Factors associated to the type of childbirth in public and private hospitals in Brazil

Raphael Mendonça Guimarães [1]
Rafael Leiróz Pereira Duarte Silva [2]
Viviane Gomes Parreira Dutra [3]
Pedro Gomes Andrade [4]
Ana Camila Ribeiro Pereira [5]
Rafael Tavares Jomar [6]
Renata Pascoal Freire [7]

[1] Fundação Oswaldo Cruz. Escola Politécnica de Saúde Joaquim Venâncio. Av. Brasil, 4365, sala 317. Manguinhos. Rio de Janeiro, RJ, Brasil. CEP: 21.041-360. E-mail: raphael.guimaraes@fiocruz.br
[2] Caliper Clínica Escola de Imagens. Rio de Janeiro, RJ, Brasil.
[3] Instituto Nacional de Infectologia. Fundação Oswaldo Cruz, Rio de Janeiro, RJ, Brasil.
[4,5] Universidade Estadual de Campinas. Campinas, SP, Brasil.
[6] Universidade do Estado do Rio de Janeiro. Rio de Janeiro, RJ, Brasil.
[7] Instituto Fernandes Figueira. Rio de Janeiro, RJ, Brasil.

Abstract

Objectives: to estimate the prevalence of cesarean sections and factors associated to the type of childbirth in Brazil.
Methods: data on childbirths were collected in Brazil in 2014. Demographic characteristics, related to pregnancy and birth hospital regime (public or private) were evaluation. For each hypothesis raised, the variables were modeled by the binary logistic regression, which the outcome was considered in the type of childbirth.
Results: the prevalence of the cesarean sections in Brazil in 2014 was 52.8%; that is 38.1% at public hospitals and 92.8% at private ones. The association between cesarean section and the legal regime at the hospital was highlighted in the logistic model which presented a positive association and interaction between age groups (OR = 23.26; 95% CI= 13.39 - 41.79 for women between 20 and 24 years old and OR = 51.04; 95% CI 31.06 - 84.23 for women aged 35 and over).
Conclusions: the performance of childbirth in Brazil meets the routines and recommendations regarding women's health and humanized childbirth established by the Brazilian National Health System policies.

Key words *Women's health, Cesarean section, Socioeconomic factors, Health management, Hospital administration*

Introduction

The excessive medicalized childbirth care model has been criticized worldwide, which culminated in adopting in maternal health as a priority in the international agenda in recent years,[1,2] as well as the national policies,[3,4] translated into the creation of a systematic assessment routine for obstetric practices, in which the World Health Organization (WHO) has adopted over the last decades.[5,6]

Normal childbirth is considered a physiological event that requires support, evaluation and surveillance. Evidences indicate that to intervene in this process it should be justified as a valid reason.[7] A cesarean section, on the other hand, is a procedure introduced into obstetrical practice with the purpose of preserving maternal and children's lives that are put at risk by complications during the prenatal period and childbirth. The WHO recommends that cesarean section rates should be kept below 15%.[8] However, this practice has increased over the last three decades, with rates observed up to 50% in some countries.[9] Specifically in Latin America, most countries have high rates of cesarean sections. Brazil particularly presents high cesarean section rates and it is still increasing from 38.9% in 2000 to 46.5% in 2007. Preliminary data of cesarean sections in 2014 indicated a rate of 56.64% and 62.66% in the South region of the country.[10] This increase in cesarean sections in Brazil, has been observed predominantly since the 1970's, highlighting the importance of identifying and studying the factors associated to decide on the type of childbirth.

The diagnosis of overutilization of cesarean sections in Brazil has generated growing concerns about the unnecessary use, generating issues as the quality of obstetric care up to the meaning of parturition for the women.[11,12] Thus, it is necessary to understand the factors that lead to the increase of this practice, so that the public policy actions could reflect over the specific population groups in order to increase their effectiveness.[13]

In this context, the aims of this present study are to describe the prevalence of cesarean sections and estimate the magnitude of the associations among the type of childbirth and demographic and pregnancy-related characteristics in both public and private hospitals in Brazil.

Methods

This study consisted of a cross-sectional study which the unit of analysis is livebirth. This information is available through the Declaração de Nascido Vivo (the Brazilian Live Birth Registration), which it is sent to the administrative registry, afterwards sent to the Municipal Health Secretary (and subsequently to the other Health Information levels) and sent to a specific Information System that contains data concerning all the births in Brazil.

The Information System on Live Births used microdata regarding births that occurred in hospital environments in 2014. The following variables were: age, categorized in age ranges: "up to 19 years old", "20 to 24 years old", "25 to 29 years old", "30 to 34 years old ", and "35 years old and over"; marital status, categorized as with no partner ("single", "widower" and "separated") and with a partner ("married" and "consensual union"); schooling, categorized as "up to 8 years of schooling" and above "8 years of schooling"; type of pregnancy, categorized as "single" or "multiple"; gestational age, categorized as "preterm and post-term" and "term"; primiparous, categorized as "yes" and "no"; type of hospital, categorized as "public" and "private"; number of prenatal consultations,[4] characterized as "adequate" (7 consultations or more) or "inadequate" (less than 7 consultations);[4] place of residence, considering whether the puerperal woman resided in the same location as where the childbirth occurred, classified as "yes" or "no"; and, finally, the type of childbirth categorized as "vaginal" and "cesarean section".

The dichotomous variable type of childbirth was considered as the outcome variable (dependent), while other variables were evaluated as variables of interest (independent). Hypotheses were elaborated based on the variables of interest. For each hypothesis raised, the variables were modeled by the binary logistic regression, which the outcome was "cesarean section". In order to evaluate the adjustment of the tested alternative model, it was established a *deviance* analysis of the model, in order to compare the difference between the *deviances* of the null model (only with the intercept) and the variable of choice.

Afterwards the univariate modeling proceeded the introduction of the variables in a multivariate model, from the strength of the association that each variable assumed in relation to the outcome, observed the differences between the *deviances* assessing the adjustment of the model. After verifying the model with the inclusion of all the explanatory variables that were statistically significant, proceeded an adequacy test on some interaction terms. The choice of the interaction terms was based on the underlying theoretical referential. For this, the null hypothesis was considered as the model in

which the statistically significant variables were included, obtaining the following previous described step.

To validate the established logistic regression model it was necessary to apply some validation tests on this model and also to verify if it was adequate The *Hosmer-Lemeshow*, Pearson and *Deviance* tests were used for this purpose to validate the model.[14]

Finally, as this study used secondary, public origin and unidentifiable databases according to the Resolution 466/2012, this study is exempt from the approval of the Ethics Committee.

Results

In 2014, the Information System on Live Births (*Sistema de Informações sobre Nascidos Vivos* - SINASC) registered 2,979,259 births in hospitals in Brazil. The descriptive data of the study estimated the prevalence of cesarean sections at 58.2%, predominantly among young, single, high schooling level, multiparous women with singleton, at term gestations. Regarding prevalence of cesarean sections by type of hospital, a statistically significant difference (p <0.001) was observed, with the prevalence of 38.1% of cesarean sections performed at public hospitals and 92.8% at private ones.

This profile is not the same when observing births according to the type of childbirth (Table 1). Generally, vaginal childbirths are more frequent among younger, single, high schooling level women with single, multiparous and at term pregnancies, while cesarean sections are more frequent in slightly older women. Among these, a higher frequency of married multiparous women with high schooling level, multiple pregnancies and premature birth rates were observed.

Since a statistically significant difference was observed for all variables in the bivariate analysis (Table 1), modeling was conducted by the logistic regression. Initially, univariate models were tested in order to compare their ajustment with the null model, without the presence of any variables and considering only the intercept. When testing the alternative models, as described in the methods, all variables contributed to the explanation of the phenomenon, and thus, after assessing the differences between the *deviances* of the null and alternative models, multivariate modeling was chosen and performed.

Subsequently, based on the multiple logistic regression, a model was constructed to estimate the probability of a woman undergoing a cesarean section at hospitals in Brazil. A reduced model with 12 parameters (9 independent variables and 3 terms of interaction) was obtained and all statistically significant at the 1% level. The explanatory power of this model was 42% (Naegelkerke's R^2). Table 2 presents more detailed information about this chosen model.

After defining the model, the *Hosmer-Lemeshow* and *Deviance* adjustment adequacy statistics were applied to verify the hypotheses regarding the acceptance of the model. The hypotheses were formulated as H_0, where the adjustment of the data is good versus H_1, where the adjustment of the data is not good. Analysis of the residues through Chi-square test for the deviances resulted in a value of 0.96, while th Hosmer-Lemeshow statistic resulted in 2.84 (10 gl), obtaining a value of 0.94.

In addition to the presented statistics, three other model discrimination indices o were also assessed. The C statistic assesses the discrimination of capacity model by calculating the ROC curve area, and ranged from 0.5 to 1, the closer the values are to 1 the more appropriate is the model. The statistic value for this performed model was 0.82, classified as excellent according to Hosmer and Lemeshow's criteria.[11] The D_{xy} statistics (Somers correlation) establishes the correlation between the estimated probabilities and the observed responses, and ranges from 0 and 1. Whereas the value of zero means that the prediction models are completely random and the value of 1 means that the model is perfectly discriminatory. In this present study, the value found was 0.69. Finally, the sensitivity and specificity of the model were assessed through contingency tables with values of 66% and 89%, respectively. This indicates that this is a more specific model that demonstrates with more reliability concerning cesarean section compared to vaginal childbirth. Thus, the model is considered adequate for this purpose.

After adjusting the model, it was then applied to estimate the probability of a pregnant woman undergoing a cesarean section. Considering the particular interest in observing the difference of this probability at public and private hospitals, the probabilities were chosen to be estimated and the odds ratios for the terms concerning the type of hospital (public or private).

All variables included in the estimated probability formulas are the dummy type, so that the calculation for the success probability (cesarean section) for each type of hospital will be calculated by setting the values of the other variables and assigning the value of 1 when the location is a public hospital and zero when it is private one. Thus, there

Table 1

Frequency type of childbirth according to demographic and clinical characteristics. Brazil, 2014 (N= 2,979,259).

Variables	Childbirth						*p*
	Vaginal		Cesarean		Total		
	n	%	n	%	n	%	
Age group (years)							<0.001
Up to 19	343,969	26.69	159,753	9.45	503,812	16.91	
20-24	381,214	29.58	302,262	17.88	683,506	22.94	
25-29	265,097	20.57	424,148	25.09	689,173	23.13	
30-34	184,936	14.35	468,608	27.72	653,555	21.94	
35 or older	113,410	8.80	335,734	19.86	449,215	15.08	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	
Martial Status							<0.001
Without a partner	992,985	77.05	866,384	51.25	1,859,474	62.41	
With a partner	295,769	22.95	824,121	48.75	1,119,785	37.59	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	
Schooling							<0.001
Up to 8 years	427,995	33.21	240,897	14.25	668,949	22.45	
8 years or more	860,759	66.79	1,449,608	85.75	2,310,310	77.55	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	
Type of pregnancy							<0.001
Single	1,278,444	99.20	1,629,478	96.39	2,908,002	97.61	
Multiple	10,310	0.80	61,027	3.61	71,256	2.39	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	
Primiparous							<0.001
Yes	824,674	63.99	979,140	57.92	1,803,747	60.54	
No	464,080	36.01	711,364	42.08	1,175,512	39.46	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	
Gestation							<0.001
Premature	1,105,236	85.76	1,417,488	83.85	2,522,813	84.68	
Up to term	183,519	14.24	273,017	16.15	456,446	15.32	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	
Prenatal consultations							<0.001
Adequate	548,752	42.58	340,975	20.17	889,670	29.86	
Inadequate	740,003	57.42	1,349,530	79.83	2,089,589	70.14	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	
Type of hospital							<0.001
Public	1207,047	93.66	699,531	41.38	1,906,538	63.99	
Private	81,707	6.34	990,974	58.62	1,072,721	36.01	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	
Place of residence							<0.001
The same as the childbirth place	1,183,334	91.82	1,479,361	87.51	2,662,705	89.37	
Different than the childbirth place	105,420	8.18	211,144	12.49	316,554	10.63	
Total	1,288,754	100.00	1,690,505	100.00	2,979,259	100.00	

Table 2

Logistic regression model with adjusted associations for statistically significant covariates and the type of childbirth with interaction terms. Rio de Janeiro, 2014. (N= 2,979,259).

Variables	Levels	β	Standard error	CI95%		Wald Test (Z)	*p*	gl
				Min	Max			
(Intercept)		-1.171	0.039	-1.248	-1.094	892,336	< 0.001	1
Hospital[a]	Private hospital	2.846	0.192	2.485	3.240	219,840	< 0.001	1
Age[b]	20 to 24 years old	0.085	0.012	0.062	0.107	10,008	0.002	1
	25 to 29 years old	0.272	0.054	0.166	0.378	25,.70	< 0.001	1
	30 a to 34 years old	0.394	0.055	0.285	0.502	50,481	< 0.001	1
	35 years oldor more	0.570	0.058	0.457	0.683	98,089	< 0.001	1
Type of pregnancy[c]	Multiple	1.554	0.070	1.419	1.693	494,306	< 0.001	1
Martial Status[d]	With partner	0.059	0.020	0.019	0.099	8,480	0.004	1
Schooling[e]	High level	0.090	0.039	0.013	0.167	9,268	0.001	1
Prenatal consultations[f]	7 or more	0.292	0.019	0.256	0.329	246,741	< 0.001	1
Place of residence[g]	Another city	0.524	0.028	0.469	0.578	356,417	< 0.001	1
Number of childbirths[h]	Primiparous	0.186	0.041	0.106	0.267	11,871	< 0.001	1
Type of gestation[i]	Preterm and Post-term	0.253	0.024	0.207	0.300	113,124	< 0.001	1
Interaction term 1 (hospital*age group)	Private*20 to 24 years old	0.083	0.021	0.041	0.125	7,152	< 0.001	1
	Private *25 to 29 years old	0.146	0.020	0.106	0.186	10,006	< 0.001	1
	Private *30 to 34 years old	0.238	0.020	0.199	0.278	101,409	< 0.001	1
	Private *35 years old or older	0.520	0.023	0.475	0.565	355,574	< 0.001	1
Interaction term 2 (schooling*age group)	High level*20 to 24 years old	0.169	0.056	0.059	0.279	9,006	0.003	1
	High level*25 to 29 years old	0.218	0.059	0.102	0.335	13,550	<0.001	1
	High level 30 a 34 anos	0.310	0.062	0.188	0.432	24,850	<0.001	1
	High level 35 years old or older	0.477	0.067	0.345	0.609	50,240	<0.001	1
Interaction term 3 (number of childbirths*age group)	Primiparous*20 a 24 anos	0.181	0.055	0.074	0.289	10,923	0.001	1
	Primiparous	0.379	0.061	0.259	0.498	38,452	< 0.001	1
	Primiparous*30 to 34 years old	0.368	0.077	0.217	0.520	22,743	< 0.001	1
	Primiparous*35 years old or older	0.459	0.105	0.254	0.667	19,010	< 0.001	1
Interaction term 4 (hospital * number of childbirths)	Private*Primiparous	0.175	0.056	0.065	0.285	10,601	0.004	1

[a] The reference range is Public hospital"; [b] The reference range is "up to 19 years of age"; [c] The reference range is "only one"; [d] The reference range is "no partner"; [e] The reference range is "Low – up to 8 schooling years"; [f] The reference range is "Less than 7 consultations"; [g] The reference range is "the same as the childbirth location"; [h] The reference range is "Multiparous"; [i] The reference range is "at term gestation (37 to 41 weeks)".

Table 3

Estimated probabilities, chances and odds ratio to perform or not a cesarean section on women according to age group. Brazil, 2014 (N=2,979,259).

Age group	π_1	π_0	π_1 Ratio	π_0 Ratio	*Odds Ratio*	CI95%	
20 to 24 years old	0.89	0.25	7.85	0.34	23.26	13.39	33.13
25 to 29 years old	0.93	0.29	13.04	0.41	32.03	19.27	44.79
30 to 34 years old	0.95	0.37	17.03	0.46	37.03	23.1	50.96
35 years old or older	0.97	0.45	27.98	0.55	51.04	31.96	70.12

$_{OR}$ 95% CI: Confidence interval of the *odds ratio* at a significance level of 95%.

Figure 1

Estimated probability curves for cesarean section and vaginal childbirth per type of hospital according to age group. Brazil, 2014 (N=2,979,259).

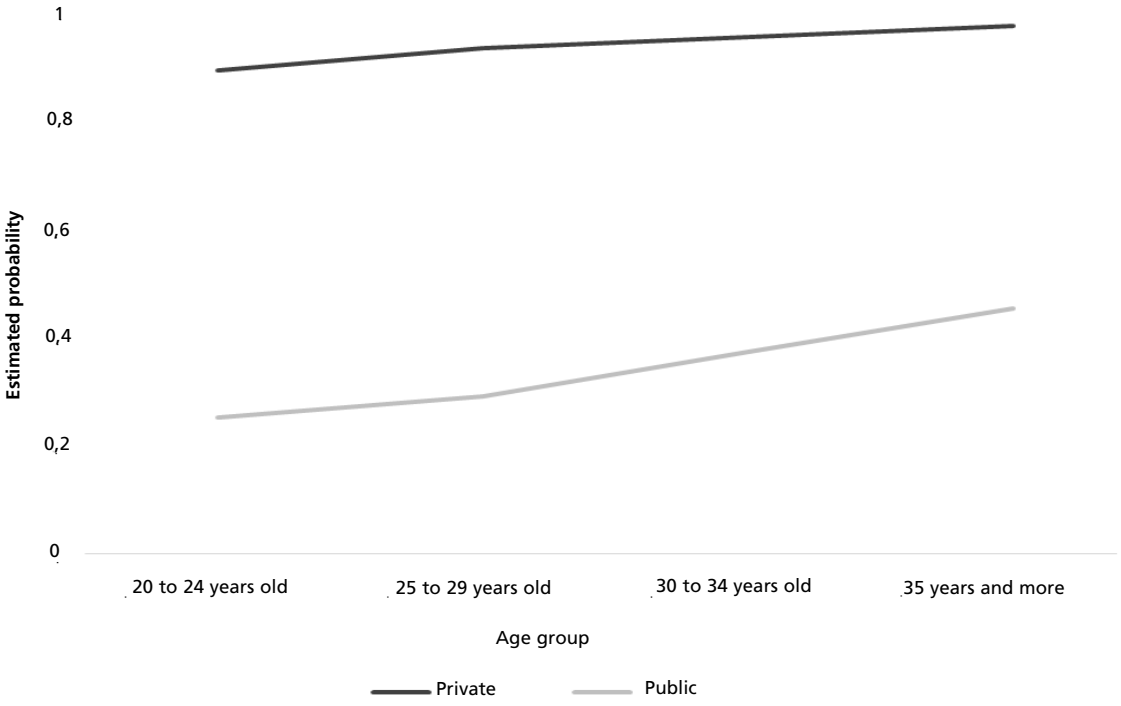
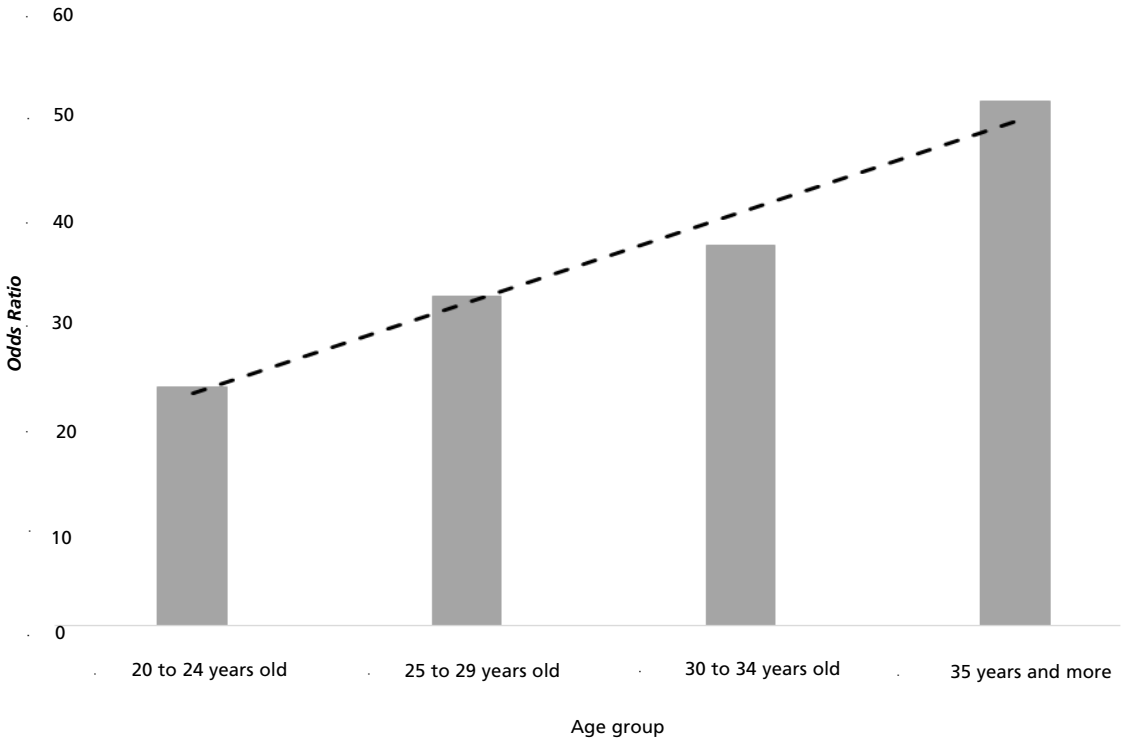


Figure 2

Increasing tendency of the odds ratio for the type of childbirth according to the type of hospital for each age group.



is for each age group the estimated probabilities and the odds ratio according to the values presented in Table 3.

Finally, Figures 1 and 2, respectively, represent the curves regarding the estimated probability of a cesarean section and a vaginal childbirth per type of hospital according to age group, as well as the tendency of increasing the odds ratio for each age group. It should be noted that the estimated probability increases with increasing age, at a different level for each type of hospital (there is unequivocally, a greater probability in private hospitals). However, it is important to note that the two curves are not parallel, evidencing an interaction effect between age and the type of hospital (public or private). The evidence regarding the possibility of a cesarean section being higher with the increasing age is, thus, reinforced with a tendency for age strata.

From the information displayed in the tables and the added graphs, there is an advantage of women in private hospitals being submitted to cesarean sections compared to women in public hospitals. In addition, an interaction with age was observed, or, in other words, this advantage presents a different magnitude according to age. Finally, this advantage grows with increasing age. For example, women aged 35 or more display an advantage concerning a cesarean section 5000% higher compared to women under 19 in private hospitals. It is worth noting that the estimated probability for 35-year-old women in private hospitals is approximately 97%, or, in other words, almost all the childbirths performed in these institutions occured in this age group.

Discussion

Maternal factors associated to cesarean sections were observed in Brazil. The risk factors presented herein are consistent with those presented in the literature. A cross-sectional study conducted in Rio Grande do Sul evaluating 2591 live births observed a significant association for the age group and the choice of childbirth for the age groups of 20-24 years old (OR = 1.13), 25-29 (OR = 1, 36) and 30

years old or more (OR = 1.21); for marital status with a partner (OR = 1.26); for high schooling level (OR = 1.28); for multiple pregnancies (OR = 2.01); and for protective association in multiparous women (OR = 0.94).[15]

Some associations seem to maintain even among patients who perform prenatal care in public units. In a study carried out with 322 pregnant women performing prenatal care at a Basic Health Unit in Rio de Janeiro, found an association for the most advanced age group (OR = 4.82) and the married women (OR = 3.05).[16]

Studies carried out in maternities also corroborate the direction of the associations observed. For example, a case-control study at a public maternity hospital in Rio de Janeiro city inclded 231 cesarean sections (cases) and 230 vaginal childbirths (controls). Through multivariate logistic regression analyses, the authors found a positive association for cesarean sections in women older than 35 years old (OR = 7.3) and for primiparous women within the multiparous reference category (OR = 6.7).[17] In addition, a sample of 15,336 women in a general hospital (therefore, not a maternity), Padua *et al*.[18] found a significant association for the more advanced age groups, stratified as 20 to 24 years old (OR = 1.26), 25 to 29 (OR = 1.54), 30 to 34 (OR = 1.82), and 35 years and more (OR = 2.05). The same study found a significant association for the married women (OR = 1.25) and for a greater number of prenatal consultations (OR = 1.24).

It is important to emphasize the importance of understanding the social representations of normal and cesarean sections childbirths for women, which is a qualitative aspect difficult to be measured. A qualitative study was conducted with 20 women in Santa Catarina city who experienced both childbirth types. The results reveal several representations of motherhood experience, such as the search for information, the experience of parturition alone *versus* accompanied, and the woman has no choice. Vaginal childbirth encompassed central themes such as feelings of ambivalence, positive perception and hospitalization. Cesarean sections were also related to feelings of ambivalence, the solution of a problem and the preference of the procedure. In other words, vaginal childbirth is considered a challenge for women, although positive feelings overcome the difficulties, while cesarean sections are associated to physical benefits related to its accomplishment.[19]

It is also noteworthy that lack of humanized attention and induction often results in women opting for a cesarean section. In addition, unpreparedness for vaginal childbirth interferes directly with the emotional system of the pregnant woman or parturient patient, reducing her confidence in the ability to be the protagonist of her own childbirth if she is not received by a providing health service. Thus, she cannot understand the advantages of vaginal childbirth and concludes that the cesarean section will bring more benefits for her and the baby.[20]

A difference was observed between public and private services regarding the type of childbirth. This data, the most consistent of all explanatory variables, is corroborated by the literature. Barros *et al*.[21] conducted a cohort study made up of all the newborns from the urban area of Pelotas city in 2004 indicated a 45% prevalence of cesarean sections for the population. When stratified by the type of service, the rates were 36% among the patients from the National Health System and 81% in the private service. Similarly, another study[15] indicated a cesarean section rate of 43% for the public group and 86% for the private group. In addition, a recent study was conducted in Maringá city to assess the temporal tendency of childbirth according to funding source,[5] during 11 years of observation. 77.1% of the childbirths were cesarean sections and only 22.9% were vaginal childbirths. In addition, an increasing tendency for cesarean sections and a decreasing tendency for vaginal childbirth in both types of funding (public and private) was evidenced. Cesarean section rates in private hospitals were always higher than 90% and more frequent than in public hospitals, even with a 36% increase in public hospitals during this studied period.

It is important to note that factors such as excessive intervention during the gestation, childbirth and puerperium processes are obstacles to the success of this policy, making it difficult to reach goals to decrease maternal mortality.[22] This problem occurs even in women with low obstetric risks.[23] This phenomenon (intense medicalization of childbirth process) associated to the maintenance of high maternal and perinatal mortality is known as the Brazilian perinatal paradox.[24] This is, therefore, evidence that justifies the reorientation of the model in pregnancy, childbirth and the puerperium care. In this sense, there has been a progress in Brazil in organizing obstetric care in the National Health System (SUS) network. Particularly highlights the Rede Cegonha (Stork Network), standardized by an Administrative Rule Number 1459, with the aim to increase the access and improve the quality of prenatal, childbirth and puerperium care, as well as child care up to 24 months of age,[4] as a stimulus to decrease maternal mortality. In this context of

discussion of a childbirth model in Brazil, the, attempts to systematize the routines and the itinerary of pregnant women are being made, providing pregnant and puerperal women and newborns with a humanized and quality care to achieve links for pregnant women to go to a reference unit for childbirth and have safe transportation and to implement good practices on childbirth and birthcare.[4,25]

This study has limitations, especially the use of secondary data from SINASC, thus it is impossible to assess other variables that are not present in the Brazilian Live Births Registration. However, since this database considers births throughout Brazil, it displays excellent accuracy,[26] and considering the evidence produced from its analysis should be taken into account.

This study indicates that childbirth in Brazil meets the routines and recommendations established in the women's health and humanized childbirth policies stated by the National Health System (SUS). Therefore, it is important that there is a reflection on this theme, so that monitoring measurements on obstetric practices are implemented, complying with the international recommendations for better clinical management and humanization in childbirth process.

References

1. IPEA (Instituto de Pesquisa Econômica Aplicada). Objetivos de Desenvolvimento do Milênio: Relatório Nacional de Acompanhamento. Brasília, DF; 2014.
2. United Nations. Sustainable development solutions networks. Genebra: ONU; 2013.
3. Brasil. Ministério da Saúde. Pacto Pela Vida. Brasília, DF; 2014.
4. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Ações Programáticas Estratégicas. Portaria nº 1.459, 24 de junho de 2011. Institui, no âmbito do Sistema Único de Saúde, a Rede Cegonha. Diário Oficial da União, Brasília, DF; 2011. Seção 1.
5. Paris GF, Monteschio LVC, Oliveira RR, Latorre MRDO, Pelloso SM, Mathias TAF. Tendência temporal da via de parto de acordo com a fonte de financiamento. Rev Bras Ginecol Obstet. 2014; 36 (12): 548–54.
6. World Health Organization. Care in normal birth: a practical guide. Maternal and newborn health/safe motherhood unit. Geneva; 1996.
7. Leão MRC, Bellini MLGR, Angelo M, Schneck CA. Reflexões sobre o excesso de cesarianas no Brasil e a autonomia das mulheres. Ciênc Saúde Coletiva. 2013; 18 (8): 2395-400.
8. Gibbons L, Belizán JM, Lauer JA, Betrán AP, Merialdi M, Athalbe F. The global numbers and costs of additionally needed and unnecessary cesarean sections performed per year: overuse as a barrier to universal coverage. Geneva: WHO; 2010.
9. Betrán AP, Merialdi M, Lauer JA, Bing-shun W, Thomas J, Van Look P, Wagner M. Rates of caesarean section: analysis of global, regional and national estimates. Paediatr Perinat Epidemiol. 2007; 21 (2): 98–113.
10. Brasil. Ministério da Saúde. Departamento de Informática do SUS. Microdados do Sistema Informação sobre Nascidos Vivos. Brasília, DF; 2014.
11. Leguizamon Junior T, Steffani JA, Bonamigo EL. Escolha da via de parto: expectativa de gestantes e obstetras. Rev Bioét. 2013; 21 (3): 509-17.
12. Hotimsky SN, Rattner D, Venancio SI, Bógus CM, Miranda MM. O parto como eu vejo... ou como eu o desejo? Expectativas de gestantes, usuárias do SUS, acerca do parto e da assistência obstétrica. Cad Saúde Pública. 2002; 18 (5): 1303–11.
13. Domingues RMSM, Dias MAB, Nakamura-Pereira M, Torres JA, d' Orsi E, Pereira APE, Schilithz AOC, Leal MC. Processo de decisão pelo tipo de parto no Brasil: da preferência inicial das mulheres à via de parto final. Cad Saúde Pública. 2014; 30 (Supl): S101–16.
14. Bussab WO, Morettin PA. Estatística Básica. São Paulo: Saraiva; 2002.
15. Mendoza-Sassi RA, Cesar JA, Silva PR, Denardin G, Rodrigues MM. Risk factors for cesarean section by category of health service. Rev Saúde Pública. 2010; 44 (1): 80–9.
16. Kac G, Silveira EA, Oliveira LC, Araújo DMR, Sousa EB. Fatores associados à ocorrência de cesárea e aborto em mulheres selecionadas em um centro de saúde no município do Rio de Janeiro, Brasil. Rev Bras Saúde Mater Infant. 2007; 7 (3): 271-80.
17. D'Orsi E, Chor D, Giffin K, Angulo-Tuesta A, Barbosa GP, Gama, AS, Reis AC. Factors associated with cesarean sections in a public hospital in Rio de Janeiro, Brazil. Cad Saúde Pública. 2006; 22 (10): 2067-78.
18. Pádua KS de, Osis MJD, Faúndes A, Barbosa AH, Moraes Filho OB. Fatores associados à realização de cesariana em hospitais brasileiros. Rev Saúde Pública. 2010; 44 (1): 70–9.
19. Velho MB, Santos EKA, Collaço VS. Natural childbirth and cesarean section: social representations of women who experienced them. Rev Bras Enferm. 2014; 67 (2): 282-9.
20. Weidle WG, Medeiros CRG, Grave MTQ, Dal Bosco SM. Escolha da via de parto pela mulher: autonomia ou indução? Cad Saúde Colet. 2014; 22 (1): 46-53.
21. Barros AJD, Santos IS, Matijasevich A, Domingues MR, Silveira M, Barros FC, Victora CG. Patterns of deliveries in a Brazilian birth cohort: almost universal cesarean sections for the better-off. Rev Saúde Pública. 2011; 45 (4): 635-43.
22. Forte FDS, Morais HGF, Rodrigues SAG, et al. Educação interprofissional e o programa de educação pelo trabalho para a saúde/Rede Cegonha: potencializando mudanças na formação acadêmica. Interface - Comunicação, Saúde, Educação. 2016; 20(58): 787-96.

23. Madeiro A, Rufino AC, Santos AO. Partos cesáreos no Piauí: tendência e fatores associados no período 2000-2011. Epidemiol Serv Saúde. 2017; 26 (1): 81-90.

24. Diniz CSG. Humanização da assistência ao parto no Brasil: os muitos sentidos de um movimento. Ciênc Saúde Coletiva. 2005; 10 (3): 627-37.

25. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Manual prático para implementação da Rede Cegonha. Brasília, DF; 2011.

26. Paiva NS, Coeli CM, Moreno AB, Guimarães RM, Camargo Jr KR. Sistema de informações sobre nascidos vivos: um estudo de revisão. Ciênc Saúde Coletiva. 2011; 16 (Supl. 1): 1211-20.

Received on April 11th, 2017

Final version presented on June 21st, 2017

Approved on July 6th, 2017