

Delivery care by obstetric nurses in maternity hospitals linked to the Rede Cegonha, Brazil – 2017

Silvana Granado Nogueira da Gama (<https://orcid.org/0000-0002-9200-0387>)¹

Elaine Fernandes Viellas (<https://orcid.org/0000-0001-5259-8102>)¹

Edymara Tatagiba Medina (<https://orcid.org/0000-0001-7180-6704>)²

Antonia Angulo-Tuesta (<http://orcid.org/0000-0002-3231-5918>)³

Carla Kristiane Rocha Teixeira da Silva (<https://orcid.org/0000-0002-4167-9342>)⁴

Sara Delfino da Silva (<https://orcid.org/0000-0002-9695-8146>)⁵

Yammê Ramos Portella Santos (<https://orcid.org/0000-0002-1955-7779>)¹

Ana Paula Esteves-Pereira (<https://orcid.org/0000-0002-0236-2043>)¹

Abstract *This study aimed to assess whether nurses' presence in delivery care in maternity hospitals linked to the Rede Cegonha program promotes access to best obstetric practices during labor and delivery. We conducted an evaluative study in 2017 in all 606 SUS maternity hospitals that joined this strategic policy in all Brazilian states. We collected data from maternity hospital managers and puerperae. The analysis was performed at two levels: hospital with or without a nurse in delivery care; and professionals that attended vaginal delivery, whether doctors or nurses. We used best practices and interventions for vaginal deliveries and cesarean section rates as dependent variables. We included 5.016 subjects for analyses of vaginal deliveries and 9.692 to calculate cesarean section rates. Multiple regressions were adjusted for geographic region, maternity hospital size, and puerperae skin color and parity. Maternity hospitals with nurses in delivery care used more the partograph and less oxytocin, lithotomy, episiotomy, and cesarean section. Deliveries attended by nurses had more frequent use of the partograph and a lower likelihood of lithotomy and episiotomy. The inclusion of nurses in vaginal delivery care has successfully brought women closer to a more physiological and respectful delivery.*

Key words Nurse, Rede Cegonha, Best practices, Labor and birth

¹ Escola Nacional de Saúde Pública, Fiocruz. R. Leopoldo Bulhões 1480, Mangueiras. 21041-210 Rio de Janeiro RJ Brasil. silvana.granado@gmail.com

² Faculdade de Enfermagem, Universidade do Estado do Rio de Janeiro. Rio de Janeiro RJ Brasil.

³ Faculdade de Ceilândia, Universidade de Brasília. Brasília DF Brasil.

⁴ Secretaria de Estado de Saúde do Rio de Janeiro. Rio de Janeiro RJ Brasil.

⁵ Faculdade ICESP Brasília. Brasília DF Brasil.

Introduction

The Brazilian delivery institutionalization process occurred in the mid-twentieth century, with doctor-centered care and removing women's autonomy. Thus, delivery shifted from a natural process to become a pathological event, with increasing interventions^{1,2}, including cesarean section, which, in 2009, has become the primary delivery route in the country³.

In the 1980s, the Ministry of Health, professionals, and women's organizations started a movement seeking delivery care models to ensure women's right to reproductive planning, quality care during pregnancy, delivery, and the puerperium⁴. Besides safe delivery, with women-centered care, guaranteeing the Unified Health System (SUS) principles, which address the comprehensiveness, universality, equality, and organization of the different maternal and child care levels⁵.

In 2011, the Ministry of Health established the Rede Cegonha (RC)⁶, a public policy that seeks to implement a delivery and birth care model based on humanization principles. The provision of training and qualification of obstetric nurses and midwives was expanded, Normal Birth Centers (CPN) were established, with environments conducive to good obstetric practices, promoting these professionals' inclusion in vaginal delivery care without dystocia.

The strategies adopted by the RC are firmly based on scientific evidence that shows the benefits of delivery care by nurses and midwives, both for women and their children^{7,8}, leading to increased satisfaction, without prejudice to perinatal indicators⁹.

This study aimed to assess whether nurses' presence in delivery care in maternity hospitals of the Rede Cegonha promotes pregnant women's access to good obstetric care practices during labor and delivery.

Methods

This paper uses data from the "Evaluation of Delivery and Birth Care in Maternity Hospitals of the Rede Cegonha", whose data collection was based on the Participatory Rapid Estimation (PRE)¹⁰ technique recommended by the Pan American Health Organization (PAHO).

All 606 public and mixed hospitals (private covenanted to the SUS) with an RC action plan in 2015 and represented almost half of the births

that year in the country, according to the Live Births Information System (SINASC), were included in the RC assessment.

The fieldwork was performed between December 2016 and October 2017, including the application of five specific electronic forms for each data source, using three different data collection methods: 1- personal interview with key informants: managers, health professionals, and puerperae, to verify their perception of the delivery and birth care and management model. 2- document analysis: to obtain information on the management of services, teamwork processes, and organization of care, check the availability of process indicators and delivery and birth care results; 3- on-site observation, which aimed to evaluate care processes and the conditions of infrastructure, physical plant, equipment, materials, supplies and the obstetric and neonatal bed count in the hospital¹¹.

In the RC assessment, all puerperae with delivery during the evaluative study were included, except for those with severe mental disorders, who did not understand Portuguese, deaf, or admitted to the Intermediate Unit and Intensive Care Unit in the postpartum period. The sample was selected in two stages. The first consisted of hospitals, and the second of puerperae. Further details on the study's methodology are available in Vilella *et al.*¹¹.

This study only considered women with term vaginal delivery (≥ 37 gestational weeks) and fetus/newborn with birth weight ≥ 2500 g. In the analysis of good practices and interventions concerning the "professional who attended childbirth", women who could not confirm the professional who attended them during delivery and those who referred to professionals other than doctors or nurses were excluded. All births in the studied maternity hospitals were included in the comparative analysis of cesarean sections' frequency.

Two analysis methods were employed. In the first, women were compared considering the delivery model adopted in the maternity hospital as the exposure variable, with or without the nurse/midwife's direct action in delivery care. In the second, the comparison was made by including the professional who attended the delivery as an exposure variable, whether a doctor or nurse/midwife.

The following covariates were included: macro-region of mother's residence; location (capital/metropolitan region, other municipalities); maternity size (< 500 births/year,

500-1,499 births/year, 1,500-2,999 births/year, $\geq 3,000$ births/year); maternal age (< 20 years, 20-34 years, and ≥ 35 years); skin color (white, black, brown, yellow, indigenous); marital status (without a partner, with a partner); schooling level (< elementary, elementary, \geq complete high school); parity (primiparous, one previous birth, two previous births, \geq three previous births).

As outcomes, we included variables related to good practices during labor (provision of liquids and food, moving around, non-pharmacological pain relief methods, partograph use); good practices to the newborn (breastfeeding in the delivery room and immediate skin-to-skin contact); and interventions during labor (IV serum administration, oxytocin, analgesia, and amniotomy) and delivery (lithotomy, Kristeller's maneuver, episiotomy, and cesarean section). For the analysis of the cesarean section, all births that occurred in those maternity hospitals were included. The maternity hospital's size was extracted from the instrument applied to managers, and the other variables from the questionnaire applied to mothers, with "yes" and "no" answer options.

We used Pearson's chi-square test (²) to compare the proportions of women's characteristics according to the delivery model adopted at the hospital (with or without nurses in delivery care) and professionals who assisted them during delivery (doctors or nurses). We used two logistic regression models to test the association between the delivery model adopted at the hospital and the professional providing delivery care and the good practices and interventions in assisting labor, delivery, and birth.

The significance level was set at 5%, and we used odds ratio (OR) estimates considering the effect of the sample design. ORs were adjusted for geographic macro-region, location, maternity size, skin color, and parity of the puerperae. For the analyses, we used a calibration factor by the inverse of the probability of inclusion of each puerperae to guarantee that the distribution of the sampled mothers corresponded to the distribution of deliveries in the maternity hospitals analyzed in 2017, considering the cluster effect in all analyses. SPSS 20.0 and Microsoft Excel version 2007 were used in the analyses.

The study was approved by the Human Research Ethics Committee of the Federal University of Maranhão and the Sérgio Arouca National School of Public Health, on December 14, 2016. All women were informed of the informed consent form's content and received a copy if they

agreed to participate in the evaluation. Due care was taken to ensure data secrecy and confidentiality.

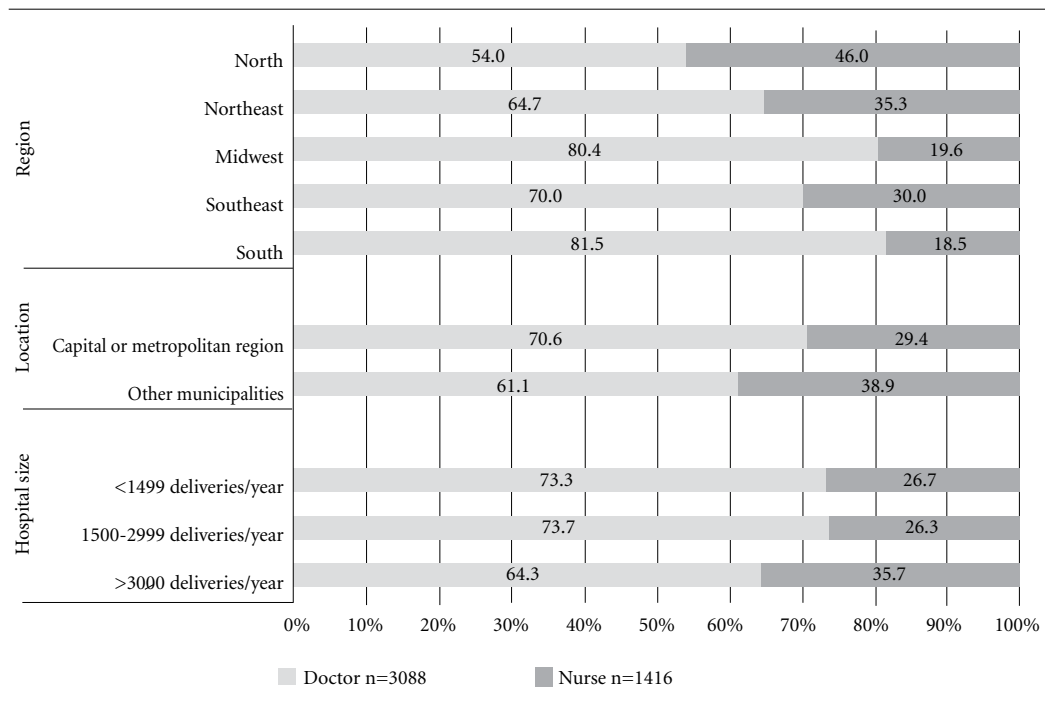
Results

A total of 10,665 puerperae interviewed in the immediate postpartum period. Five hundred seventy-one maternity hospitals remained after applying the exclusion criteria. A total of 5,016 mothers were included in the comparative analysis according to the maternity delivery model. Concerning the analysis according to the professionals who attended the delivery, women who could not confirm the professionals who attended them (9.2%) and those who reported professionals other than doctors or nurses (0.9%) were also excluded, leaving out 4,504 women. Finally, all 9,692 births in the maternity hospitals studied were included only to calculate the cesarean rate.

The distribution of births attended by nurses in Brazil differs regarding the macro-regions and by location and volume of births in the maternity hospitals. In the maternity hospitals evaluated, 30% of vaginal births were attended by nurses, reaching 46% in the North of the country. On the other hand, the Midwest and South regions had the lowest frequencies, 19.6% and 18.5%. Delivery care by nurses was also more implemented in inland region cities than metropolitan regions and maternity hospitals with $\geq 3,000$ births per year, compared to smaller ones (Graph 1).

The similar profile of the women interviewed stands out, whether comparing by type of professional or by the type of maternity delivery model. Approximately 23% of women were teenagers, and 42% had completed high school or more. Only parity distinguished them regarding the type of professional who attended delivery, and primiparous women were the most attended by doctors. Concerning the maternity delivery model, in nurse-assisted deliveries, brown skin color and living with a partner were more frequently reported (Table 1).

Good practices during labor, delivery, and with the newborn were more frequent in the 309 maternity hospitals attended by nurses. There was a more significant provision of liquids and food, more encouragement for the pregnant woman's movement, use of at least one non-pharmacological pain relief method, more important skin-to-skin contact between the newborn and the mother, and more breastfeeding in the delivery room (Table 2).



Graph 1. Proportion of vaginal births attended by a doctor or nurse, according to hospital characteristics in maternity hospitals in the Rede Cegonha - Brazil, 2017.

A similar result was found in the comparison by professionals who attended the delivery, with greater adherence to good practices and fewer obstetric interventions by nurses than by doctors. Amniotomy, which was not differentiated by maternity hospital delivery model, was also significantly less adopted by nurses (Table 2).

Some interventions remain in the routine of the maternity hospitals studied. However, they were less used in maternity hospitals with direct nurse participation in delivery care. These hospitals had a lower frequency of IV serum administration, oxytocin use, and analgesia during labor. The use of the lithotomy position, Kristeller's maneuver, and episiotomy was also less frequent during delivery. The proportion of cesarean surgery was high in the maternity hospitals evaluated (48.2%). On the other hand, it was lower in those whose model included nurses in vaginal delivery care (Table 2).

In the multiple analysis, maternity hospitals with the inclusion of obstetric nursing in the vaginal delivery care had greater partograph use (OR=1.9 CI 1.3-2.7) and lower use of oxytocin (OR=0.7 CI 0.5-0.9), lithotomy (OR=0.6 CI 0.4-0.9), and episiotomy (OR=0.7 CI 0.5-0.9) than

those without the inclusion of obstetric nursing, even after adjusting for confounding variables. When analyzing all births, cesarean sections were also less performed in these maternity hospitals (OR=0.8 CI 0.7-0.9) (Table 3).

When considering the type of professional who attended the delivery (doctor or nurse), the result of the multiple analysis indicated a more significant completion of partograph (OR=1.5 CI 1.2-1.9) and less use of lithotomy (OR=0.7 CI 0.5-0.8) and episiotomy (OR=0.4 CI 0.3-0.6) by nurses, a result similar to the comparison according to the maternity delivery model (Table 4).

Discussion

The World Health Organization (WHO) has designated 2020 as the "Year of the Nurse and the Obstetric/Midwife Nurse", a recognition designed to draw the world's attention to nurses/midwives' essential role in transforming the health of women and babies¹². This study shows significant advances in vaginal delivery care and improved good practices in public maternity hospitals linked to the RC.

Table 1. Maternal characteristics according to the maternity hospital delivery model and type of professional who assisted vaginal delivery in maternity hospitals that joined the Rede Cegonha, Brazil, 2017.

Variables	Maternity hospitals with vaginal delivery care by nurse			P-value ¹	Type of professional who attended vaginal delivery			P-value ²
	No n = 1,135 (%)	Yes n = 3,881 (%)	Total n = 5,016 (%)		Doctor n = 3,088 (%)	Nurse n = 1,416 (%)	Total n = 4,504 (%)	
Maternal age								
< 20 years	22.6	23.8	23.5	0.439	23.0	23.4	23.1	0.934
20-34 years	68.3	68.4	68.4		68.6	68.0	68.4	
≥ 35 years	9.1	7.9	8.1		8.4	8.7	8.5	
Skin color								
White	33.2	25.1	26.9	0.003	28.2	24.3	27.0	0.063
Black	13.9	13.8	13.8		13.8	13.0	13.6	
Brown	52.9	61.1	59.2		58.0	62.7	59.5	
Marital status								
Without partner	26.5	21.7	22.8	0.038	23.0	21.0	22.3	0.244
With partner	73.5	78.3	77.2		77.0	79.0	77.7	
Schooling								
< Elementary	29.8	27.7	28.2	0.435	27.4	28.3	27.7	0.475
Elementary complete	30.1	29.5	29.6		29.1	30.8	29.6	
≥ High School complete	40.1	42.9	42.2		43.5	41.0	42.7	
Parity								
Primiparous	49.1	47.1	47.6	0.692	49.1	42.1	46.9	0.001
One previous delivery	24.7	26.9	26.4		26.2	27.3	26.5	
Two previous deliveries	13.3	13.1	13.2		12.6	15.7	13.6	
Three or more previous deliveries	12.9	12.9	12.9		12.1	14.9	13.0	

1 P-value of the chi-square test comparing between maternity hospitals with and without nurses in delivery care. 2 P-value of the chi-square test comparing delivery performed by nurse and doctor.

Almost a third of vaginal deliveries were attended by nurses, in contrast to the 16.2% found in SUS maternity hospitals in the 2011/12 study *Nascer no Brasil*¹³. Comparing the Rede Cegonha with public hospitals and mixed results from the 2011/12 *Nascer no Brasil* study, Leal et al.¹⁴ observed a decline in interventions during labor and delivery and an upward trend in good practices, regardless of the care-providing professionals, suggesting a positive effect of this public policy to achieve the expected results, which aim respectful, safe, and dignified delivery/birth based on best scientific evidence.

Despite the advances identified, the rate of vaginal deliveries was low, and obstetric nurses' delivery care was still insufficient. The Brazilian legislation on obstetric nursing provides for care for usual-risk delivery from admission to discharge and the identification of dystocia

and decision-making until the transfer of care to the medical professional¹⁵. These findings reveal barriers and difficulties identifying obstetric nursing, which can be attributed to the still insufficient investment in the training of these professionals, the low hiring by public hospitals, even less by private hospitals, unattractive salaries, obstetricians' resistance to collaborative work, and the federal and regional professional medicine councils' disputes¹⁶⁻¹⁹.

The role of the Brazilian nurses/midwives is significantly different from the experiences of European health systems, such as the United Kingdom, the Netherlands, Germany, and other countries such as Australia, where nurses/midwives play an important role in monitoring pregnancy and delivery, and physicians are only responsible for assisting surgical or complicated deliveries^{7,20-24}.

Table 2. Good obstetric practices and interventions according to the maternity hospital delivery model and type of professional who attended vaginal delivery in maternity hospitals that joined the Rede Cegonha, Brazil, 2017.

Variables	Maternity hospitals with vaginal delivery care by nurse			Type of professional who attended vaginal delivery				
	No	Yes	Total	P-value ¹	Doctor	Nurse	Total	P-value ²
Number of maternity hospitals	262	309	571	-	-	-	-	-
Number of vaginal deliveries	1,244	3,432	5,016	-	3,088	1,416	4,504	-
% among vaginal deliveries	%	%	%		%	%	%	
Good practices during labor								
Provision of liquids and food	40.4	49.4	47.4	0.001	45.8	51.5	47.6	0.011
Moving around	70.7	77.7	76.1	0.002	74.8	79.8	76.3	< 0.001
Non-pharmacological pain relief methods	64.5	70.5	69.2	0.055	67.9	72.6	69.4	0.032
Partograph use	61.2	66.7	65.5	0.151	63.8	68.5	65.3	0.054
Good practices with the newborn								
Breastfeeding in the delivery room	34.1	44.1	41.9	0.005	39.1	47.0	41.6	0.002
Skin-to-skin contact after delivery	59.5	71.1	68.5	< 0.001	66.9	73.0	68.8	0.003
Interventions during labor								
IV serum	67.4	55.9	58.5	< 0.001	61.7	51.1	58.4	< 0.001
Oxytocin	47.2	36.2	38.7	< 0.001	41.9	32.3	38.9	< 0.001
Analgesia	21.8	14.4	16.0	0.001	17.9	13.4	16.5	0.011
Amniotomy	43.0	39.5	40.3	0.116	42.9	35.1	40.4	< 0.001
Interventions during delivery								
Lithotomy (horizontal delivery)	93.6	85.2	87.1	< 0.001	89.9	82.9	87.7	< 0.001
Kristeller's maneuver	21.8	14.8	16.4	< 0.001	18.5	13.4	16.8	< 0.001
Episiotomy	46.1	30.8	34.2	< 0.001	40.7	21.6	34.6	< 0.001
Cesarean ³	52.3	46.9	48.2	0.007	-	-	-	-

1 P-value of the chi-square test comparing between maternity hospitals with and without a nurse in delivery care

2 P-value of the chi-square test comparing delivery performed by nurse and doctor.

3 Total N = 9,692 puerperae

The care model proposed by the RC proposes changes in the health care of women and children, assuring good practices and safety in delivery and birth care as a guideline. One of the actions is to encourage greater participation by nurses in prenatal care, delivery, and birth, including funding from the National Residency Program in Obstetric Nursing (PRONAENF) and courses to improve obstetric nurses across the country. These RC guidelines increased care to women by the obstetricians/obstetrical nursing, contributing to a more significant provision of good practices in delivery care, and reduced interventions^{6,25}.

The proportion of nurses in conducting vaginal delivery was heterogeneous and depended on the characteristics of maternity hospitals. While

having the lowest volume of deliveries in the country, almost half of vaginal deliveries in the Northern region were attended by nurses, which was also observed in the inland region's cities, with almost 40%. These data point out that the likelihood of women being serviced by nurses at the time of delivery increases with distance from large urban centers and capitals. A probable hypothesis for such a finding would be the smaller supply of doctors in these areas.

A study carried out on the distribution of doctors in the country pointed out the North region with the lowest ratio of doctors/inhabitants, 1.12 doctors per 100,000 inhabitants, while this ratio was 2.81 in the Southeast. Several elements are assumed, and the most likely is the attraction exerted by the economic factor²⁶. In contrast, in

Table 3. Association between obstetric practices and maternity hospitals with nurses' participation in delivery care in maternity hospitals that joined the Rede Cegonha, Brazil, 2017.

Variables	Crude OR	95% CI (Crude OR)	Adjusted OR*	95% CI (Adjusted OR)
Good practices during labor				
Provision of liquids and food	1.4	1.2 - 1.8	1.2	1.0 - 1.5
Moving around	1.4	1.1 - 1.8	1.0	0.7 - 1.3
Non-pharmacological pain relief methods	1.3	1.0 - 1.7	1.3	0.9 - 1.7
Partograph use	1.3	1.0 - 1.8	1.9	1.3 - 2.7
Good practices with the newborn				
Breastfeeding in the delivery room	1.5	1.1 - 2.0	1.1	0.8 - 1.5
Skin-to-skin contact after delivery	1.7	1.3 - 2.2	1.3	1.0 - 1.7
Interventions during labor				
IV serum	0.6	0.5 - 0.8	0.9	0.7 - 1.2
Oxytocin	0.6	0.5 - 0.8	0.7	0.5 - 0.9
Analgesia	0.6	0.5 - 0.8	0.7	0.5 - 1.0
Amniotomy	0.9	0.7 - 1.0	1.0	0.8 - 1.2
Interventions during delivery				
Lithotomy (horizontal delivery)	0.4	0.3 - 0.6	0.6	0.4 - 0.9
Kristeller's maneuver	0.6	0.5 - 0.8	0.9	0.7 - 1.1
Episiotomy	0.5	0.4 - 0.6	0.7	0.5 - 0.9
Cesarean**	1.3	1.1 - 1.5	0.8	0.7 - 0.9

* Adjusted for geographical region, location, and hospital size. ** Model only with cesarean.

Table 4. Association between obstetric practices and delivery care performed by nurses in maternity hospitals that joined the Rede Cegonha, Brazil, 2017.

	Crude OR	95% CI (Crude OR)	Adjusted OR*	95% CI (Adjusted OR)
Good practices during labor				
Provision of liquids and food	1.3	1.1 - 1.5	1.1	0.9 - 1.3
Moving around	1.3	1.1 - 1.6	1.0	0.8 - 1.2
Non-pharmacological pain relief methods	1.3	1.0 - 1.7	1.2	1.0 - 1.5
Partograph use	1.3	1.0 - 1.5	1.5	1.2 - 1.9
Good practices with the newborn				
Breastfeeding in the delivery room	1.4	1.1 - 1.7	1.2	1.0 - 1.5
Skin-to-skin contact after delivery	1.3	1.1 - 1.6	1.1	0.9 - 1.4
Interventions during labor				
IV serum	0.6	0.5 - 0.8	0.9	0.7 - 1.1
Oxytocin	0.7	0.5 - 0.8	0.8	0.6 - 1.0
Analgesia	0.7	0.6 - 0.9	1.0	0.7 - 1.3
Amniotomy	0.7	0.6 - 0.9	0.8	0.7 - 1.0
Interventions during delivery				
Lithotomy (horizontal delivery)	0.5	0.4 - 0.7	0.7	0.5 - 0.8
Kristeller's maneuver	0.7	0.6 - 0.8	0.9	0.7 - 1.2
Episiotomy	0.4	0.3 - 0.5	0.4	0.3 - 0.6

* Adjusted for geographical region, location, and hospital size.

the Southeast region, nurses' participation in deliveries is growing even with a comprehensive provision of doctors, linked to the obstetric model's change, as recommended by the MS⁶ and the WHO¹².

We found that the percentage of deliveries attended by nurses was higher in larger hospitals. Prioritizing hospitals due to the higher concentration of deliveries has been a practice of public policies established in the last decade by the Ministry of Health in order to reach the largest number of professionals and women by providing support and incentives for the qualification of delivery and birth care, introducing a collaborative delivery model, including obstetric nurses, per the national guidelines⁶. We can also consider these large hospitals' relevance as centers that radiate public policies, as they are regional and SUS reference centers.

A previous study on RC evaluation did not observe a declining rate of cesarean sections in women with public delivery payment, which remained around 43% in the 2011-2017 period¹⁴. Although this was not a direct objective of RC, it is an intervention, often unnecessary, with a higher likelihood of complications for women and fetuses^{27,28}. On the other hand, we found a lower likelihood of cesarean delivery for women who had their deliveries in maternity hospitals adopting a delivery model with nurses in vaginal delivery care. Betrán *et al.*²⁹ show that the excessive use of cesarean sections does not show benefits to women and can increase the risk of harm. They also point out that midwife-spearheaded care has been associated with higher proportions of physiological births, safer results, and lower costs.

Studies on nursing contribution to reducing cesarean rates show results that vary from stable to declining rates³⁰⁻³². According to Johantgen *et al.*³⁰, these differences are often attributed to selection bias, assuming that women who "need" cesarean delivery are more likely to be attended by obstetricians. At the same time, those who decide to deliver with fewer interventions are more likely to be attended by nurses or midwives.

In contrast, Edmonds *et al.*³² evidenced variations from 8.3% to 48.0% in cesarean rates among 3,031 women cared for by nurses and doctors in labor and delivery. These variations were not associated with the studied maternal conditions (nulliparous, term, single fetus, and cephalic presentation), but the care provided to women by nurses. The authors considered this finding a potential nursing factor, which can influence the probability of cesarean section.

Moreover, a study conducted by Hildingsson *et al.*³³ observed that the presence of a qualified nurse reduces anxiety and fear during the delivery and birth process. We believe that studies on this theme should be encouraged, providing better evidence on this care's effects. In this study, we explain the benefits of nurses' presence in delivery care, showing the advantages of a delivery model including these professionals.

It is noteworthy that 9.2% of the puerperae do not know which professionals attended their vaginal delivery. Introducing oneself to the parturient, informing one's name and function, is one of the items highlighted in the RC "obstetrics reception" guideline. Only 58.9% of the respondents answered that all or most of the professionals introduced themselves to them during hospitalization, which classified the set of maternity hospitals as "partially adequate", according to the RC³⁴ evaluation matrix.

Other good practices in labor and delivery care were also essential. The use of the partograph at the individual and maternity hospital level was greater with nurses, which is an indicator of the provision of care and recording of their practices because it provides more security to parturients, promotes the exchange of information between professionals, and records care history. In this sense, it is a technological device to strengthen information systems in maternity hospitals and at the national level, which allows monitoring and evaluating the RC and the progress of sexual and reproductive health care of women in the country, regarding Goal 3.7 of the SDG agenda³⁵.

The RC consists of guidelines that encourage the adoption of good practices in labor and delivery, such as non-pharmacological pain relief methods, breastfeeding, and the strengthening of the mother-baby bond. Although it lost statistical significance after adjusting for confounding variables, we highlight a likely more effective breastfeeding practice in the delivery room and skin-to-skin contact in hospitals with nurses working in the birth process, confirming these professionals' efforts to comply with RC guidelines.

Concerning avoidable practices in labor and delivery, oxytocin use as a routine, the lithotomic position, and episiotomy were less performed in nurses' presence in delivery care. This result is consistent with other studies that show fewer of such nurses' interventions^{22-24,30}. However, the continuation of these practices has unfavorable implications and reinforces the need to improve hospital management to guarantee the safety and

quality of maternal and neonatal care in maternity hospitals, ensuring equal access for women and improving the economic impact on the health system³⁶⁻³⁹.

There is an urgent need to strengthen and invest in the health system and policies aimed at women that support health and reproductive rights and expand the quality of maternal and neonatal care, which also includes the valorization of health workers, improved hospital structure and information systems, and a more inclusive relationship, giving women a voice⁴⁰.

Conclusions

The results presented here confirm nursing care as less interventionist in delivery, besides exposing medical professionals' advance of good practices compared to a similar study conducted in Brazil in 2011/12¹³. They suggest a positive influence of the collaborative work between nurses and obstetricians in obtaining better results and on the humanization of care in labor and delivery for usual-risk women and their newborns.

Global strategies point to practice betterment initiatives to improve nurses/midwives' performance through training, education, and formation to influence delivery. However, analyses of these initiatives point to the need to face professional barriers related to gender inequalities and economic, social, and cultural issues regarding recognizing the performance and professionalization of nurses and midwives that provide them with a lower socio-cultural status^{7,8,39,41,42}.

Collaborations

SGN Gama contributed to the concept and the entire process of writing the paper. She collected the bibliography, was the primary writer, especially the discussion, and did the last review. EF Viellas and CKRT Silva participated in the paper's design and methodology, data analysis and interpretation, and paper writing. ET Medina, AJ Angulo-Tuesta e SD Silva participated in data analysis and interpretation and paper writing. YRP Santos created the variables, ran all the tables, generated the chart, and contributed to the paper's methodology. AP Esteves-Pereira performed a critical review of the entire manuscript, including the method of data analysis. All authors evaluated and approved the final version.

References

1. Progiante JM, Barreira IA. A obstetrícia, do saber feminino à medicalização: da época medieval ao século XX. *Rev enferm UERJ* 2001; 9(1):91-97.
2. Nagahama EEI, Santiago SM. A institucionalização médica do parto no Brasil. *Cien Saude Colet* 2005; 10(3):651-657.
3. Brasil. Ministério da Saúde (MS). *Datasus: informações de saúde: estatísticas vitais: nascidos vivos* [página na Internet]. [acessado 2020 mai 9]. Disponível em: <http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sinasc/cnv/nvuf.def>
4. Rattner D. Humanização na atenção a nascimentos e partos: ponderações sobre políticas públicas. *Interface (Botucatu)* 2009; 13(Supl. 1):759-768.
5. Edmonds JK, Ivanof J, Kafalafala U. Midwife Led Units: Transforming maternity care globally. *Annals of Global Health* 2020; 86(1):44.
6. Brasil. Ministério da Saúde (MS). Portaria nº 1.459, de 24 de junho de 2011. Institui, no âmbito do SUS, a Rede Cegonha. *Diário Oficial da União* 2011; 24 jun.
7. World Health Organization (WHO). *Nursing and midwifery progress report 2008-2012*. Geneve: WHO; 2013.
8. United Nations Population Fund (UNFPA). *The state of the World's Midwifery 2014. A Universal Pathway. A woman's right to health*. New York: UNFPA; 2014.
9. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwifery-led continuity models versus other models of care for childbearing women. *Cochrane Database Syst Rev* 2016; (4):CD004667.
10. Piovesan MF, Padrão MVV, Dumont MU, Gondim GM, Flores O, Pedrosa JI, Lima LFM. Vigilância Sanitária: uma proposta de análise dos contextos locais. *Rev. bras. Epidemiol* 2005; 8(1):83-95.
11. Vilela MEA, Leal MC, Thomaz EBAF, Gomes MAM, Bittencourt S, Gama SGN, Silva L, Lamy Z. Avaliação da atenção ao parto e nascimento nas maternidades da Rede Cegonha: os caminhos metodológicos. *Cien Saude Coletiva* 2020; 26(3):789-800.
12. World Health Organization (WHO). *WHO Campaigns. Year of the nurse and midwife 2020*. Geneve: WHO; 2020.
13. Gama SGN, Viellas EF, Torres JA, Bastos MH, Brüggemann, Theme Filha MM, Schilithz AOC, Leal MC. Labor and birth care by nurse with midwifery skills in Brazil. *Reproductive Health* 2016; 3(Supl. 3):123.
14. Leal MC, Bittencourt AS, Esteves-Pereira AP, Ayres BVS, Silva LBRAA, Thomaz EBAF, Lamy ZC, Nakamura-Pereira M, Torres JA, Gama SGN, Domingues RMSM, Vilela MEA. Avanços na assistência ao parto no Brasil: resultados preliminares de dois estudos avaliativos. *Cad. Saude Publica* 2019; 35(7):e00223018.
15. Conselho Federal de Enfermagem (COFEN). Resolução nº 516, de 24 de junho de 2016. Normatiza a atuação e a responsabilidade do Enfermeiro, Enfermeiro Obstetra e Obstetrix na assistência às gestantes, parturientes, puérperas e recém-nascidos nos Serviços de Obstetrícia, Centros de Parto Normal e/ou Casas de Parto e outros locais onde ocorra essa assistência; estabelece critérios para registro de títulos de Enfermeiro Obstetra e Obstetrix no âmbito do Sistema Cofen/Conselhos Regionais de Enfermagem, e dá outras providências. *Diário Oficial da União* 2016; 27 jun.
16. Angulo-Tuesta A, Giffin K, Gama AS, d'Orsi E, Barbosa GP. Saberes e práticas de enfermeiros e obstetras: cooperação e conflito na assistência ao parto. *Cad Saude Publica* 2003; 19(5):1425-1436.
17. Conselho Federal de Medicina (CFM). Parecer nº 251, de 28 de maio de 1998. Aprova a realização de parto sem distócia por enfermeiro obstetra ou obstetrix. [página na Internet]. [acessado 2020 Abr 22]. Disponível em: <https://sistemas.cfm.org.br/normas/visualizar/despachos/BR/1998/251>
18. Conselho Federal de Medicina (CFM). Despacho COJUR/CFM nº 814, de 7 de dezembro de 2018. Extrapolação dos limites legais na regulamentação da atividade de enfermeiras obstétricas nas casas de parto. [página na Internet]. [acessado 2020 Abr 22]. Disponível em: <https://sistemas.cfm.org.br/normas/visualizar/despachos/BR/2018/814>
19. Conselho Regional de Medicina do Estado de Santa Catarina (CRM-SC). Parecer nº 2486 / 2016. Enfermeira obstetrix e doulas são profissões regidas por legislação próprias e devem se ater a elas. Ao médico compete respeitar a decisão do paciente em relação ao parto, desde que sejam sem complicações. [página da Internet]. [acessado 2020 Fev 13]. Disponível em: <https://sistemas.cfm.org.br/normas/visualizar/pareceres/SC/2016/2486>
20. National Maternity Review. *Better births: improving outcomes of maternity services in England*. NHS England; 2016. [acessado 2020 mai 23]. Disponível em: <https://www.england.nhs.uk/wp-content/uploads/2016/02/national-maternity-review-report.pdf>
21. Homer CSE, Friberg IK, Dias MAB, Hoop-Bender PT, Sandall J, Speciale AM, Bartlett LA. The projected effect of scaling up midwifery. *Lancet* 2014; 384(9948):1146-1157.
22. Renfrew MJ, McFadden A, Bastos MH, Campbell J, Channon AA, Cheung NF, Silva DRAD, Downe S, Kennedy HP, Malata A, McCormick F, Wick L, Declercq E. Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care. *Lancet* 2014; 384(9948):1129-1145.
23. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database of Systematic Reviews* 2013; (8):CD004667.
24. Berg M, Ólafsdóttir OA, Lundgren I. A midwifery model of woman-centred childbirth care – In Swedish and Icelandic settings. *Sex Reprod Healthc* 2012; 3(2):79-87.
25. Santos Filho SB, Souza KV. Metodologia para articular processos de formação-intervenção-avaliação na educação profissional em enfermagem. *Cien Saude Colet* 2020; 25(1):79-88.
26. Póvoa L, Andrade MV. Distribuição geográfica dos médicos no Brasil: uma análise a partir de um modelo de escolha locacional. *Cad Saude Publica* 2006; 22(8):1555-1564.
27. Liu S, Liston RM, Joseph KS, Heaman M, Sauve R, Kramer MS. Maternal mortality and severe morbidity associated with low-risk planned cesarean delivery versus planned vaginal delivery at term. *CMAJ* 2007; 176(4):455-460.

28. Kallianidis AF, Schutte JM, Van Roosmalen J, Van Den Akker T. Maternal mortality and severe morbidity audit committee of the Netherlands Society of Obstetrics and Gynecology. Maternal mortality after cesarean section in The Netherlands. *Eur J Obstet Gynecol Reprod Biol* 2018; 229:148-152.
29. Betrán AP, Temmerman M, Kingdon C, Mohiddin A, Opiyo N, Torloni MR, Zhang J, Musana O, Wanyonyi SZ, Gülmezoglu AM, Downe S. Interventions to reduce unnecessary caesarean sections in healthy women and babies. *Lancet* 2018; 392(10155):1358-1368.
30. Johantgen M, Fountain L, Zangaro G, Newhouse R, Stanik-Hutt J, White K. Comparison of labor and delivery care provided by certified nurse-midwives and physicians: A Systematic Review, 1990 to 2008. *Women's Health Issues* 2012; 22(1):e73-e81.
31. Rosenstein MG, Nijagal M, Nakagawa S, Gregorich SE, Kuppermann M. The Association of Expanded Access to a Collaborative Midwifery and Laborist Model With Cesarean Delivery Rates. *Obstet Gynecol* 2015; 126(4):716-723.
32. Edmonds JK, O'Hara M, Clarke SP, Shah NT. Variation in Cesarean Birth Rates by Labor and Delivery Nurses. *JOGNN* 2017; 46:486-493.
33. Hildingsson I, Rubertsson C, Karlström A, Haines H. Known midwife can make a difference for women with fear of childbirth: birth outcome and women's experiences of intrapartum care. *Sex Reprod Healthc* 2019; 21:33-38.
34. Bittencourt SDA, Vilela MEA, Marques MC, Santos A, Silva CK, Domingues RMSM, Reis A, Santos G. Atenção ao Parto e Nascimento em Maternidades da Rede Cegonha: avaliação do grau de implantação das ações. *Cien Saude Coletiva* 2020; 26(3):801-822.
35. Starrs AM, Ezeh AC, Barker G, Basu A, Bertrand JT, Blum R, Coll-Seck AM, Grover A, Laski L, Roa M, Sathar ZA, Say L, Serour GI, Singh S, Stenberg K, Temmerman M, Biddlecom A, Popinchalk A, Summers C, Ashford LS. Accelerate progress sexual and reproductive health and rights for all: report of the Guttmacher-Lancet Commission. *Lancet* 2018; 391(10140):2642-2692.
36. Kozhimannil BK, Law MR, Virnig BA. Cesarean delivery rates vary tenfold among US hospitals. Reducing variation may address quality and cost issues. *Health Affairs* 2013; 32(3):527-535.
37. Snowden JM, Darney BG, Cheng YW, McConnell KJ, Caughey AB. Systems factors in obstetric care: the role of daily obstetric volume. *Obstet Gynecol* 2013; 122(4):851-857.
38. Kenny C, Devane D, Normand C, Clarke M, Howard A, Begley C. A cost-comparison of midwife-led compared with consultant-led maternity care in Ireland (the MidU study). *Midwifery* 2015; 31(11):1032-1038.
39. Sharma G, Mathai M, Dickson KE, Weeks A, Hofmeyr GJ, Lavender T, Day LT, Mathews JE, Fawcus S, Simen-Kapeu A, de Bernis L. Quality care during labour and birth: a multi-country analysis of health system bottlenecks and potential solutions. *BMC Pregnancy Childbirth* 2015; 15(Suppl. 2):S2.
40. Leal NP, Versiani MH, Leal MC, Portella Y. Práticas sociais do parto e do nascer no Brasil: a fala das puéperas. *Cien Saude Coletiva* 2020; 26(3):941-950.
41. Filby A, McConville F, Portella A. What Prevents Quality Midwifery Care? A systematic mapping of barriers in low and middle income countries from the provider perspective. *PLoS ONE* 2016; 11(5):e0153391.
42. ten Hoope-Bender P, de Bernis L, Campbell J, Downe S, Fauveau V, Fogstad H, Homer CS, Kennedy HP, Matthews Z, McFadden A, Renfrew MJ, Van Lerberghe W. Improvement of maternal and newborn health through midwifery. *Lancet* 2014; 384(9949):1226-1235.

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