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Association between early pregnant hospitalization and use of obstetric interventions and cesarean: a cross-sectional study

Associação entre internação precoce de gestantes e uso de intervenções obstétricas e cesarianas: estudo transversal

Relación entre internación precoz de embarazadas y uso de intervenciones obstétrica y cesarianas: estudio transversal

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ABSTRACT

Objective: Evaluate the association between early pregnant hospitalization and the use of obstetric interventions and cesarean delivery route. **Methods:** Cross-sectional study, with 758 women selected at the time of childbirth. It was assumed as early hospitalization when the woman was admitted to the hospital having less than 6 cm of cervical dilation. Logistic regression models were constructed in order to estimate the *odds ratio* for each obstetric intervention, adjusted by sociodemographic and obstetric variables. **Results:** 73.22% of women were early hospitalized. On average, they had 1.97 times the chance to undergo Kristeller's maneuver, 2.59 and 1.80 times the chance to receive oxytocin infusion and analgesia, respectively, and 8 times more chances to having their children by cesarean delivery when compared to women that had timely hospitalization. **Conclusion:** Early hospitalized women were submitted to a higher number of obstetric intervention and had increased chances of undergoing cesarean sections.

Descriptors: Obstetric Nursing; Perinatal Care; Childbirth; Labor, Obstetric; Clinical Protocols.

RESUMO

Objetivo: Avaliar a associação entre a internação precoce de gestantes e o uso de intervenções obstétricas e via de nascimento cesariana. **Métodos:** Estudo transversal, com 758 mulheres selecionadas por ocasião da realização de parto. Assumiu-se como internação precoce quando a mulher foi admitida no hospital tendo menos que 6 cm de dilatação cervical. Foram construídos modelos de regressão logística para estimar a *odds ratio* para cada intervenção obstétrica, ajustados pelas variáveis sociodemográficas e obstétricas. **Resultados:** Das mulheres, 73,22% foram internadas precocemente. Em média, estas tiveram 1,97 vezes a chance de sofrerem a manobra de Kristeller, 2,59 e 1,80 vezes a chance de receberem a infusão de ocitocina e analgesia, respectivamente, e 8 vezes mais chances de terem seus filhos por cesariana quando comparadas às mulheres que tiveram a internação oportuna. **Conclusão:** Mulheres internadas precocemente foram submetidas a um maior número de intervenção obstétrica e tiveram chances aumentadas de sofrerem cesarianas.

Descritores: Enfermagem Obstétrica; Assistência Perinatal; Parto; Trabalho de Parto; Protocolos Clínicos.

RESUMEN

Objetivo: Evaluar relación entre internación precoz de embarazadas y uso de intervenciones obstétricas y vía de nacimiento cesariana. **Métodos:** Estudio transversal, con 758 mujeres seleccionadas por ocasión de realización de parto. Se asumió como internación precoz cuando la mujer ha sido admitida en hospital teniendo menos que 6 cm de dilatación cervical. Han construidos modelos de regresión logística para estimar la *odds ratio* para cada intervención obstétrica, ajustados por variables sociodemográficas y obstétricas. **Resultados:** De las mujeres, 73,22% se internaron precozmente. En media, estas tuvieron 1,97 veces la chance de sufrieren la maniobra de Kristeller, 2,59 y 1,80 veces la chance de recibir la infusión de oxitocina y analgesia, respectivamente, y 8 veces más chances de tener sus hijos por cesariana cuando comparadas a las mujeres que tuvieron internación oportuna. **Conclusión:** Mujeres internadas precozmente se someten a un mayor número de intervención obstétrica y tuvieron chances aumentadas de sufrir cesarianas.

Descriptores: Enfermería Obstétrica; Asistencia Perinatal; Parto; Trabajo de Parto; Protocolos Clínicos.

INTRODUCTION

In recent years, the prevalence of births by cesarean delivery have increased in the world [1]. In the United States, around 33% of women undergo surgeries[2]. In Brazil, a nationwide study from the early 2010s showed that cesarean rates varied from 87.9% in private sector to 42.9% in public sector[3]. It should be noticed that the World Health Organization (WHO), in 1985 and later in 2015, pointed that cesarean delivery is an effective alternative to decrease the mother death and perinatal taxes when there is real indication. However, cesarean delivery taxes over 10% do not decrease such negative outcomes[4].

Given the expressive number of cesarean deliveries, authors discuss the moment considered safer to hospitalization of the woman[5]. In Brazil, the definition of normal progression of first stage labor is based on data published in the 1950s. Friedman's[6] study consider that the latent phase of labor comprise from 0-4 centimeters (cm) of cervical dilation; and the active stage, from 4 to 10 cm, opportune moment for the parturient woman's hospitalization[6].

In 2010, data from 60 thousand women from the United States provided estimates for the building of a modern labor progression curve, which consider for admission, a value of 6 cm of Cervical Dilation (CD), and shows that early hospitalization is associated to a higher risk of unnecessary interventions[5], such as cesarean deliveries, greater infusion of oxytocin and epidural, increased episiotomy rate, regardless the parturient woman's hospitalization[7-8].

American College of Obstetricians and Gynecologists (ACOG) and Society for Maternal-Fetal Medicine (SMFM) guidelines established that, in order to decrease cesarean delivery taxes, it should be used the value of 6 cm of CD as a parameter to start the active phase of labor[9]. Scientific evidences show that several practices in labor assistance, such as timely hospitalization, are crucial for better obstetric results and undoubtedly contributes for the decrease of negative perinatal outcomes.

Given the above, scientific evidence culminated in the development of recommendations about care patterns related to labor and birth, denominated "Good practices in childbirth care". These evidences were used as a basis for the creation of National Guidelines for Assistance of Normal Childbirth, developed by the Ministry of Health (MH) and partner institutions, aiming the provision of subsidies and guidance to all those involved in the care, in order to promote, protect and encourage vaginal delivery[10].

Considering the persistence of high rates of interventions without indications based on scientific evidences, this study presents the hypothesis that the early hospitalization (before 6 cm of cervical dilation) elevates the use of obstetric interventions (OI) and the occurrence of unnecessary cesarean deliveries. The results obtained should subside health actions aimed at improving delivery and birth care practices.

OBJECTIVE

Evaluate the association between early pregnant hospitalization and the use of obstetric interventions and cesarean delivery route.

METHODS

Ethical aspects

The present study was approved by the had the Ethics Committee of the Federal University of Minas Gerais, as well as by the heads of the maternity hospitals involved, and all women interviewed recently signed the Free Informed Consent Form.

Design, place of study and period

This is an observational study, with cross-sectional design guided by the STROBE tool, and developed based on the data from the survey "Born in Belo Horizonte: Survey on childbirth and birth", held in 11 maternity hospitals in Belo Horizonte, State of Minas Gerais, 7 of them with public service, and 4 with private service.

Data collection was done by means of interviews performed by nurses trained by the Project coordinating teams, carried out with the mothers through the application of a structured research instrument, at least six hours after labor, in the period of November 2011 to March 2013. In addition, mother's medical records data was used. More information about the sample design are detailed in another publication [11].

Sample

For sample calculation, the number of childbirths performed in each participant maternity that had 500 or more born alive in 2007 was used, according to the Born Alive Information System (SINASC). The sample process had three stages: selection of participant hospitals, reverse sampling method, and random selection of mothers.

For this study, all the pregnant admitted in the selected maternities on childbirth, and those who had the CD information by evaluated by a professional at the moment of the admission registered in their medical records were considered eligible. The final sample had 758 mothers, of a total of 1,088.

Study protocol

As the main explanatory variable, early hospitalization was considered the moment when the women were admitted at the hospital with less than 6 cm of CD in active stage of labor, given that: 0 – CD ≥ 6 cm; and 1 – DC < 6 cm.

The outcomes of this study were obstetric interventions (OIs) and delivery route (vaginal or cesarean). OIs were based on the recommendations regarding care patterns in normal birth, proposed by WHO in 1996 and, subsequently, ratified by the Ministry of Health and called "Good practices in the care of normal birth"[12]. They are: demonstrably useful practices that should be stimulated; clearly harmful or ineffective practices that must be eliminated ("lying on your back with legs raised" position" and Kristeller' maneuver), and practices frequently used inappropriately during labor and childbirth (amniotomy, oxytocin infusion, analgesia and episiotomy)[12].

Other variables included in this survey refer to sociodemographic characteristics (age, color, paid employment, education, and presence of a partner), obstetric/pregnancy history (companion during hospitalization, gestational age, number of prenatal consultations, primiparity), clinics, delivery route, in addition to

characteristics of the institution: hospital funding source (public or private), and presence of obstetric nurse (no/yes). It was also created a variable called intercurrences (clinic or obstetric) during pregnancy or childbirth and that, possibly, would influence both the greater chance of early hospitalizations, regardless of CD, and the cesarean delivery route. Intercurrence was considered when there was at least one of the following conditions present: pre-existing clinical diseases, hypertensive syndromes, diabetes, gestational diabetes, HIV infection, restricted intrauterine growth (IUGR), oligohydramnios, polyhydramnios, isoimmunization, 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 isthmus incompetence (CII), premature amniorexis, eclampsia and previous uterine surgeries (myomectomy, microcesarean or other body surgeries). It should be noted that, for some variables, the total number of categories may be less than the total number of samples, due to loss of information.

Analysis of results and statistics

A Statistical Software for Professional (Stata) package, version 14.0, was used in order to perform the data analysis.

Estimates were presented in proportions (%), with their appropriate confidence intervals (CI) of 95%. For quantitative variables, after verifying the asymmetry by statistical test Shapiro-Wilk, sampled data was presented using the median and interquartile range (IQR).

In order to verify the association magnitude between the CD and the use of OIs, logistic regression models were built to estimate the *odds ratio* (OR) for each IO, adjusted by the sociodemographic and obstetric variables. In order to evaluate the adjustments of the final model, the Hosmer-Lemeshow goodness-of-fit method was used.

RESULTS

The sample of this study was composed by 758 women, with an average age of 26 years old (IQ: 21-31), and predominated: the self-referenced color – brown (66.62%), those who did not have a paid employment (52.51%), with complete high school (57.86%), and lived with the partner (68.07%) (Table 1).

Among the 758 women hospitalized with register of dilation, 555 (73.22%) were early hospitalized (< 6 cm of CD) (data not shown). Table 2 shows the influence of early hospitalization in the models of logistic regression for each outcome studied. A priori, in gross model, the early hospitalization was associated with Kristeller's maneuver, oxytocin infusion, analgesia, and cesarean delivery route. Those associations were kept in Model 1, after adjustment by sociodemographic variables (Table 2).

In the final model, adjusted by sociodemographic and obstetric variables (Model 2), the influence of early hospitalization on obstetric practices was observed: Kristeller's maneuver, oxytocin infusion, analgesia, and cesarean delivery route.

Regarding clearly harmful or inefficient practices that must be eliminated, it is observed that early hospitalized women had, on average, 1.97 times (IC95% 1.20-3.22) the chance to undergoing Kristeller's maneuver, when compared to women that had the hospitalization with 6 cm or more of CD, with adjustments by sociodemographic and obstetric variables (Table 2).

In relation to obstetric practices used in an unappropriated way in the moment of labor and childbirth, it was verified that early hospitalized woman had, on average, 2.59 (IC95% 1.73-3.87) and 1.80 (IC95% 1.07-3.01) times the chance to receive the oxytocin infusion and analgesia, respectively, when compared to women that had a timely hospitalization (≥ 6 cm of CD), with adjustments by sociodemographic and obstetric variables (Table 2).

Women who had early hospitalization for the birth of their babies showed an increase, on average, of 8.00 (IC95% 4.32-14.81) times the chance of having their children by cesarean birth in relation to those who were hospitalized after 6 cm of CD, adjusted by sociodemographic and obstetric variables (Table 2).

Table 1 – Sample characterization, Belo Horizonte, Minas Gerais, Brazil, 2011-2013

Variables	n (%)
Age (years)*	26 (21-31)
Self-referenced color	
White	180 (23.75)
Black	73 (9.63)
Brown**	505 (66.62)
Paid employment	
Yes	360 (47.49)
No	398 (52.51)
Education	
Primary school	248 (32.76)
High school	438 (57.86)
College education	71 (9.38)
With partner	
Yes	516 (68.07)
No	242 (31.93)

*Notes: * Average (interquartile range); ** Includes: Brown, dark-skinned, yellow and indigenous.*

Table 2 – Gross and adjusted models about the influence of early hospitalization in obstetric interventions and on delivery route, Belo Horizonte, Minas Gerais, Brazil, 2011-2013

	Gross Model		Model 1*		Model 2**	
	OR (IC95%)	*p* value	OR adjusted (IC95%)	*p* value	OR adjusted (IC95%)	*p* value
Clearly harmful or ineffective practices that must be eliminated						
"Lying on your back with legs raised" position						
Early hospitalization						
Yes	1.04 (0.63-1.71)	0.860	1.07 (0.65-1.78)	0.768	1.20 (0.67-2.14)	0.536
Kristeller's maneuver						
Early hospitalization						
Yes	1.90 (1.27-2.84)	0.002	1.87 (1.24-2.82)	0.003	1.97 (1.20-3.22)	0.007

To be continued

Table 2 (concluded)

	Gross Model		Model 1*		Model 2**	
	OR (IC95%)	*p* value	OR adjusted (IC95%)	*p* value	OR adjusted (IC95%)	*p* value
Practices frequently used inappropriately during labor and childbirth						
Amniotomy						
Early hospitalization						
Yes	1.30 (0.79-2.13)	0.285	1.31 (0.78-2.17)	0.297	1.20 (0.68-2.10)	0.522
Oxytocin infusion						
Early hospitalization						
Yes	2.80 (1.93-4.06)	**<0.001**	2.92 (2.00-4.27)	**<0.001**	2.59 (1.73-3.87)	**<0.001**
Analgesia						
Early hospitalization						
Yes	2.08 (1.34-3.24)	0.001	2.03 (1.29-3.18)	0.002	1.80 (1.07-3.01)	0.024
Episiotomy						
Early hospitalization						
Yes	1.43 (0.94-2.16)	0.091	1.41 (0.91-2.16)	0.114	1.10 (0.67-1.82)	0.687
Delivery Route - Cesarean Delivery						
Early hospitalization						
Yes	8.23 (4.73-14.30)	**<0.001**	8.21 (4.66-14.44)	**<0.001**	8.00 (4.32-14.81)	**<0.001**

*Notes: Values in bold = p < 0.05; OR = odds ratio; IC95% = confidence interval of 95%. * Model adjusted by sociodemographic variables (age, education, marital status, color, and paid employment); **Model adjusted by variables present in Model 1 plus obstetric and assistance variables (companion during hospitalization, gestational age, number of prenatal consultations, primiparity, presence of an obstetric nurse at the institution, clinical or obstetric complications and hospital financing); In all models with significance for early hospitalization, the p value in Hosmer-Lemeshow method for the Model 2 was higher than 0.05.*

DISCUSSION

The results of this study showed a significant association between the early hospitalization and the obstetric practices (Kristeller' maneuver, oxytocin infusion, and analgesia), in addition to the influence of cesarean delivery route.

Proper managing during the labor latent stage has the objective that the parturient woman's hospitalization is performed in a timely manner, which contributes to lower risks of interventions and, then, decrease the number of negative outcomes during the labor and childbirth. For timely hospitalization, it would be appropriate for the pregnant woman to be guided, received, supported and receive care and orientations based on good practices in childbirth and birth care[10,12], based on quaternary prevention[13]. In addition, an urgent change in Brazilian obstetric scenario is necessary, overcoming the technocratic model and its resulting hypermedicalization, in order to qualify childbirth care by aligning the use of evidence-based practices in childbirth to women-centered care[13]. Doubtless, this is one of the most evident contributions of obstetric nursing.

Interventionist attention culminates with high taxes of cesarean delivery, and Brazil is worldly recognized for this negative rate. Early hospitalization, as highlighted in this study, increases the chances of cesarean delivery without justification and non-based on scientific evidence. Observational studies have also shown a relation between increased rates of cesarean sections in women who had early admission to labor[8,14-15]. Another possible relation shown by International studies is that parturient women hospitalized in the latent phase receive a higher number of unnecessary interventions, highlighting the oxytocin infusion and[16], which contributes to increase the cesarean delivery rate[7-8,16-17].

It should be noted that the interventions do not occur in isolation, since the oxytocin infusion and were increased in this study, with a higher probability of occurrences in women admitted in latent stage of labor. International studies bring similar findings, and such interventions are statistically related to delivery route[8,18-20]. It was also possible to evaluate that parturient women submitted to analgesia during labor present an increased chance of being subjected to oxytocin infusion[21].

The early hospitalization, associated to cesarean delivery, contributes to negative outcomes, resulting from the unnecessary performance of this procedure. Such surgeries, when indicated without a precise indication, are associated with increased maternal and neonatal morbidity and mortality and lead to longer hospital stays, greater chance of puerperal infection, maternal hemorrhage, delayed peridural analgesia postpartum recovery time, late breastfeeding, prematurity and increased spending on the health system[22-23].

Research conducted with the survey "Born in Brazil: a survey on childbirth and birth" about the use of obstetric interventions during childbirth and labor in pregnant women with usual risk showed high rate of obstetric interventions, revealing that, in large part, interventions were unnecessary[18].

In order to identify necessary obstetric interventions during labor, WHO has proposed, since 1994[24], the use of the partogram, that is the graphic representation of childbirth. Recently, new WHO guidelines regarding intrapartum care for a positive childbirth experience recognize that each childbirth is unique and the duration of the first stage of labor can vary in each woman[25]. Thus, interventions to accelerate childbirth are not recommended, such as the oxytocin infusion or cesarean delivery before 5 cm of CD[25]. The results of this survey also corroborates of a National survey, which indicates the use of oxytocin indiscriminately[18].

Kristeller's maneuver, another unappropriated intervention, due to inefficiency and deleterious effects to women and to the babies[26], is still performed in around 36% of the parturient women in the country[18]. In this study, it was evidenced with a double chance of occurrence in women admitted in the latent phase of childbirth. Such unappropriated interventions and mistakenly used during labor contribute in violating women's right, causing, among other aspects, discomfort for the parturient women. Kristeller's maneuver is classified as one of the numerous possibilities of obstetric violence that parturient woman may suffer.

Findings of this study point to a technocratic obstetric model, in which obstetric interventions are used in unappropriated way, which may result damages to the mother and the newborn. Assistance during labor provides for the work of the multidisciplinary team to avoid the use of unnecessary interventions and to guide the pregnant women about specifics of this moment. It is also evident that the rates of obstetric interventions may be related to the professional conducting labor, being lower when they are nurses[27-28], specially obstetric nurses. In addition to less interventionist care, the performance of obstetric nursing, through its training, seeks to rescue the leadership of women during labor[29]. Together with other members of multidisciplinary team, these professionals recognize the parturition process as physiological and work providing guarantee of rights, safety, and comfort to women during labor, childbirth, and post childbirth[30].

Study limitations

As this is a cross-sectional study, it was not possible to identify the temporality associations shown here. Furthermore, as it was used a medical record to collect information, some information may be lost for certain variables.

Contributions to Nursing area

Despite these limitations, this study advances in the perspective of data analysis still not totally explored in the area of obstetric nursing, for its contribution to reorganization of services, processes and care practices management, in addition to the potential contribution to changing the model of care for childbirth and birth. The results can serve as a basis for better assistance and safer and less technocratic care at birth, replacing the excess of obstetric interventions.

CONCLUSION

The findings of this survey emphasize that women early hospitalized were submitted to a higher number of obstetric interventions and had increased chances of undergoing cesarean section. It is noticed that obstetric care practices are still based on the technocratic care model.

Such results indicate the need to effectuate public policies in women health field and obstetric attention in the country, aiming the adoption of more assertive practices during prenatal care and childbirth. This is a complex task, which passes by professional qualification (that produces interference in work processes, in the multi/interprofessional team and in integrated/people-centered care, supported by the best scientific evidence); by the relations among professionals, users and their families; by health system management and reorganization of process and care practices; by social participation (including women when deciding about their lives and their bodies); and, still, for the issues related to the commercialization of the care to the birth.

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