

## Influence of mode of delivery on satisfaction with hospitalization for childbirth in the study Birth in Brazil

Influência do tipo de parto na satisfação com a internação para o parto na pesquisa Nascer no Brasil

Influencia del tipo de parto en la satisfacción con la hospitalización para el parto en la encuesta Nacer en Brasil

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### Abstract

Controversial results have been reported on the association between mode of delivery and patient satisfaction. This study investigates which mode of delivery leads to greater satisfaction with hospital admission for childbirth. A cohort study was conducted with data from the Birth in Brazil study, which began in 2011. A total of 23,046 postpartum women were included from a random sample of hospitals, selected by conglomerates with a three level stratification. At the first follow-up, 15,582 women were re-interviewed. Mode of delivery, dichotomized into vaginal or cesarean section, and confounders were collected before hospital discharge. The outcome maternal satisfaction, investigated as a 10-item unidimensional construct, was measured by the Hospital Birth Satisfaction Scale up to six months after discharge. We used a directed acyclic graph to define minimal adjustment variables for confounding. The effect of mode of delivery on satisfaction was estimated using a structural equation model with weighting by the inverse of the probability of selection, considering the complex sampling design. The weight was estimated considering the different sample selection probabilities, the losses to follow-up, and the propensity score, which was estimated in a logistic regression model. The analysis revealed no significant difference in satisfaction with hospitalization for childbirth between respondents who had vaginal delivery and cesarean section in the adjusted analysis (standardized coefficient = 0.089; p-value = 0.056). Therefore, women who had vaginal delivery and cesarean section were equally satisfied with their hospitalization for childbirth.

Parturition; Cesarean Section; Natural Childbirth; Patient Satisfaction; Causality

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## Introduction

Although delivery is a physiological process typically without complications<sup>1</sup>, political, socio-economic, cultural, institutional, technical-scientific changes, as well as changes in health and medical work models (which have become more technical and interventionist), have ended up characterizing delivery as an act of medical-hospital responsibility since the mid-21st century<sup>2,3,4,5,6</sup>.

While this medicalization of delivery has presented a positive impact on decreasing maternal and neonatal mortality rates, it has also resulted in medical interventions without scientific indications and loss of women's autonomy over the labor process<sup>1,5</sup>. Consequently, cesarean section rates have increased globally in the first two decades of the 21st century<sup>4,7,8,9,10</sup>, often exceeding the 10% to 15% recommended by the World Health Organization (WHO)<sup>4,11</sup>, and even surpassing vaginal childbirth rates in Brazil, Cyprus, Dominican Republic, and Egypt<sup>12</sup>.

Contrary to this increase in cesarean section rates<sup>12</sup>, studies carried out in countries at different levels of development have shown that, generally, women prefer vaginal childbirth<sup>5,13,14,15,16,17,18,19,20</sup>. Cesarean section, in turn, is preferred by multiparous women undergoing this mode of delivery<sup>13,14,15,17,19,20</sup> and among those with private health insurance<sup>14,20</sup>. The preference for cesarean section was associated with fear of pain<sup>7,13,16,18,20</sup>, perception that it is safer than vaginal delivery<sup>13,18,20</sup>, negative previous experiences in delivery<sup>13</sup>, influence of health professionals, friends, and family members<sup>13</sup>, and limited access to information about the characteristics of these two modes of deliveries<sup>13,17</sup>.

Delivering according to plan<sup>21,22,23,24,25</sup> contributes to maternal satisfaction with hospitalization for delivery. Participating in the choice of mode of delivery; ease of access to the hospital of delivery; facility with appropriate physical structure; availability of medicines and equipment; receiving dignified, respectful, and courteous treatment; privacy and confidentiality in care; availability of technically competent physicians and nurses (especially during emergencies); provision of cognitive and emotional support; and good delivery outcomes were associated with greater satisfaction with the delivery healthcare service in a systematic review<sup>23</sup>. Conversely, the perception of intense pain, especially during labor induction, instrumental vaginal delivery, emergency cesarean section, and prolonged labor, were associated with a negative experience<sup>26</sup>.

Maternal satisfaction with childbirth hospitalization has been more commonly investigated based on theories of satisfaction with care received in health services<sup>23,24</sup>. These theories are based on previous expectations or experiences that occurred during delivery or even on attributes of health services<sup>24,27</sup>. Its measurement instruments in quantitative surveys often assess one or more determinants of maternal satisfaction with labor/birth and vary in the number of items (6 to 30 questions), response options (dichotomous or Likert scale), and variable construction (single score and uni- or multidimensional constructs)<sup>22,23,24,28</sup>.

Based on the above, this study presents the following hypothesis: there should be no differences in maternal satisfaction with hospitalization for vaginal delivery and cesarean section if they are performed as idealized and planned by pregnant women.

## Methods

### Type of study

A cohort study was conducted with data from the first two stages of the *Birth in Brazil* study – a hospital-based population survey, which aimed to study the incidence, associated factors, and consequences of cesarean section in Brazil. The first stage was carried out from February 2011 to October 2012, and the second stage from March 2011 to February 2013<sup>29,30,31</sup>.

### Sampling and data collection

From a list of 1,403 hospitals with more than 500 deliveries per year registered in the Brazilian Information System on Live Births (SINASC), 266 were selected. The sample was stratified by Brazilian

macro-regions (North, Northeast, Central-West, Southeast and South), type of municipality (state capital or not) and hospital administration (public, private or mixed). Each stratum presented at least 450 postpartum women selected from five or more hospitals. Inverse sampling was used to select the number of research days (minimum of seven) to reach 90 interviews per hospital. Information on data collection and sample design of the *Birth in Brazil* study is detailed in three articles <sup>29,30,31</sup>.

In the first stage, 24,200 puerperal women were interviewed during childbirth hospitalization <sup>19,29,30,31</sup>. In the first follow-up, 16,255 mothers were contacted and re-interviewed by telephone, on average 90 days (from 45 days to less than six months) after delivery <sup>29,30,31</sup>.

The basic sample weights were estimated as the inverse of the product of the inclusion probabilities at each stage and calibrated so that the estimates of the total live births of the strata corresponded to the total live births obtained from SINASC. For the telephone follow-up, conducted six months later, the probability of puerperal women's response was modeled by the variables available at the baseline survey to correct the sample weights for non-response in the second phase. The probability of response was estimated as a function of the three variables that define the stratum (macro-region, capital or not, and hospital administration) and the Brazilian Economic Classification Criteria <sup>32</sup>: age group, paid employment, satisfaction with the pregnancy at the beginning and stillbirth or neonatal death <sup>31</sup>.

### **Scale of satisfaction with hospitalization for delivery**

The scale of satisfaction with hospital for delivery, with a total of eleven items, was part of Block III (Satisfaction with Hospital Care) of the *Birth in Brazil* survey. It is an instrument that mainly assesses the work of health professionals during childbirth hospitalization <sup>28</sup>.

The first seven questions of this scale were extracted from the *World Health Survey* and adapted to childbirth hospitalization (items 1 to 7) <sup>33</sup>. As satisfaction with hospital care during delivery involves aspects not covered in these seven *World Health Survey* questions, one question on verbal, psychological, and physical violence practiced by care professionals (item 8), and three questions on general satisfaction with delivery, postpartum, and neonatal (items 9 to 11) were added. Psychometric analyses of the scale showed that it was a unidimensional construct of ten items with 0.91 composite reliability <sup>28</sup>.

### **Theoretical model and variable**

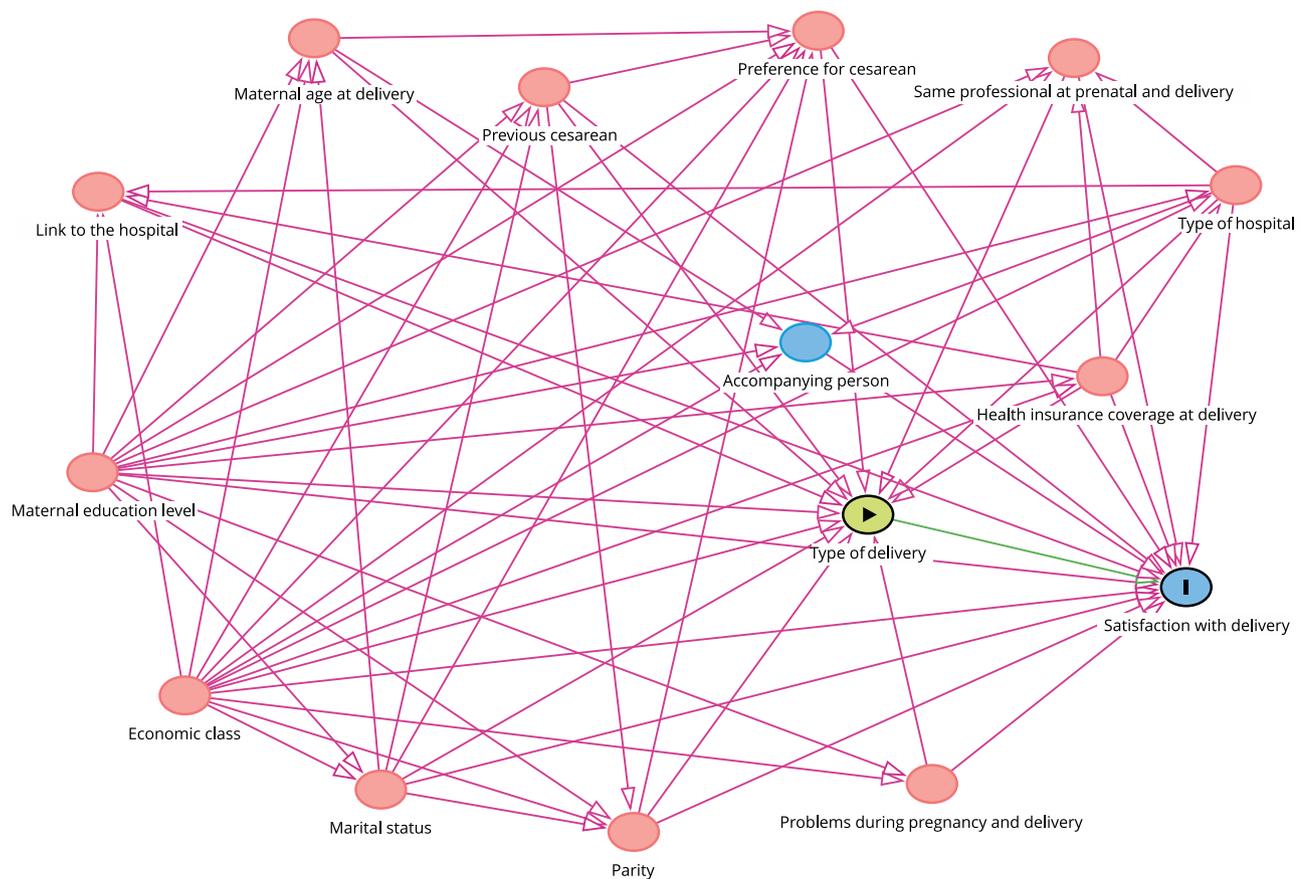
The theoretical model (Figure 1) was presented as a directed acyclic graph (DAG). The exposure variable mode of delivery was dichotomized into vaginal delivery and cesarean section. The outcome satisfaction with childbirth hospitalization was tested as a 10-item unidimensional latent variable. Mode of delivery and its predictor variables were collected in the after birth and the outcome satisfaction in the first stage of the follow-up.

The predictive variables of the mode of delivery were the following: Brazilian Economic Classification Criteria <sup>32</sup>, categorized as D/E, C and A/B, according to possession of goods and the education level of the head of the family, with categories A and B having greater purchasing power; maternal schooling, measured in years of study (0-4, 5-8, 9-11 or  $\geq 12$  years); marital status, categorized as: single, consensual union, and married; maternal age at birth, with categories < 20 years old, 20-34 years old, and  $\geq 35$  years old; type of hospital according to funding, with the Brazilian Unified National Health System (SUS) and private categories; previous cesarean section, with the primiparous categories, with and without cesarean section; preference for the mode of delivery, categorized in "had not decided", "normal delivery", and "cesarean section"; and, also, categorized as "no" and "yes"; "pregnancy and/or delivery complications" <sup>19</sup>; "private health insurance coverage of delivery"; "link to the hospital"; and "same professional at prenatal and childbirth".

To construct the variable "pregnancy or delivery problems", the occurrence of the following situations that could be associated with the decision for cesarean section was investigated: pre-existing clinical diseases, alterations in the cervix, intrauterine growth restriction, oligohydramnios, polyhydramnios, Rh-negative blood, placenta previa, placental abruption, loss of amniotic fluid, gestational diabetes, gestational hypertension, eclampsia, threatened preterm labor, fetal distress, syphilis, urinary tract infection, HIV infection, toxoplasmosis, streptococcal vulvovaginitis, congenital malforma-

**Figure 1**

Directed acyclic graph for estimating the causal effect of cesarean section on women's satisfaction with childbirth hospital admission. Brazil, 2011-2013.



tion, hepatitis B and C, complications that influence the negative outcome of the newborn, complications that influence the mode of delivery, and previous uterine surgery and seizure.

### **Statistical analysis**

Counterfactual approach<sup>34</sup> was used to estimate the effect of mode of delivery on maternal satisfaction with childbirth hospitalization. Initially, the propensity score was estimated with logistic regression<sup>35</sup> in the birth database. Via the back door criterion, a method proposed by Pearl<sup>36</sup> and Pearl et al.<sup>37</sup>, the minimum set of adjustment for confounding was selected with the help of the public domain program DAGitty (<http://www.dagitty.net/>)<sup>38</sup>.

The balance of pre-exposure variables was verified via standardized absolute differences in means and variance ratios between vaginal childbirth or cesarean section groups using the `tebalance` command after the `teffects ipw` routine command in Stata, version 14 (<https://www.stata.com>)<sup>39</sup>. Balance was reached as the standardized absolute differences in the means ranged from -0.10 to 0.10 and the variance ratios from 0.8 to 1.2<sup>40,41</sup>. Observations were weighted as follows: for the group born by cesarean section, weight was the inverse of the probability of cesarean section and it was the inverse of the probability of vaginal delivery for the group born by vaginal delivery, i.e., the inverse of one minus the probability of being born by cesarean section.

The effect of the mode of delivery on satisfaction was estimated in a structural equation model with mode of delivery as exposure and the satisfaction construct as response variable, weighted by the inverse of the selection probability, considering the complex sampling design. The weight was estimated considering the different probabilities of sample selection, the losses to follow-up, and the weight obtained from the propensity score<sup>42</sup>. Standardization was performed only for the response variable. Comparisons were made between weighted percentages considering only the complex sampling design to those also considering losses to follow-up to assess to what extent inverse probability weighting was able to reduce selection bias.

Mplus version 8.5 software program (<https://www.statmodel.com/>) was used and, as the variables were ordinal categorical, the weighted least square mean and variance adjusted (WLSMV)<sup>43</sup> was used.

The model fit was tested using the following indicators: (a) p-value < 0.05 and upper limit of the confidence interval < 0.08 for the root mean square error of approximation (RMSEA)<sup>44</sup> index; (b) values > 0.95 for the comparative fit index (CFI) and Tucker Lewis index (TLI); and (c) standardized root mean square residual (SRMR) < 0.05<sup>42,45</sup>.

### **Ethical aspects**

The project complied with the principles of *Resolution n. 196/1996*, which deals with research involving human beings, and the Brazilian National Health Council and its complementary rules. It was approved by the Ethics Research Committee of the Sergio Arouca National School of Public Health, Oswaldo Cruz Foundation (ENSP/Fiocruz, CAAE 0096.0.031.000-10). Those responsible in each institution and all postpartum women signed an informed consent form at the face-to-face interview.

### **Results**

For the purposes of this study, from the total of 24,200 deliveries in the hospital sample, 488 multiple births, 64 neonatal deaths, as well as missing data for mode of delivery (n = 304), maternal education (n = 104), marital status (n = 8), economic class (n = 154), maternal age at delivery (n = 4), and the same professional attending prenatal care and childbirth (n = 28) were excluded, totaling 23,046 cases in the first stage. In the first follow-up, after losses and exclusions, 15,582 complete cases remained.

In the follow-up, there was a lower proportion of mothers from classes D/E, < 9 years of maternal schooling, single, younger than 20 years, users of SUS, without previous cesarean section, with preference for normal delivery, without pregnancy and labor complications, without health insurance, without link to the hospital, and not attended by the same professional at prenatal and childbirth. Inverse probability weighting considering losses to follow-up reduced selection bias – weighted percentages that considered losses to follow-up were closer to those at birth than to those at follow-up uncorrected (Table 1).

More than half of the interviewees in the final sample of this study (52.2%) underwent cesarean section (result not shown). Almost all predictor variables tested were independently associated with cesarean section, except for the Brazilian economic classification, having health insurance at delivery, and link to the hospital. The predictors strongly associated with cesarean section were same professional at prenatal and childbirth (OR = 5.53; 95%CI: 4.34-7.05), pregnancy and/or labor complications (OR = 4.58; 95%CI: 4.04-5.19), childbirth hospitalization in a private hospital (OR = 4.40; 95%CI: 2.48-7.79), and previous cesarean section (OR = 3.65; 95%CI: 3.06-4.34) (Table 2).

The balance was obtained for all variables, with the exception of preference for the mode of delivery and pregnancy and/or labor complications; as for these variables, the standardized absolute difference between the means of both groups was either slightly below or slightly above -0.10, more stringent cutoff, but still ranging from -0.20 to 0.20, i.e., a less stringent but still acceptable cutoff (Table 3).

Both crude and inverse selection probability weighted models showed good fit. In the crude model, cesarean section was associated with greater satisfaction with delivery (standardized coefficient – SC = 0.258; p-value < 0.001, RMSEA = 0.040) (90%CI: 0.038-0.042; CFI = 0.973; TLI = 0.966; SRMR = 0.034). However, after weighting, the association between mode of delivery and satisfaction was no longer statistically significant (SC = 0.046; p-value = 0.056) (Figure 2).

**Table 1**

Comparisons between weighted percentages of the sample at birth and the sample at the follow-up after delivery. *Birth in Brazil*, 2011-2013.

Variables	Frequency	% at birth **	% at follow-up uncorrected **	% at follow-up corrected ***
Brazilian economic classification <sup>32</sup>				
D/E	5,227	23.7	17.1	21.3
C	11,316	52.0	54.8	54.7
A/B	6,503	24.3	28.2	24.0
Maternal education (years of schooling)				
0-4	2,041	9.2	5.8	6.2
5-8	6,206	28.7	26.5	28.1
9-11	9,552	42.6	46.1	45.2
≥ 12	5,247	19.4	21.7	20.4
Marital status				
Single	3,942	18.5	17.9	18.4
Consensual union	11,076	49.1	46.5	46.6
Married	8,028	32.5	35.5	35.0
Maternal age at birth (years)				
< 20	4,184	19.2	17.3	18.0
20-34	16,302	70.4	71.7	71.2
≥ 35	2,560	10.4	11.0	10.8
Type of hospital				
SUS	16,944	80.1	77.6	79.6
Private	6,102	19.9	22.4	20.4
Previous cesarean section				
Primiparous	10,735	46.7	47.9	47.8
No	7,065	31.9	29.9	30.6
Yes	5,246	21.4	22.2	21.6
Preference for mode of delivery				
Had not decided	1,429	6.0	5.9	6.3
Preference for normal delivery	14,648	66.3	65.5	66.6
Preference for cesarean section	6,969	27.8	28.6	27.1
Pregnancy and/or delivery problems				
No	8,598	35.6	34.9	31.5
Yes	14,448	64.4	65.1	68.5
Health insurance coverage at delivery				
No	17,635	81.9	79.6	82.4
Yes	5,411	18.1	20.4	17.6
Link to the hospital				
No	9,318	41.6	39.8	39.4
Yes	13,728	58.4	60.2	60.6
Same professional at prenatal and delivery				
No	16,381	77.1	74.5	76.2
Yes	6,665	22.9	25.5	23.8
<b>Total</b>	<b>23,046</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

SUS: Brazilian Unified National Health System.

\* Due to the huge sample size all differences were statistically significant;

\*\* Weighted percentage considered the complex sampling design;

\*\*\* Weighted percentage considered the complex sampling design, losses to follow-up and the weight obtained from the propensity score.

**Table 2**Predictors of cesarean section. *Birth in Brazil*, 2011-2013.

Predictors	Frequency	% of cesarean *	OR	95%CI
Brazilian Economic Classification <sup>32</sup>				
D/E	5,227	36.3	1.00	-
C	11,316	50.0	1.05	0.91-1.20
A/B	6,503	72.4	1.11	0.92-1.35
Maternal education (years of schooling)				
0-4	2,041	33.4	1.00	-
5-8	6,206	41.0	1.30	1.08-1.57
9-11	9,552	53.5	1.34	1.09-1.66
≥ 12	5,247	74.8	1.50	1.15-1.95
Marital status				
Single	3,942	45.1	1.00	-
Consensual union	11,076	45.3	1.18	1.02-1.36
Married	8,028	66.7	1.43	1.22-1.67
Maternal age at birth (years)				
< 20	4,184	37.6	1.00	-
20-34	16,302	54.1	1.46	1.30-1.64
≥ 35	2,560	65.9	2.08	1.73-2.51
Type of hospital				
SUS	16,944	43.2	1.00	-
Private	6,102	88.3	4.40	2.48-7.79
Previous cesarean section				
Primiparous	10,735	56.4	1.00	-
No	7,065	23.2	0.23	0.21-0.26
Yes	5,246	86.1	3.65	3.06-4.34
Preference for mode of delivery				
Had not decided	1,429	63.0	1.00	-
Preference for normal delivery	14,648	42.3	0.69	0.57-0.83
Preference for cesarean section	6,969	73.5	1.29	1.06-1.57
Pregnancy and/or delivery complications				
No	8,598	36.2	1.00	-
Yes	14,448	61.1	4.58	4.04-5.19
Health insurance coverage at delivery				
No	17,635	44.3	1.00	-
Yes	5,411	87.8	0.74	0.41-1.32
Link to the hospital				
No	9,318	46.9	1.00	-
Yes	13,728	56.0	1.09	0.99-1.20
Same professional at prenatal and delivery				
No	16,381	41.5	1.00	-
Yes	6,665	88.2	5.53	4.34-7.05
<b>Total</b>	<b>23,046</b>	<b>52.2</b>	<b>-</b>	<b>-</b>

95%CI: 95% confidence interval; OR: odds ratio; SUS: Brazilian Unified National Health System.

\* Weighted percentage.

**Table 3**

Standardized absolute differences in means and variance ratios between vaginal and cesarean delivery groups. *Birth in Brazil, 2011-2013.*

Variables	Mean		Variance ratios	
	Crude	Weighted	Crude	Weighted
Brazilian economic classification <sup>32</sup>				
D/E	-0.31	0.01	0.56	1.01
C	-0.26	0.01	1.03	1.00
A/B	0.55	-0.02	1.66	0.99
Maternal education (years of schooling)				
0-4	-0.19	0.03	0.47	1.12
5-8	-0.34	-0.06	0.67	0.93
9-11	-0.05	0.04	0.99	1.01
≥ 12	0.53	0.01	2.05	1.00
Marital status				
Single	-0.16	0.02	0.75	1.04
Consensual union	-0.30	0.04	0.96	1.01
Married	0.45	-0.06	1.30	0.98
Maternal age at birth (years)				
< 20	-0.31	0.02	0.58	1.03
20-34	0.10	-0.02	0.91	1.02
≥ 35	0.22	0.01	1.77	1.02
Type of hospital				
Private	0.94	0.01	3.59	1.01
Previous cesarean section				
Primiparous	0.14	0.04	1.01	1.00
No	-0.84	0.01	0.47	1.02
Yes	0.76	-0.06	3.84	0.93
Preference for type of delivery				
Had not decided	0.11	-0.02	1.55	0.93
Preference for normal delivery	-0.62	-0.11	1.53	1.07
Preference for cesarean delivery	0.59	0.13	1.80	1.12
Pregnancy and/or delivery problems				
Yes	0.38	-0.17	0.83	1.14
Health insurance at delivery				
Yes	0.83	0.10	3.62	1.12
Link to the hospital				
Yes	0.19	-0.04	0.92	1.02
Same professional at prenatal and childbirth				
Yes	1.03	-0.01	3.51	1.00

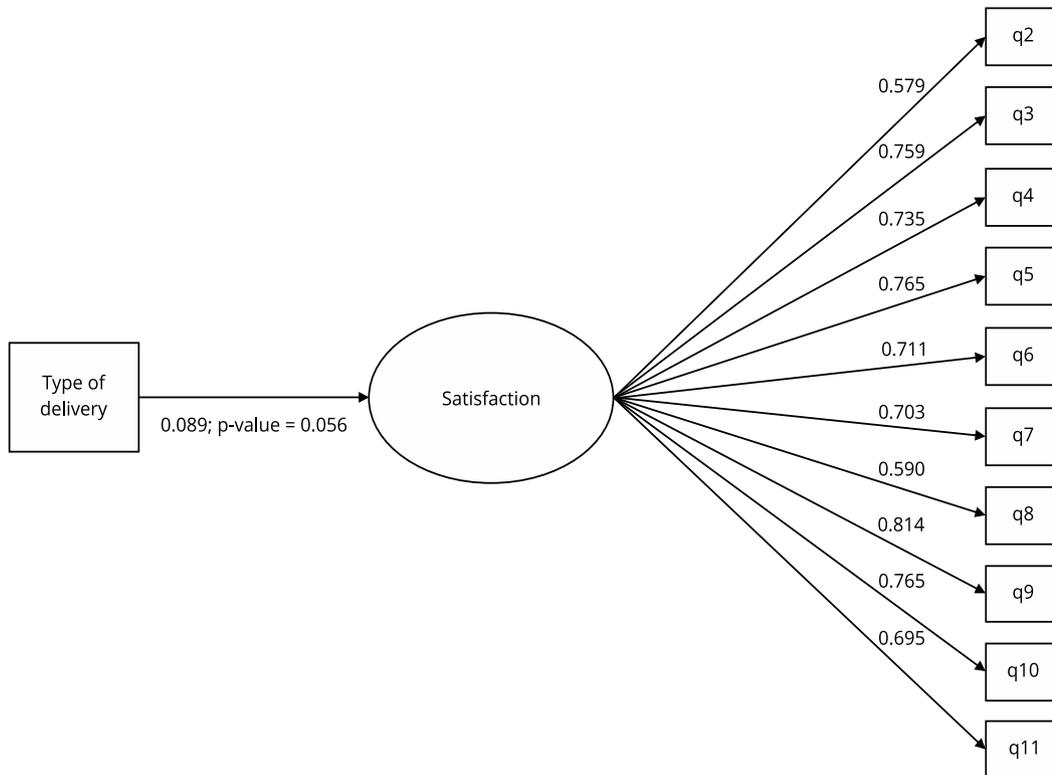
## Discussion

The results of this study showed that users of Brazilian hospital services were equally satisfied with hospital admission for both vaginal and cesarean delivery.

The limitations of this study are related to selection and memory biases, losses to follow-up, and characteristics of the instrument that measured satisfaction. Regarding memory bias, the authors consider that the data collection time from 45 days to less than six months after delivery was adequate to measure maternal satisfaction with hospital admission for delivery. This is because a systematic review on instruments to measure satisfaction with care during labor and childbirth suggested that

**Figure 2**

Structural equation model adjusted by the inverse probability of selection to estimate the effect of cesarean section on satisfaction with childbirth hospital admission. Brazil, 2011-2013.



interviews should be conducted after hospital discharge so that problems that occurred during hospitalization were not overshadowed by the birth of a healthy baby<sup>24</sup>. Concerning the selection bias, the weighting technique by the inverse of the selection probability was performed. The final weight was estimated considering the different probabilities of sample selection, the losses to follow-up, and the weight obtained from the propensity score. The joint use of these techniques tends to reduce the likelihood of selection bias and confounding that arise due to the variables used to derive the weights. However, selection bias and confounding due to other variables not included in the weight calculation may still be present.

The scale used in this study to measure maternal satisfaction with hospital admission for delivery showed good evidence of validity and excellent psychometric properties<sup>28</sup>. As for the instrument to assess the work of health professionals in delivery care, a systematic review drew attention to the fact that the interpersonal relationship between the user and the health team was the main determinant of satisfaction with childbirth hospitalization<sup>23</sup>.

This study advances compared to other studies due to the set of methodological strategies used: (a) a prospective cohort study with random and stratified sampling at three levels was conducted: macro-region, type of municipality (capital or not capital), type of hospital administration, which brought together women from different socioeconomic and cultural conditions in a large country such as Brazil; and (b) a set of methodological techniques was used to better study causality relationship:

directed acyclic graphs, counterfactual approach, maternal satisfaction with childbirth hospitalization outcome estimated as a latent variable, and estimation of the causal effect in a structural equation model with inverse weighting of selection probability, with weights derived from the propensity score, follow-up losses, and considering the complex sampling design.

No difference in satisfaction with hospital admission according to mode of delivery can be explained by the women's final decision between the vaginal childbirth and cesarean section since, at the end of pregnancy, they gave birth as planned. This finding is in line with analyses of qualitative, quantitative, and systematic review studies that found similar satisfaction when the mode of delivery planned was performed<sup>21,22,23,24,25,46</sup>. Our results are in agreement with those reported in a cross-sectional study with 355 Swedish postpartum women who were interviewed before hospital discharge, in which no differences were observed in maternal satisfaction according to vaginal and cesarean mode of delivery<sup>47</sup>. In another study, which recruited 335 German women who had full-term newborns without congenital malformations, no differences were found in the satisfaction of women who had vaginal childbirth or cesarean section, including emergency cesarean section and surgical vaginal delivery. The authors concluded that the mode of delivery did not directly influence women's satisfaction with delivery. The factors that improved woman's experience with birth the most were decision-making power, support received, and effective analgesia<sup>27</sup>.

However, in a study of 204 U.S. primiparous women who planned and managed to have a cesarean section (n = 44) or vaginal childbirth (n = 160), maternal satisfaction was higher for those who planned to have a cesarean<sup>48</sup>. Conversely, another study evaluating 894 women shortly after delivery in Ethiopia, greater satisfaction was observed after vaginal delivery<sup>49</sup>. Higher satisfaction scores were also reported after vaginal and cesarean section performed before labor in another U.S. study, whereas a greater dissatisfaction was observed in cesarean births performed after the onset of labor<sup>50</sup>. In another study carried out in Sweden, a greater dissatisfaction was detected when the delivery was prolonged or performed by cesarean section<sup>51</sup>.

Another study from the *Birth in Brazil* survey also found no differences in overall maternal satisfaction according to mode of delivery in the adjusted analysis. However, in that survey, the outcome general satisfaction with delivery was investigated using the question: "In your opinion, was your delivery care...", with an instrument measuring maternal satisfaction with hospital admission for delivery, via a dichotomous variable (no and yes)<sup>30</sup>. In contrast, in our study, a more comprehensive measure of satisfaction with childbirth hospitalization was measured via a latent variable, with no measurement error.

In conclusion, no difference was observed in maternal satisfaction with delivery when comparing women who had vaginal childbirth or cesarean section after adjusting for confounding. However, this equal satisfaction among women who gave birth by vaginal delivery in the *Birth in Brazil* study cohort does not indicate that Brazilian obstetric services always occur with quality and in a humanized way. We must recognize that advances and improvements have been observed in recent years both in the public and private sectors<sup>52</sup>; however, inequalities persist, the adoption of good practices is not as frequent as ideal, and humanized care during childbirth is still an objective to be achieved<sup>53</sup>.

## Contributors

D. D. O. Costa was responsible for ensuring the accuracy and integrity of all aspects of the work. V. S. Ribeiro contributed to the data analysis and interpretation and review and approved the final version. M. R. C. Ribeiro contributed to the study design, data analysis and interpretation, and writing and approved the final version. A. P. Esteves-Pereira contributed to the data analysis and interpretation and approved the final version. M. C. Leal contributed to the data analysis and interpretation and approved the final version. A. A. M. Silva contributed to the study design, data analysis and interpretation, and writing and approved the final version.

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## Additional information

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## Resumo

*Estudos mostram resultados controversos sobre a associação entre o tipo de parto e a satisfação da paciente. Este estudo investiga qual tipo de parto traz maior satisfação com a internação hospitalar para o parto. Foi realizado um estudo de coorte com dados da pesquisa Nacer no Brasil, iniciada em 2011. Foram incluídas 23.046 puérperas de uma amostra aleatória de hospitais, por conglomerados, com estratificação em três níveis. No primeiro seguimento, 15.582 mulheres foram reentrevistadas. Coletou-se antes da alta hospitalar dados sobre o tipo de parto, dicotomizado em vaginal e cesáreo, e fatores de confusão. O desfecho satisfação materna, avaliado como um construto unidimensional de 10 itens, foi mensurado pela Escala de Satisfação com a Hospitalização para o Parto até seis meses após a alta. As variáveis mínimas de ajuste para confusão foram definidas em um gráfico acíclico direcionado. O efeito do tipo de parto sobre a satisfação foi estimado em um modelo de equação estrutural com ponderação pelo inverso da probabilidade de seleção, considerando o desenho amostral complexo. A ponderação foi estimada considerando as diferentes probabilidades de seleção da amostra, as perdas de seguimento e o escore de propensão. O escore de propensão foi estimado em um modelo de regressão logística. Não houve diferenças na satisfação com a internação para o parto entre as entrevistadas que tiveram partos vaginais e cesáreos na análise ajustada (coeficiente padronizado = 0,089;  $p = 0,056$ ). As mulheres que tiveram partos vaginais e cesáreos ficaram igualmente satisfeitas com a hospitalização para o parto.*

*Parto; Cesárea; Parto Normal; Satisfação do Paciente; Causalidade*

## Resumen

*Los estudios muestran resultados controvertidos en cuanto a la asociación entre el tipo de parto y la satisfacción de la paciente. Este estudio investiga qué tipo de parto presenta mayor satisfacción con la hospitalización para el parto. Se realizó un estudio de cohorte con los datos de la encuesta Nacer en Brasil, que había comenzado en 2011. Se incluyeron a 23.046 puérperas de una muestra aleatoria de hospitales, por conglomerados, con estratificación en tres niveles. En el primer seguimiento se volvió a entrevistar a 15.582 mujeres. Los datos sobre el tipo de parto, ya sea por cesárea o vaginal, y los factores de confusión se recogieron antes del alta hospitalaria. El resultado de satisfacción materna, evaluado como un constructo unidimensional de diez ítems, se midió con la Escala de Satisfacción con la Hospitalización por Parto hasta seis meses después del alta. Las variables de ajuste mínimo de confusión se definieron en un gráfico acíclico dirigido. El efecto del tipo de parto sobre la satisfacción se estimó en un modelo de ecuaciones estructurales ponderadas por la inversa de la probabilidad de selección, considerando el diseño de muestreo complejo. La ponderación se estimó con diferentes probabilidades de selección de la muestra, pérdidas de seguimiento y puntuación de propensión. La puntuación de propensión se estimó mediante el modelo de regresión logística. No hubo diferencias en la satisfacción con la hospitalización por parto entre las encuestadas que tuvieron partos vaginales o por cesárea en el análisis ajustado (coeficiente estandarizado = 0,089;  $p = 0,056$ ). Tanto las mujeres que tuvieron partos vaginales como las que tuvieron por cesárea estaban igualmente satisfechas con su hospitalización por parto.*

*Cesárea; Parto Normal; Satisfacción del Paciente; Causalidad*

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