la variable de resultado y sus posibles determinantes (variables de exposición), se construyeron modelos de regresión logística para estimar el *Odds Ratio*. **Resultados:** el aumento de la edad, la ausencia de un acompañante, la financiación privada del hospital para el parto y el hecho de ser una mujer embarazada por primera vez aumentaron las posibilidades de tener una ruta de parto por cesárea. **Consideraciones Finales:** el conocimiento de los factores asociados con la prevalencia de cesáreas puede apoyar las reflexiones entre los profesionales de la salud sobre este procedimiento quirúrgico en ciertas situaciones, especialmente cuando no hay indicaciones clínicas precisas.
Descriptores: Parto Normal; Cesárea; Mujer Embarazada; Enfermería; Obstetricia.

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INTRODUCTION

Over the years, labor and delivery assistance in Western societies has undergone major changes. Initially, it was configured as a home event, with pregnant women and midwives[1]. This scenario changed gradually in modern times, with the insertion of the medical professional and the hospital context[1].

These changes were associated with the consolidating ways of life and values that favored technologies, economic benefit, the biologicist science[2], and techniques such as cesarean surgery and anesthesia[3].

With transformations of modern society and the hospital context, assistance to labor, delivery and birth was based on a culture in which the biomedical model of assistance is the center of the whole process of giving birth[2]. Given this context, the process of giving birth has become ingrained in an interventionist culture and among these interventions, cesarean section has been consolidated as the first choice mode of delivery[4].

Although the cesarean delivery has made births with absolute obstetric indications safer and reduced maternal and neonatal mortality, rates of cesarean sections without real indications are still very high[5]. According to the World Health Organization (WHO) [6], absolute indications for a cesarean delivery are cephalopelvic disproportion and total placenta previa; other situations should be assessed individually, especially during labor[6]. The frequency of cesarean sections in Brazil has shown an increasing trend since the mid-1990s, reaching 57% in 2014, with a reduction to 55.5% in 2015, and higher prevalence in the private health system compared to the public health system[6].

The risk of complications resulting from the high and unnecessary number of caesarean sections, especially elective cesarean sections, contributes to higher maternal mortality rates[7]. Furthermore, according to the WHO, the main causes of maternal death are hemorrhage, abortion and indirect obstetric causes[6]. Given the above, in the absence of contraindications, vaginal delivery guarantees benefits and lower risks for the mother and the baby[8].

Women's process of choosing a cesarean delivery is influenced by different individual factors such as lower age, higher education and higher income, previous experience of cesarean section and white color/race[9]. Associated with these individual variables, the mode of delivery is also influenced by financing factors from the hospital where the pregnant woman will give birth, mainly in private services, such as: financial reimbursement offered by the Brazilian supplementary health insurance, issues related to infrastructure and qualification of human resources[10-11].

As childbirth is a physiological, natural process and part of women's reproductive rights, they must actively participate in the process of choosing the mode of delivery and other aspects composing the obstetric context. In this perspective, childbirth presupposes that women's informed and conscious choice for each procedure performed on their body is also guided by their physical and psychic time and their choices related to the environment, aiming for the minimum of biomedical interventions and having woman as the center of care[12].

Health professionals involved in childbirth and birth care should avoid the process of medicalization of childbirth, unnecessary interventions, and help women with the choice of their preferred mode of delivery based on recent scientific evidence[13]. However, there is a common trend that professionals induce a certain mode of delivery without references to scientific evidence or effective participation of women, meeting the interests of the team and the institution[14].

OBJECTIVES

To investigate the factors associated with the mode of delivery in pregnant women in the city of Belo Horizonte.

METHODS

Ethical Aspects

This study was approved by the Ethics Committee of the *Universidade Federal de Minas Gerais* and by the Ethics Committees of the maternities involved. Data collection started after obtaining parturient women's signature of the Informed Consent form.

Design, study location and period

This is a cross-sectional study developed with data from the study "Being born in Belo Horizonte: survey on childbirth and birth", carried out in seven maternities that serve the public health system and in four maternities that serve the supplementary health system of Belo Horizonte - Minas Gerais.

The study "Being born in Belo Horizonte: survey on childbirth and birth" used the same method of sampling, logistics and material resources as the nationwide study entitled "Being born in Brazil: survey on childbirth and birth"[15-16].

Sample

Regarding inclusion criteria, all women admitted to the selected maternity hospitals for giving birth participated in this study. The final sample included 1088 mothers.

Data collection took place from November 2011 to March 2013 by interviewing the mothers at least six hours after delivery (pre-established time defined as a minimum interval for postpartum rest) and by investigating their medical records.

Study protocol

The outcome variable of this study was the mode of delivery, being: 0 - Vaginal delivery and 1 - Cesarean delivery.

The variables included in this study referred to sociodemographic characteristics, obstetric, clinical, pregnancy and childbirth history, in addition to the source of hospital funding (public or private).

A variable called intercurrences (clinical or obstetric) during pregnancy or childbirth was also created and would possibly influence in the greater chance of childbirth by cesarean section. The presence of at least one of the following conditions was considered as an intercurrence: pre-existing clinical diseases, hypertensive syndromes, diabetes, gestational diabetes, HIV infection, intrauterine growth restriction (IUGR), oligohydramnios,

polyhydramnios, alloimmunization, placenta previa, placental abruption, fetal distress, premature labor, severe congenital malformation, two or more previous cesarean sections, failure to induce labor and complications in the evolution of labor[9], in addition to cervical insufficiency, premature rupture of fetal membranes, eclampsia and previous uterine surgeries (myomectomy, micro cesarean section or other body surgeries).

Analysis of results and statistics

The Statistical Software for Data Science (Stata), version 14.0, was used for data analysis.

The estimates were presented in proportions (%) with their respective Confidence Intervals (95% CI). For quantitative variables, after asymmetry was verified by the Shapiro-Wilk test, data were presented using median and interquartile range (IQR). To check the magnitude of the association between the outcome variable and its possible determinants (exposure variables), logistic regression models were constructed to estimate the Odds Ratio (OR).

For the multivariate regression model, the backward method was used to construct the model and all variables of interest related to a level of statistical significance below 20% were included in the bivariate analysis, being removed one by one. To assess the adjustments of the final model, the Hosmer-Lemeshow's model goodness of fit test was used.

RESULTS

The sample of this study was composed of 1088 women with a median age of 28 years (IQR = 23 - 33 years), predominance of self-reported mixed race (65.53%), performing paid work (53.49%), with secondary education (54.23%) and in a civil partnership (73.07%). Regarding obstetric history, the median was eight prenatal consultations (IQR = 7 - 10), 95.95% had companionship in the prenatal period, childbirth and immediate postpartum, 81.80% had no type of clinical or obstetric intervention and 67.56% had their children in publicly funded hospitals (Table 1).

Table 1 – Sociodemographic and obstetric profile of puerperal women, Belo Horizonte, Minas Gerais, Brazil, 2011–2013

	n(%)	95%CI
Sociodemographic		
Age*	28(23 - 33)	
Skin Color		
White	285(26.19)	23.66 – 28.89
Black	90(8.27)	6.77 – 10.06
Mixed race**	713(65.53)	62.65 – 68.30
Paid Work		
No	506(46.51)	43.55 – 49.48
Yes	582(53.49)	50.51 – 56.44
Schooling		
None and Elementary School	311(28.58)	25.97 – 31.34
High School	590(54.23)	51.25 – 57.17
University education	187 (17.19)	15.05 – 19.55
Marital Status		
With partner	795(73.07)	70.34 – 75.62
Without partner	293(26.93)	24.37 – 29.65
Obstetric		
Number of prenatal consultations*	8(7 – 10)	
Place of prenatal consultations		
Public	634(58.70)	55.73 – 61.61
Private	387(35.83)	33.02 – 38.74
Both	59(5.46)	4.25 – 6.99
Primigravida		
No	603(55.42)	52.44 – 58.35
Yes	485(44.58)	41.64 – 47.55
Companionship in prenatal period, childbirth and immediate postpartum		
No	44(4.04)	3.02 – 5.39
Yes	1044(95.95)	94.60 – 96.97
Clinical and obstetric complications		
No	198(18.20)	16.01 – 20.60
Yes	890(81.80)	79.39 – 83.98
Funding of the birth hospital		
Private	353(32.44)	29.72 – 35.29
Public	735(67.56)	64.70 – 70.27

*Note: * Median (IQR); ** Includes Asian and Indigenous; 95% CI - Confidence Intervals.*

Table 2 - Factors associated with the mode of delivery, Belo Horizonte, Minas Gerais, Brazil, 2011–2013

	Mode of delivery		Crude model*	
	Vaginal n(%)	Cesarean n(%)	OR (95%)	*p* value
Sociodemographic				
Age*	26 (21 – 31)	31 (25 – 34)	1.09 (1.07 – 1.11)	**<0.001**
Schooling				**<0.001**
Elementary School	205(65.92)	106(34.08)	1	
High School	340(57.63)	250(42.37)	1.42(1.07 – 1.89)	
University Education	55(29.41)	132(70.59)	4.64(3.15 – 6.91)	
Skin Color				**<0.001**
Asian*	420(58.91)	293(41.09)	1	
White	128(44.91)	157(55.09)	1.75(1.33 – 2.33)	
Black	52(57.78)	38(42.22)	1.04(0.66 – 1.62)	
Marital Status				**<0.001**
With partner	404(50.82)	391(49.18)	1	
Without partner	196(66.89)	97(33.11)	0.51(0.38 – 0.67)	
Paid Work				**<0.001**
No	316(62.45)	190(37.55)	1	
Yes	284(48.80)	298(51.20)	1.74(1.37 – 2.22)	
Obstetric				
Number of prenatal consultations	8 (6 – 9)	9 (7 – 10)	1.19 (1.13 – 1.26)	**<0.001**
Place of prenatal consultations				**<0.001**
Public	443(69.87)	191(30.13)	1	
Private	123(31.78)	264(68.22)	4.97(3.78 – 6.54)	
Both	29(49.15)	30(50.85)	2.39(1.40 – 4.10)	
Primigravida				0.502
No	338(56.05)	265(43.95)	1	
Yes	262(54.02)	223(45.98)	1.08(0.85 – 1.38)	

To be continued

Table 2 (concluded)

	Mode of delivery		Crude model*	
	Vaginal n(%)	Cesarean n(%)	OR (95%)	*p* value
Companionship in prenatal period, childbirth and immediate postpartum				0.188
Yes	580(55.56)	464(44.44)	1	
No	20(45.45)	24(54.55)	1.49(0.81 – 2.74)	
Clinical and obstetric complications				**<0.001**
No	163(82.32)	35(17.68)	1	
Yes	437(49.10)	453(50.90)	4.82(3.27 – 7.11)	
Funding of the birth hospital				**<0.001**
Public	511(69.52)	224(30.48)	1	
Private	89(25.21)	264(74.79)	6.76(5.07 – 9.01)	

Note: 95% CI - Confidence Interval; OR - Odds Ratio; p-value in bold - significant.

Table 3 – Adjusted final model of factors associated with the mode of delivery, Belo Horizonte, Minas Gerais, Brazil, 2011–2013

Variable	Adjusted Model* OR(95%)	*p* value
Age	1.07 (1.04 – 1.10)	<0.001
Primigravida		0.025
No	1	
Yes	1.43 (1.04 – 1.96)	
Companionship in prenatal period, delivery and immediate postpartum		0.048
Yes	1	
No	1.95 (1.01 – 3.80)	
Funding of the birth hospital		<0.001
Public	1	
Private	3.98(2.44 – 6.48)	

*Note: *Adjusted model also for variables of theoretical importance: maternal education, skin color, place of prenatal consultations and clinical or obstetric complications during pregnancy or childbirth.95% CI - Confidence Intervals; OR - Odds Ratio; Bold intervals - significant. Hosmer-Lemeshow's model Goodness of fit test = 0.06.*

Regarding the outcome variable, 55.15% of puerperal women had a vaginal delivery. In the bivariate analysis, variables associated with the mode of delivery were age, schooling, skin color, marital status, performing some type of paid work, number of prenatal consultations, place of prenatal consultations, clinical and obstetric complications and hospital funding (Table 2).

Table 3 shows that after adjustments, the one-year increase of a pregnant woman's age increased, on average, 1.07 (95% CI 1.04 - 1.10) times her chance of giving birth by cesarean section. In addition, being a first-time pregnant woman increased, on average, 1.43 (95% CI 1.04 - 1.96) times the chance of undergoing a cesarean section compared to multiparous women. Women without a companionship in the prenatal period, childbirth and immediate postpartum period had, on average, a 1.95 (95% CI 1.01 - 3.80) times higher chance of having their children by cesarean section compared to pregnant women with a companionship. Pregnant women who had their babies in a private hospital had, on average, a 3.98 (95% CI 2.44 - 6.48) times higher chance of having a cesarean delivery compared to those who gave birth in public hospitals.

DISCUSSION

This study demonstrated that older women, primigravida women, who delivered their children in a privately funded hospital and did not have a companionship had higher chances of experiencing a cesarean section.

Over the past few years, a relationship has been observed between the increase in the average age of pregnant women and the increase in the number of cesareans[17]. The association between mode of delivery and maternal age has been observed in other studies. More advanced ages were related to complications that reflect the choice of delivery mode[18-19]. In this study, this association remained significant even after adjustments for complications and other confounders, reinforcing the independent relationship with generational factors[20]. Although in recent years the recommendation has been that women choose the mode of delivery, this option still happens based on professional information, which allows fewer choices, induces decisions and hurts women's autonomy[20].

The socially constructed character of childbirth contributes to its different meanings in a society, varying according to generations, races, ethnicities and social classes. The factors of generation and motherhood in relation to the increasing age have been little studied[21].

In pregnancy experiences, social aspects are translated by ingrained cultures, considered natural[22]. Thus, the reduction in fertility that occurs with increasing age also leads to a social understanding of worse health status, since in Western society, the perception of women's health is often related to the fertility factor. The indication of cesarean section, which is often related to social perceptions and not scientific evidence, can be based only on technical (biological) issues for poor health conditions, as it is assumed to be the condition of older women.

In this study, among first-time pregnant women, there was a higher chance of having children by cesarean section. In primigravida, a cesarean delivery must also be performed with precise indication[23]. It is known that the evolution of labor tends to take longer among primiparous women[24] and culminates in a higher number of unnecessary interventions[25], including cesarean sections. The American College of Obstetricians and Gynecologists[26] guides the reduction of the number of caesarean deliveries in primiparous women, as this choice may be decisive in future pregnancies[20,26]. In this case, differently from older women, who are perceived as having a fragile health, the cesarean delivery route is used for primiparous women as an option related to the lack of experience, capable of responding to a cultural demand. In this case, the experience would be an uncontrollable one, which is learned in a way that involves suffering and also requires authority from women, authority to experience something that has been controlled by doctors since the 18th century[27].

This study also showed that not having a companionship increases women's chance of undergoing a cesarean section. Having a companionship in labor and postpartum is a parturient woman's right supported by Brazilian law 11,108 of April 7, 2005. The presence of a companionship in labor is proven to be related to emotional benefits. Provides calm, tranquility and security. This undoubtedly contributes to a reduction in the rate of cesarean section, a decrease in the use of oxytocin, time of labor and use of drugs for pain relief[1].

Finally, this study showed that cesarean rates are related to the funding of the hospital, that is, women in the private system are more likely to have surgical delivery compared to women in public hospitals, with a significant association after adjustments. This relationship has been observed in other studies[4,28], thereby suggesting the occurrence of a large number of cesarean sections without indication, mainly, in the private sector.

The practice of cesarean delivery due to maternal decision is not usual in Brazilian public hospitals[29]. Especially in university maternity wards, care protocols are well defined and routinely used, thereby avoiding unnecessary cesarean deliveries. In these environments, concerns about the humanization of care emerge as part of a multidisciplinary team in which evidence-based practice is valued.

In recent years, cesarean section has ceased to be an exclusive method for improving perinatal results, often becoming a consumer commodity, more common in women with greater purchasing power and high schooling[26]. Therefore, socioeconomic issues can be related to female protagonism in the choice for the mode of delivery, issues of access and equity in health services[30]. In this direction, choosing a cesarean delivery can also be related to social status and the fact that women can choose the day and time the baby will be born and the perspective of avoiding the pain of vaginal delivery[28].

Obstetric interventions, especially cesarean sections, showed great disparity between the risk groups and a still very high rate in the usual risk group composed of pregnant women with no real clinical or obstetric indication for cesarean section[31]. The risks outweigh the benefits and therefore, caesarean deliveries should be performed with caution and safety[5]. Possible complications are associated with postpartum infection, admission to the intensive care unit, maternal death, among others.

In this sense, the factors associated with the mode of delivery found in this study lead us to the discussion about "contracted maternity" and "experience maternity" that helps to problematize choices in the obstetric context and can result in very different perspectives[12]. On the one hand, there are choices related to the perspective of contracted maternity, in which although women decide, they end up adhering to practices that distance them from their own bodies and selfless desires in the face of institutional control[12]. On the other hand, there are more referenced choices from the perspective of experience, in which there is a possibility to create, experiment and even transcend the hegemonic institutional models[12].

The decision of mode of delivery should often be analyzed by more than one health professional and made together with the pregnant woman, respecting their autonomy. The training of some professionals can guide them to the understanding of cesarean delivery as a practical and safe procedure, in addition to the surgery being recognized by several parturient women as a pain reduction mechanism, disregarding perinatal risks[31].

Study limitations

Firstly, the fact that interviews were conducted after delivery may have altered the report of some women. In addition, some data regarding conditions that could be associated with the indication for cesarean delivery were absent, even though the availability in the database allowed for inferences, even if indirect. Finally, the need to replicate these analyzes in a representative sample for the city of Belo Horizonte is reinforced.

Contributions to Nursing

The present study contributes to the advancement in the discussion about factors associated with the mode of delivery in pregnant women. By knowing these factors, multidisciplinary team members can avoid unnecessary interventions in childbirth and birth care. Such professionals must be based on recent scientific evidence and have an efficient clinical judgment in order to prioritize essential aspects in this context, such as the woman's desire and her physiological conditions.

CONCLUSIONS

The knowledge of factors associated with the prevalence of cesarean deliveries can support reflections among health professionals about this surgical procedure in certain situations, especially when there are no precise clinical indications. A cesarean delivery should be performed when a benefit is identified that neutralizes the costs and risks added to this mode of delivery.

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