Evaluation of the birthplace of newborns with gestational age less than 34 weeks according to the complexity of the Neonatal Unit in maternity hospitals linked to the "Rede Cegonha": Brazil, 2016-2017

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Abstract *This study aims to evaluate the birthplace of preterm infants with less than 34 gestational weeks at birth by type of neonatal care service in maternity hospitals of the "Rede Cegonha" and estimate the maternal factors associated with the inadequate place of birth for gestational age. This national cross-sectional study was performed in 2016/2017 to evaluate health establishments with the Rede Cegonha's action plan. Information was analyzed from 303 puerperae and the respective health establishments of their births. Newborns were classified by gestational age at birth (<30 and 30-33 weeks) and health establishments as hospitals with neonatal intensive care service, hospitals with intermediate neonatal care service, and hospitals without neonatal care service. Ministerial Ordinance N° 930/2012 was used to classify the birthplace as appropriate for the newborn's gestational age. Preterm birth prevalence was 37.3 at less than 30 weeks' gestation and 66.8 at 30-33 weeks. Birth in inappropriate services for the newborn's gestational age occurred in 6.3%, with significant regional and social differences. Inequalities in access to neonatal care for preterm infants persist in the "Rede Cegonha" despite advances.*

Key words *Preterm newborn, Neonatal intensive care unit, Maternal and child health, Maternal and child health services, Health policy*

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Introduction

Preterm birth is an important public health issue since it is the leading cause of infant mortality and the second among children up to 5 years of age[1,2]. Also, it is associated with several medium- and long-term health problems[3] in children.

Annually, about 30 million newborns are at risk, two-thirds of whom are preterm[4]. It is estimated that 14.8 million births are preterm globally, equivalent to 11% of all live births. Preterm birth affects both high- and low-income countries, and China is the country with the highest absolute number, with the U.S. ranking fourth[5]. The World Health Organization (WHO) defines preterm birth as that occurring between the 20th and 37th gestational week[6], which can be classified by gestational week as extremely preterm (< 28 weeks), very preterm (28 to < 32 weeks), and moderately preterm (32 to < 37 weeks). Within this last category, births occurring from the 34th to 36th gestational week are called late preterm[4].

In Brazil, a national survey on childbirth care carried out in 2011-2012 estimated a preterm birth rate of 11.5% (95% CI 10.3%-12.9%), and 74% were classified as late preterm, with no significant variations by macro-region of the country and type of childbirth funding (public or private)[7]. Compared to term, preterm newborns have important limitations in responding to extrauterine stimuli and reacting immunologically to the presence of microorganisms, requiring extensive, comprehensive care starting in the immediate postnatal period and extending throughout childhood[8,9].

An integrated, hierarchical, and regionalized maternal and child health care network based on maternal risk classification will allow parturients and their babies to receive the necessary care, resulting in greater survival for both. To this end, health facilities must be equipped to address complications, with physical infrastructure and a trained staff[10,11].

In Brazil, Ordinance N° 930 of May 10, 2012[12] recommends that newborns (NB) with a gestational age of fewer than 30 weeks should be admitted to Neonatal Intensive Care Units (NICU)[12]. There is no recommendation for admission to Conventional Neonatal Intermediate Care (UCINCo) or Kangaroo Neonatal Intermediate Care Unit (UCINCa) based only on the NB's gestational age. However, newborns with a gestational age of less than 34 weeks are considered high-risk, requiring differentiated care[13].

This study aims to evaluate the birthplace of newborns with gestational age of less than 34 weeks by type of neonatal care service appropriate for their gestational age in maternity hospitals linked to the "Rede Cegonha" and to verify the factors associated with births occurring in inappropriate places and the related early outcomes.

Methods

This study is nested in the "Evaluation of childbirth and birth care practices in maternity hospitals in the Rede Cegonha" developed by the Federal University of Maranhão (UFMA) and Prof. Sérgio Arouca National School of Public Health (ENSP), Oswaldo Cruz Foundation (Fiocruz), in the 2016-2017 period, under the coordination of the Ministry of Health.

This assessment aimed to verify best practices in labor and childbirth care in all public or private hospitals convened to the Brazilian Unified Health System (SUS), with a Regional Action Plan in the "Rede Cegonha" (RC), and at least 500 births/year in 2015, totaling 606 health establishments. The volume of births in these hospitals accounted for almost 50% of livebirths that year in the country, according to the Live Birth Information System (SINASC)[14].

All women with a hospital birth during the study period were considered eligible for the primary research. Only those with a severe mental disorder who did not understand the Portuguese language, deaf, or hospitalized in the Intermediate Unit or Intensive Care Unit in the postpartum were excluded. All eligible puerperae admitted to each hospital unit were invited to participate in the study during the fieldwork period. This period was defined by the macro-region in which the hospital was located, namely, three days in the Southeast and Northeast, six days in the North and South, and eight days in the Midwest.

A total of 10,665 puerperae were interviewed, 10,555 who had live births, regardless of weight and gestational age, and 83 stillbirths weighing more than 500 grams or gestational age greater than 22 weeks.

The data collection methods used were face-to-face interviews with key informants (puerperae, health professionals, and managers), data extraction from medical records, analysis of documents, and on-site observation. More detailed information on the methodology of the study is available in Vilella et al.[15].

This study used the information obtained in the interview with women, data extracted from medical records and the on-site observation. The interviews with women were held during hospi-

talization, at least six hours after birth. An electronic instrument was developed specifically for this study, containing questions about sociodemographic characteristics, information on access to the hospital/maternity, hospital admission, and hospital care during labor and childbirth. Data from hospital records were obtained immediately after the interview with the puerperae using an instrument for data extraction containing information on the care provided to women and their newborns and some neonatal outcomes that occurred up to that moment of hospitalization. The on-site observation sought to evaluate the care processes, infrastructure conditions, and physical plant. A previously prepared script served as a guide for the evaluator as he walked the path taken by the woman – entrance door, reception, admission, observation sector, high-risk pregnancies infirmary, labor and childbirth ambiance, rooming-in, and Neonatal Care Unit.

Women with live births with gestational age of less than 34 weeks were included for this study's analyses, excluding those who had a stillborn fetus or live births with unknown gestational age (43). Data from hospital records were used to calculate gestational age at birth using an algorithm previously adopted, which favors the calculation of gestational age based on information from ultrasound tests performed during prenatal care[16].

In the first stage of the analysis, the women's sociodemographic and obstetric characteristics were described according to the newborn's gestational age (< 30 weeks and 30-33 weeks). We evaluated region of residence (North, Northeast, South, Southeast, Midwest), self-reported skin color (white, black, brown, yellow, and indigenous), schooling (less than elementary school, complete elementary school, high school and over), marital status (with or without a partner), parity (primiparous, 1-2 previous births, 3 or more previous births), planned pregnancy (yes or no), NB condition at the time of the interview (live or neonatal death), and pilgrimage during labor (search for more than one hospital service for hospitalization for childbirth care, yes or no).

Next, the proportion of newborns born in an inappropriate place, according to their gestational age, and their distribution, according to maternal characteristics, was estimated. Ministerial Ordinance N° 930/2012 was the normative reference used to classify the birthplace as appropriate for gestational age: appropriate place = if gestational age < 30 weeks and admission to service with NICU beds; if gestational age 30-33 weeks and admission to service with NICU or UCIN-Co/UCINCa beds; inappropriate = if gestational age < 30 weeks and admission to service without NICU beds; if gestational age is 30-33 weeks and admission to services without NICU/UCINCo/UCINCa beds.

Simple and multiple logistic regression models were performed to estimate the association between inappropriate birthplace for gestational age and maternal sociodemographic and obstetric characteristics. The inappropriate birthplace of newborns with less than 34 gestational weeks was considered the outcome variable due to the small number of births in each gestational age range. Maternal characteristics associated with difficulties in accessing neonatal services of greater complexity were used as explanatory variables. All variables with a p-value associated with the regression coefficient below 0.20 in simple logistic regression were included in the multiple regression model. Women who self-reported yellow or indigenous were excluded from this stage of the analysis due to the small number of cases (1.6% and 0.7%, respectively). Crude and adjusted odds ratios and their 95% confidence intervals were obtained from these analyses. As the last step, a description of the early outcomes of preterm newborns was carried out, including the place of hospitalization, transfers, and neonatal deaths up to the moment of the maternal interviews.

Procedures were used for complex samples in all analyses, with weighting by the inverse probability of including each puerperae, a calibration to ensure that the distribution of the sampled mothers corresponded to the distribution of deliveries in the 606 hospitals in 2017, and using the design effect. All analyses were performed using SPSS software version 22.

The Human Research Ethics Committee of the Federal University of Maranhão and the Sérgio Arouca National School of Public Health approved the evaluation study on December 14, 2016. The Informed Consent Form (ICF) was read before the interview to all women and managers, and a copy was given to those who agreed to participate in the evaluation. All precautions were taken to ensure the privacy and confidentiality of the information.

Results

A total of 303 (2.9% 95% CI: 2.4%-3.4%) of the 10,539 live births had a gestational age fewer than 34 weeks at birth, 33.2% had GA less than 30 weeks, and 66.8% with GA between 30

and 33 weeks. Most women lived in the Northeast (37.3%) and Southeast (29.6%) regions of the country, self-reported brown (59.3%), and had secondary education and over (43.8%). One-fifth of women were adolescents (20.8%), 23.6% had no partner, and 43.3% were having their first birth. Most women (60.2%) did not plan the pregnancy, and 37.9% reported having sought more than one service for admission to childbirth. There were no significant differences in maternal characteristics according to GA at birth (Table 1).

In total, 6.3% (95% CI 3.7% -10.5%) of the total number of newborns with GA less than 34 weeks were admitted to hospitals with inappropriate neonatal services for gestational age at birth. Women residing in the midwestern macro-region (10%), aged between 30 and 34 years old (8.6%), black (8.7%), with less education than elementary school (12.1%), with three or more previous births (14.2%), living without a partner (9.7%), and with unplanned pregnancies (8.7%), had a higher prevalence of inappropriate birthplace (Table 2).

In the non-adjusted logistic regression, the highest likelihood of birth in an inappropriate place was observed in less educated women (OR=4.97 CI=1.25-19.76) and in those with higher parity (OR=5.68 CI=1.42-22.69), with a gradient in the associations, that is, the lower the education level and the greater the number of births, the greater the likelihood of birth in inappropriate services for gestational age. The gradient for schooling was maintained after adjusting for covariates, but with loss of statistical significance. The likelihood of birth in an inappropriate place in women with three or more previous births was increased after adjusting for the other variables (OR=8.28 95% CI 1.34-51.11). Women aged 35 years or older were less likely to have preterm birth in an inappropriate place (OR=0.13 CI=0.17-0.95) (Table 3).

Figure 1 shows the early outcomes of newborns up to the time of the interviews with women in the postpartum period, according to the gestational age ranges of less than 30 weeks and 30 to 33 weeks. Nine of the newborns with less than 30 weeks of gestation were born in maternity services without neonatal ICU. Of these, one died early, and eight had hospitalization records: two were transferred to other services of greater complexity and six were hospitalized under adapted conditions – of which two died. Thus, mortality in newborns with GA less than 30 weeks hospitalized in services not appropri-

ate to their risk was 33.3%, while it was 5.9% in those hospitalized in appropriate services. Ten of the newborns with a gestational age of 30 to 34 weeks were born in services without UCINCo/UCINCa, with only one of them having hospitalization records made under adapted conditions, and the remaining nine probably remained in rooming-in with their mothers.

Discussion

In Brazil (DATASUS) and globally (Torchin et al.), 85% of preterm births are moderate to late, occurring in the gestational range of 32-36 weeks[17,18]. In this study, using data form "Rede Cegonha" reference services, we observed a 2.9% rate of preterm birth with GA of less than 34 weeks. This result is similar to that found in a national survey conducted in the 2011-2012 period, where this proportion was 3.0%, equivalent to 74% of preterm births[19]. Costa et al. evaluated information from SINASC for 2013 and found 1.0% of SUS births within the gestational age range below 32 weeks[20].

Several maternal (sociodemographic, obstetric, psychological, and genetic characteristics), environmental, and paternal factors have been associated with preterm births[18,21]. Maternal characteristics of preterm and full-term newborns were not compared in this study. However, a higher proportion of preterm infants was observed in the Midwest, North, and Northeast regions, the least economically developed, and a lower proportion in the South and Southeast regions.

The proportion of adolescent mothers was also higher among preterm infants than in the total live births in the country (20.8% vs. 16.5%)[22], similarly to other studies that point to a higher prevalence of preterm births in women of extreme age groups[23,24]. The schooling level also differed from that observed for the total of preterm births in Brazil, with higher proportions among women with less than elementary education or with secondary education. Lower schooling, a factor related to greater social vulnerability, is associated with spontaneous preterm births[7]. The higher proportion of women with complete secondary education or more may be due to a generational cohort effect since the proportion of pregnant women in advanced age was high, and these are generally more educated than adolescents. Concerning teenage pregnancy, a recent integrative review showed the influence of prenatal care and schooling level on the preterm birth

Table 1. Demographic, social, and obstetric characteristics of women by gestational age at birth. Rede Cegonha Network. "Rede Cegonha", Brazil, 2016-2017.

Maternal characteristics	N	%	Less than 30 weeks (n = 101)		30-33 weeks (n = 202)	
			%	IC	%	IC
Regions						
North	41	13.4	14.4	(7 - 27.5)	12.8	(7.3 - 21.6)
Northeast	113	37.3	32.4	(20.2 - 47.6)	39.7	(29.5 - 50.9)
Midwest	30	9.8	10.7	(5.3 - 20.4)	9.4	(5.5 - 15.7)
Southeast	90	29.6	30.5	(19.5 - 44.4)	29.1	(20.5 - 39.5)
South	30	9.9	11.9	(6.7 - 20.4)	8.9	(5.3 - 14.5)
Age						
Less than 20 years	63	20.8	22.4	(14.5 - 33)	19.9	(14.5 - 26.7)
20-34 years	196	64.9	67.6	(56.9 - 76.8)	63.6	(56.1 - 70.5)
35 years and over	43	14.3	9.9	(5.1 - 18.4)	16.5	(10.7 - 24.5)
Self-reported skin color						
White	66	22.3	17.9	(9.7 - 30.6)	24.5	(18.3 - 32.0)
Black	47	15.6	19.5	(11.1 - 32.1)	13.6	(9 - 20)
Brown	176	59.3	60.1	(47.1 - 71.8)	58.9	(50.8 - 66.6)
Yellow/oriental	6	2.2	1.4	(0.3 - 5.7)	2.5	(1 - 6.3)
Indigenous	2	0.7	1.1	(0.2 - 7.6)	0.5	(0.1 - 1.9)
Schooling						
Less than elementary	90	30.0	37.1	(27.6 - 47.8)	26.4	(20.6 -33.2)
Elementary complete	79	26.2	24.2	(16.1 - 34.6)	27.2	(20.3 - 35.3)
High school and over	133	43.8	38.7	(28.1 - 50.5)	46.4	(38.6 - 54.4)
Living with companion						
No	71	23.6	27.3	(18.1 - 39)	21.7	(15.9 - 29)
Yes	231	76.4	72.7	(61 - 81.9)	78.3	(71 - 84.1)
Parity						
Primiparous	129	43.3	41.6	(30.8 - 53.3)	44.1	(36.3 - 52.2)
1-2 previous births	126	42.5	44.5	(32.7 - 56.8)	41.5	(33.6 -49.8)
3 previous births and over	43	14.3	14	(7.5 - 24.4)	14.4	(9.8 - 20.8)
Planned pregnancy				-		-
No	182	60.2	60.7	(49.3 - 71)	60	(51.8 - 67.7)
Yes	121	39.8	39.3	(29 - 50.7)	40	(32.3 - 48.2)
Pilgrimage during labor						
No	187	62.1	62	(49.1 - 73.5)	62.4	(53.3 - 70.7)
Yes	114	37.9	38	(26.5 - 50.9)	37.6	(29.3 - 46.7)

, concluding that obstetric and fetal risks can be minimized if there is a support network directed at adolescents, who focus on reproductive, prenatal care, and social support[25]. A higher prevalence was also observed in non-white women, mostly brown and black women, the population with the most significant social vulnerability in the Brazilian context[26].

The proportion of women who reported having sought more than one service for admission to childbirth care (37.9%) was higher than that found in a previous national survey, which estimated 16.2% of pilgrimage[27]. Studies have reported association of pilgrimage with negative maternal[27,28] and neonatal[29,30] outcomes because of delayed access to hospital care and to receiving adequate care. A possible explanation for our result is that the "Rede Cegonha's" maternity hospitals are generally reference services in their municipalities/states, leading women to be admitted to these services after having sought the first service in a less complex one.

Our result of absence of association of pilgrimage with inadequate birthplace for preterm

Table 2. Demographic, social and obstetric characteristics of mothers of newborns with gestational age below 34 gestational weeks by the classification of the place of birth. "Rede Cegonha", Brasil, 2016-2017.

Maternal characteristics	Place of birth			
	Not appropriate for Gestational Age		Appropriate for Gestational Age	
	N	%	N	%
Regions				
North	3	7.3	38	92.7
Northeast	9	7.9	104	92.1
Midwest	3	10.0	27	90.0
Southeast	4	4.5	85	95.5
South	1	3.3	29	96.7
Age				
Less than 20 years	5	7.9	58	92.1
20-29 years	9	6.5	130	93.5
30-34 years	5	8.6	53	91.4
35 years and over	1	2.3	43	97.7
Self-reported skin color				
White	3	4.5	63	95.5
Black	4	8.7	42	91.3
Brown	10	5.7	166	94.3
Yellow/oriental	0	0	6	100
Indigenous	0	0	2	100
Schooling				
Less than elementary	11	12.1	80	87.9
Elementary complete	5	6.3	74	93.7
High school and over	3	2.3	129	97.7
Parity				
Primiparous	4	3.1	125	96.9
1-2 previous births	7	5.5	119	94.5
3 previous births and over	6	14.2	36	85.8
Living with companion				
No	7	9.7	65	90.3
Yes	12	5.2	219	94.8
Planned pregnancy				
No	15	8.7	167	91.3
Yes	3	2.5	117	97.5
Pilgrimage during labor				
No	16	3.2	171	96.8
Yes	3	2.6	110	97.4
Total	19	6.3	284	93.7

newborns is in line with this hypothesis, reflecting the search of pregnant women for more complex services within "Rede Cegonha". Other studies, like the one conducted by Menezes et al.[31], found no association between the antepartum pilgrimage and the risk of the pregnant woman at the time of hospitalization, which may indicate that the pilgrimage process may also occur in search of availability of places and not necessarily of resources adequate to gestational risk needs.

An indicator used to assess perinatal health in Europe is the percentage of birth of very preterm newborns in units without NICU[32]. Belgium, France, and Germany had more than 75% of live births with GA less than 32 weeks in units with NICU[32,33]. A study carried out with puerperae attended at SUS in Rio de Janeiro highlights that 29% of high-risk puerperae had childbirth care in establishments without NICU[32].

In this study, 6.3% of newborns with less than 34 gestational weeks were born in establishments with inappropriate neonatology services for their gestational age. As we only included in our study services located in a health region that had a "Rede Cegonha"[34] action plan, which is a strategy for organizing the line of care for pregnant women and children up to the age of two, it should be assumed that our results are better than those carried out in hospitals not integrated to the "Rede Cegonha".

A study that analyzed hospitalizations in neonatal services, using birth weight below 1,500g and Apgar score in the 5th minute below 7 as severity markers, found that 38% of births with a severity marker occurred in establishments without Neonatal Intensive Care Unit. While the criteria adopted are different, some results, such as the highest rate of hospitalization in an appropriate place in the South and Southeast, are similar to our study[20].

In 2011-2012, only 39.3% of public hospitals had NICUs and data on UCINCo were not available [35]. On that occasion, the North, Northeast, and Midwest regions had the lowest proportions of services with NICUs, although they had similar prevalence of extreme preterm births[35]. In this study, these same regions showed the highest hospitalization rates in inappropriate services according to gestational age at birth. While these differences were not statistically significant, probably due to the small sample size, they may point to inequalities in the distribution of neonatal care services. Survival and quality of life are higher for extremely preterm infants born in hospitals with NICU care services. In France,

Table 3. Logistic and multiple regression of factors associated with inappropriate birthplace for newborns with gestational age below 34. "Rede Cegonha", Brazil, 2016-2017.

| Maternal characteristics	Extreme preterm born in an inappropriate unit for gestational age			
	Crude OR	CI	Adjusted OR	CI
Regions				
North	3.89	(0.37-40.95)		
Northeast	4.77	(0.51-44.96)		
Midwest	5.77	(0.55-60.58)		
Southeast	2.86	(0.27-30.22)		
South	1			
Age *				
Less than 20 years	1.05	(0.36-3.07)	1.45	(0.39-5.34)
20-34 years	1		1	
35 years and over	0.24	(0.05-1.18)	0.13	(0.17-0.95)
Self-reported skin color				
White	1			
Black	1.74	(0.25-12.07)		
Brown	1.13	(0.30-4.31)		
Schooling *				
Less than elementary	4.97	(1.25-19.76)	1.95	(0.37-10.20)
Elementary complete	2.61	(0.49-14.00)	1.48	(0.33-6.70)
High school and over	1		1	
Parity *				
Primiparous	1		1	
1-2 previous births	2.08	(0.64-6.73)	1.88	(0.54-6.51)
3 previous births and over	5.68	(1.42-22.69)	8.28	(1.34-51.11)
Living with companion				
No	1.76	(0.60-5.20)		
Yes	1			
Planned pregnancy *				
No	3.14	(0.91-10.86)	2.59	(0.60-11.20)
Yes	1		1	
Pilgrimage during labor				
No	1			
Yes	0.3	(0.05-1.95)		

* Variables with a p-value less than 0.20 in the simple logistic regression.

living in a distant location from services with a NICU reduced the likelihood of hospitalization in specialized services, even when adjusted for maternal and obstetric characteristics[36].

The finding of adapted hospitalizations of preterm newborns with less than 30 gestational weeks in "Rede Cegonha" services without NICU service is a reason for concern. Although the numbers are small, the mortality rate in these adapted hospitalizations was six times higher than that observed in hospitals with NICUs (33.3% vs. 5.9%). Deaths in non-adapted hospitalizations may indicate that births occurring in a place with an appropriate neonatal service for GA do not guarantee timely care[32].

The highest proportion of births in an inappropriate place was observed in less educated women, with unplanned pregnancies and a higher number of previous births, although only parity had a significant association in the adjusted analysis. The association between lower schooling and an inappropriate place for the
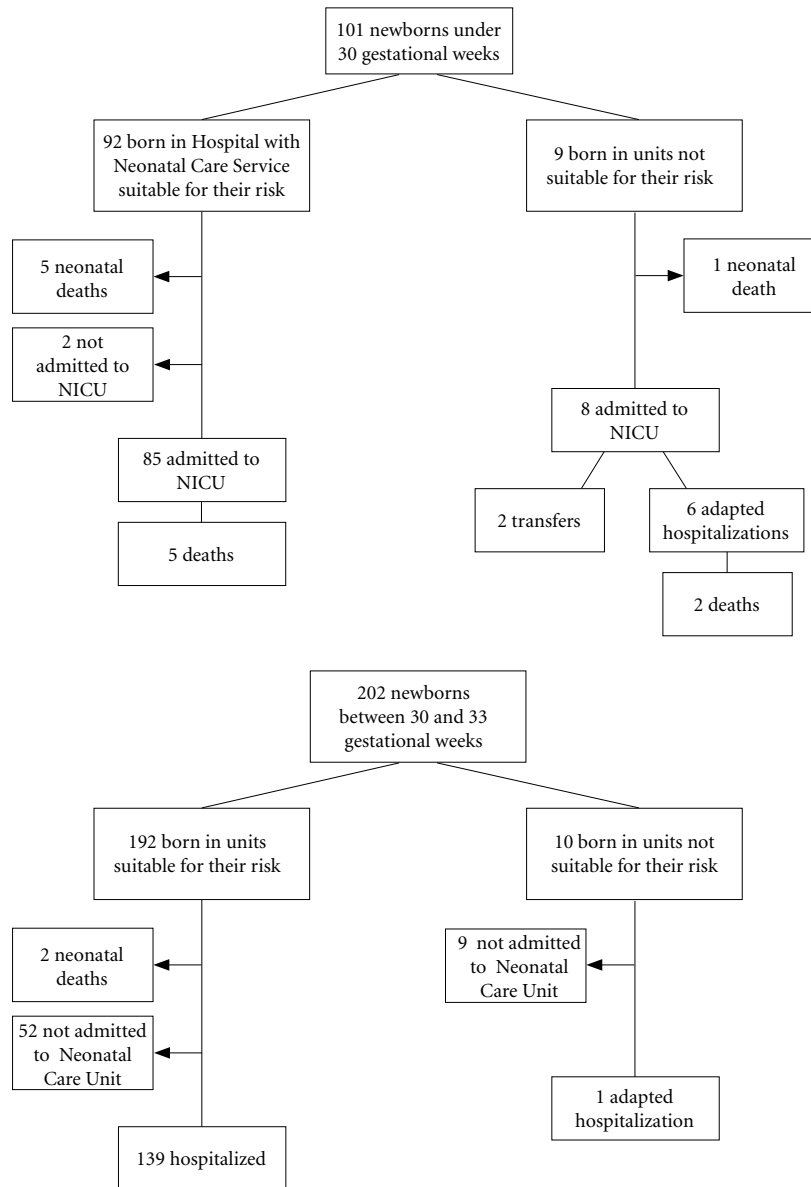
Figure 1. Early outcomes of newborns with less than 34 gestational weeks. Rede Cegonha, Brazil, 2016-2017.

risk of the puerperae was described by Menezes, in which the likelihood of less-educated women to have their children in establishments without a Neonatal Unit was 30% greater[32]. Low schooling, higher parity, and unplanned pregnancies are also associated with lower use of prenatal care services, with a higher proportion of women not attending prenatal care services or with late pre-

natal care initiation and fewer visits[37]. A nationwide study also showed the association of women low schooling with pilgrimage to childbirth care[36]. Women with unplanned pregnancies, lower economic status and substandard quality care for childbirth and neonatal care also have a higher prevalence of postpartum depression[38]. In France, Zeitlin et al.[39] assessed the factors associ-

ated with the birth of extremely preterm infants in services without NICU care. The study identified that prematurity's most significant risk often occurs in pregnant women that also have difficulty to access specialized services, deteriorating perinatal outcomes.

This study has some limitations. The first one refers to the exclusive use of gestational age to define the type of neonatal care service needed. Newborns with more than 30 gestational weeks may have required intensive care (NICU), but they were classified as "birth in an appropriate place" when they were born in establishments with UCINCo, which may have overestimated our findings of birth in an appropriate place. However, this limitation does not affect this study's objective, which is to assess whether the birthplace of the newborn under 34 weeks was appropriate for his gestational age.

The method used to calculate gestational age is also a limitation. We used a specific algorithm to estimate the most accurate gestational age but errors may have occurred, which may explain, for example, our results of newborns with less than 30 gestational weeks without admission to an intensive care service and with favorable outcome. It is worth mentioning that we assessed the newborn's outcome during the maternal interview, identifying neonatal deaths that occurred up to that moment. Some newborns may have died later during hospitalization, which may have underestimated unfavorable progress.

Finally, items related to the structure and care processes of the existing neonatal care services were not evaluated, and in these cases, the newborns may have been hospitalized in appropriate places according to their typology, but without appropriate operating conditions. Even in the face of these limitations, this study brings essential contributions to understanding the care flows and the factors associated with the place of birth of preterm newborns among the maternity hospitals affiliated with "Rede Cegonha".

Conclusion

The prevalence of preterm births below 34 gestational weeks in the country is high, with significant regional and social differences. The proportion of preterm infants admitted to intensive or intermediate neonatal care services not appropriate for gestational age at birth was low but was associated with factors that indicate a greater social vulnerability of parturients. This situation shows that there are still inequalities in access to intensive and intermediate care for preterm newborns in the context of maternity hospitals linked to the "Rede Cegonha".

We highlight, therefore, the importance of early identification of this group of women to ensure an adequate line of care throughout pregnancy, childbirth and postpartum, avoiding the emergence of adverse health outcomes. Specifically, at the time of hospital admission for childbirth care, the gestational age would allow the transfer of pregnant women to services with an appropriate structure to assist preterm newborns.

New studies should also investigate long-term outcomes of newborns hospitalized in inappropriate places for gestational age at birth, such as deaths, and assess neonatal services' adequacy, ensuring that newborns are admitted to places appropriate to their gestational age and with adequate operating conditions.

For health management, this study's findings confirm how urgent it is to invest in the health system and public policies geared to the quality of maternal and neonatal care in the maternity hospital units of "Rede Cegonha".

Collaborations

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