

Type of childbirth, skin-to-skin contact, and breastfeeding in the first hour of life in Manaus, Amazonas

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Abstract

Objectives: to evaluate the influence of type of childbirth, on skin-to-skin contact and breastfeeding in the first hour of life in public maternity hospitals in Manaus, Amazonas, Brazil.

Methods: cross-sectional study with 443 puerperal women from eight public maternity hospitals in Manaus (August 2023 to January 2024). Data were collected via a validated questionnaire and analyzed by logistic regression in Stata® 18.0, adjusted for sociodemographic, prenatal, and perinatal variables. Crude and adjusted odds ratios, 95% confidence intervals, and p-values were estimated.

Results: vaginal delivery was associated with a higher probability of breastfeeding in the first hour of life (adjusted odds ratio = 2.05; 95%CI= 1.19–3.54; p=0.010) and skin-to-skin contact (adjusted odds ratio = 1.96; 95%CI= 1.15–3.34; p=0.013). Each additional week of gestational age increased the chance of breastfeeding in the first hour of life by 40%. Neonatal complications and the use of analgesia significantly reduced the chances of both outcomes.

Conclusions: vaginal delivery favors skin-to-skin contact and breastfeeding in the first hour of life, reinforcing the need for policies that standardize humanized practices, especially after cesarean section, for equity in neonatal care.

key words Childbirth, Breast feeding, Cesarean section, Vaginal delivery



Introduction

Breastfeeding within the first hour of life and immediate skin-to-skin contact are fundamental strategies for promoting maternal and child health, as recommended by the World Health Organization (WHO).¹ These practices reduce neonatal morbidity and mortality while strengthening the mother–infant bond.² However, their implementation is influenced by sociodemographic factors, obstetric conditions, and particularly, the type of childbirth.^{3,4}

Vaginal delivery in low-risk pregnancies favors early initiation of breastfeeding and skin-to-skin contact, as it facilitates maternal recovery and rooming-in.⁵ Conversely, cesarean section is associated with barriers such as postoperative pain, mother–infant separation, and delays in breastfeeding initiation.⁶ Studies have shown that, in hospitals lack humanized protocols, these difficulties are even more evident.^{7,8}

In Brazil, prevalence rates vary: the *Nascer no Brasil* (2011–2012) (Born in Brazil) survey reported that only 28.2% of the newborns experienced immediate skin-to-skin contact⁹; in private hospitals, the rate of breastfeeding within the first hour reached 58%¹⁰; and in *Hospital Amigo da Criança* (Child-Friendly Hospital), it reached 65%,¹¹ highlighting the impact of institutional policies. Regional inequalities also interfere. In the North of Brazil, where Manaus is located, presents geographic, socioeconomic, and cultural vulnerabilities that hinder access to prenatal care, safe childbirth, and breastfeeding support.^{12,13} A recent study emphasized that this region concentrates the territories with the greatest vulnerability for achieving the health goals of the 2030 Agenda.¹⁴

In this context, the present study aims to evaluate the influence of the type of childbirth, skin-to-skin contact and breastfeeding within the first hour of life in public maternity hospitals in Manaus, Amazonas.

Methods

This is a cross-sectional study designed to assess the association between the type of childbirth (main exposure) and the outcomes “breastfeeding within the first hour of life” and “immediate skin-to-skin contact.” The hypothesis was that vaginal deliveries would be associated with higher odds of these outcomes compared to cesarean sections.

The target population comprised postpartum women who delivered at the eight public maternity hospitals in Manaus, Amazonas, between August 2023 and January 2024. Inclusion criteria included women in the immediate postpartum period (at least six hours after delivery) who had at least one live newborn, regardless of birth weight or gestational age; or stillbirths weighing ≥ 500 g and/or gestational age ≥ 22 weeks.

Sample size calculation was based on the finite population of childbirths recorded at each maternity hospital in 2022, the expected prevalence of outcomes, and a margin of error of 1 to 5 percentage points, resulting in 443 puerperal women, proportionally stratified across hospitals.

The main independent variable was type of childbirth (cesarean or vaginal). Adjustment variables included: Sociodemographic: maternal age (years), schooling (none, elementary, high school, higher education), and self-reported race/skin color (white, mixed, black, Asian, Indigenous); Prenatal: number of prenatal visits (none; 1–3; 4–5; ≥ 6); Perinatal: gestational age (weeks), neonatal complications (yes/no), and analgesia use (yes/no).

Primary outcomes were breastfeeding within the first hour of life and skin-to-skin contact, both categorized as “yes” or “no.”

The information were obtained using the hospital–puerperal women questionnaire developed by the *Escola Nacional de Saúde Pública* (ENSP/Fiocruz) (National School of Public Health) as part of the *Nascer no Brasil* (Born in Brazil) project.⁹ Data collection was conducted by trained researchers through electronic recording in REDCap®, ensuring standardization and security. Interviews were conducted by bedside, at least six hours after the childbirth.

Analyses were performed using Stata® version 18.0 (StataCorp LLC, USA), adopting a 5% significance level. Sample characteristics were described using absolute and relative frequencies (categorical variables) and mean with standard deviation (maternal age). Crude and adjusted associations were estimated using logistic regression, reporting odds ratios, 95% confidence intervals (95%CI), and p-values. Confounder selection followed a hierarchical model in three blocks: sociodemographic, prenatal, and perinatal, with stepwise inclusion ($p < 0.20$). Sensitivity analyses excluded high-risk pregnancies.

The study was approved by the Research Ethics Committee of the *Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo* (CEP-EERP-USP) (School of Nursing, University of São Paulo) (CAAE: 55040522.2.0000.5393).

Results

A total of 443 puerperal women were included, with a mean age of 25.9 years (SD = 7.1). The majority had completed high school (69.5%), self-identified as mixed-race (82.2%), and had vaginal delivery (55.3%). Almost 81% of the sample breastfed within the first hour of life, and about two-thirds (64.8%) engaged in skin-to-skin contact (Table 1).

Table 1

Characteristics of the analytical sample according to sociodemographic variables, mode of delivery, breastfeeding within the first hour of life, and skin-to-skin contact. Manaus, Amazonas (2023–2024).		
Variable	N	%
A analytical sample	443	
Age ($\bar{X} \pm SD$)	25.9 $\pm$ 7.1	
Schooling		
Elementary school	61	13.8
High School	308	69.5
Higher education	68	15.3
None	6	1.4
Race/ self-reported race/skin color		
Asian	5	1.1
White	50	11.3
Indigenous	4	0.9
Mixed	364	82.2
Black	20	4.5
Type of pregnancy		
Multiple	8	1.8
Singleton	435	98.2
Type of childbirth		
Cesarean section	198	44.7
Vaginal	245	55.3
Breastfed within the first hour of life	357	80.6
Skin-to-skin contact with the newborn	287	64.8

The crude association between type of childbirth and the outcomes of interest was assessed and presented in Table 2. Vaginal delivery was associated with higher odds of breastfeeding within the first hour of life (OR = 2.33; 95%CI = 1.42–3.80; $p=0.001$) and of skin-to-skin contact (OR = 13.6; 95%CI = 8.32–22.16; $p<0.001$), compared to cesarean section. Each additional week of gestational age increased the likelihood of breastfeeding by 40% (95%CI = 1.27–1.54; $p < 0.001$) and of skin-to-skin contact by 17% (95%CI = 1.09–1.26; $p < 0.001$).

After adjustment for number of prenatal visits, neonatal complications, and gestational age, vaginal delivery remained significantly associated with higher odds of breastfeeding within the first hour of life (OR = 2.05; 95%CI = 1.19–3.54; $p=0.010$) and skin-to-skin contact (OR = 1.96; 95%CI = 1.15–3.34; $p=0.013$). Neonatal complications reduced the likelihood of both outcomes by approximately 50%, whereas gestational age maintained a positive effect (Table 3).

Discussion

The results demonstrated that vaginal delivery was associated with higher odds of skin-to-skin contact and

breastfeeding within the first hour of life, even after adjustment for sociodemographic and perinatal variables. Gestational age was also a determining factor, increasing the probability of breastfeeding by 40% with each additional week.

Regional vulnerabilities must also be considered. The North of Brazil presents structural inequalities that hinder the implementation of good obstetric and neonatal practices, including limited access to health services, lower prenatal care coverage, and a higher prevalence of elective cesarean sections.¹⁹ These inequalities help explain the challenges observed in Manaus. Internationally, similar results have been reported: in Sub-Saharan Africa, cesarean section reduced the odds of breastfeeding within the first hour by 46%²⁰; in Vietnam, this probability was 75% lower among women undergoing cesarean section.²¹ These findings confirm that the type of childbirth directly impacts the implementation of essential neonatal practices.

The positive association between gestational age and immediate breastfeeding observed in Manaus reinforces the role of neonatal maturity. Late preterm infants have a reduced capacity for effective sucking, which explains the lower rates of breastfeeding within the first hour compared to full-term infants.²²

Mother–infant separation, which is common in cesarean sections, reduces opportunities to stimulate breastfeeding, as observed in Bangladesh, where 71% of newborns delivered via cesarean did not experience skin-to-skin contact.²³ Moreover, the lack of protocols enabling skin-to-skin contact in surgical settings, combined with the prioritization of hospital routines over practices recommended by WHO, perpetuates inequalities in neonatal care.^{7,8,24}

This study has limitations that must be acknowledged. The cross-sectional design prevents causal inferences, as it is not possible to determine whether the type of childbirth directly preceded the outcomes or whether unmeasured factors, such as prior breastfeeding intentions, influenced both variables. Data collection in the immediate postpartum period may introduce recall bias, as the puerperal women may not accurately remember events during the baby's first hour of life. The restriction of the sample to public maternity hospitals limits generalizability to private settings or regions with lower cesarean prevalence. The possibility of residual confounding bias remains, given that variables such as family support and previous breastfeeding experiences were not adjusted for, which may affect the magnitude of associations. Selection bias from the exclusion of high-risk pregnancies (8.1% of the initial sample) may have produced an overly homogeneous population, reducing data variability and limiting applicability to vulnerable groups. Finally, it is noteworthy that national reference data on childbirth and

Table 2

Crude association between main exposure, potential confounders, and outcomes of interest. Manaus, Amazonas (2023–2024).

Variable	Breastfeeding within the first hour					Skin-to-skin contact				
	N	%	OR	95%CI	p	N	%	OR	95%CI	p
Type of childbirth					0.001					<0.001
Cesarean section	145	73.2	1.00	Ref.		71	35.9	1.00	Ref.	
Vaginal	212	86.5	2.33	1.42–3.80		216	88.2	13.60	8.32–22.16	
Schooling					0.759					0.131
Higher Education	52	76.5	1.00	Ref.		36	52.9	1.00	Ref.	
High School	252	81.8	1.38	0.74–2.60		205	66.6	1.77	1.04–3.01	
Elementary School	48	78.7	1.14	0.50–2.61		41	67.2	1.82	0.89–3.73	
None	5	83.3	1.54	0.17–14.15		5	83.3	4.44	0.49–40.08	
Prenatal consultations					0.723					0.318
6 or more	250	81.7	1.00	Ref.		193	63.0	1.00	Ref.	
4-6	83	79.8	0.89	0.51–1.55		72	69.2	1.32	0.82–2.12	
1-3	16	72.7	0.59	0.22–1.59		15	68.2	1.25	0.50–3.17	
None	7	87.5	1.57	0.19–13.00		7	87.5	4.10	0.50–33.74	
Neonatal complications					0.008					0.003
No	206	89.2	1.00	Ref.		174	75.3	1.00	Ref.	
Yes	73	77.7	0.42	0.22–0.80		55	58.5	0.46	0.28–0.77	
Analgesia					0.027					<0.001
No	176	89.3	1.00	Ref.		178	90.4	1.00	Ref.	
Yes	103	80.5	0.49	0.26–0.92		51	39.8	0.07	0.04–0.13	
Age	-	-	0.99	0.96–1.03	0.664	-	-	0.99	0.96–1.02	0.494
Gestational age	-	-	1.40	1.27–1.54	<0.001	-	-	1.17	1.09–1.26	<0.001

newborn care practices still derive from the *Nascer no Brasil* (2011–2012).⁹ (Born in Brazil) survey. The second edition (*Nascer no Brasil II*) completed data collection in March 2025 and has released preliminary results, but full publication is still pending, limiting more up-to-date comparisons.

Vaginal delivery was associated with higher odds of skin-to-skin contact and breastfeeding within the first hour of life, regardless of sociodemographic and perinatal factors. Gestational age proved to be a determinant, with a 40% increase in the probability of breastfeeding for each additional week, while neonatal complications significantly reduced these outcomes.

These findings reinforce the importance of policies ensuring skin-to-skin contact and early breastfeeding

also in cesarean sections, in line with the *Hospital Amigo da Criança* (Child Friendly) Initiative, in addition to continuous training of multiprofessional teams to integrate humanization practices in surgical settings. Future longitudinal and qualitative studies are recommended to further explore perceived barriers, providing evidence for more effective interventions.

Authors' contribution

Silva ALC, Faisal Cury A, Gomes-Sponholz FA: data analysis, manuscript drafting, and critical revision.

Parreira BDM, Barbosa NG, Gozzo TO, Nascimento ES: manuscript drafting and critical revision.

Table 3

Adjusted association between the main exposure and outcomes of interest, considering confounders selected through the forward method, Manaus, Amazonas (2023–2024).

Variable	Breastfeeding within the 1 st hour ^a			Skin-to-skin contact ^b		
	OR	95%CI	p	OR	95%CI	p
Type of childbirth			0.010			0.013
Cesarean section	1.00	Ref.		1.00	Ref.	
Vaginal	2.05	1.19–3.54		1.96	1.15–3.34	
Prenatal consultations			0.587			-
6 or more	1.00	Ref.		-	-	
4-6	0.68	0.32–1.47		-	-	
1-3	0.75	0.24–2.40		-	-	
None	-	-		-	-	
Neonatal complications			0.013			0.020
No	1.00	Ref.		1.00	Ref.	
Yes	0.49	0.28–0.86		0.52	0.30–0.90	
Gestational age	1.34	1.21–1.49	<0.001	1.35	1.22–1.49	<0.001

^aAnalyses adjusted for number of prenatal consultation, neonatal complications, and gestational age. ^bAnalyses adjusted for neonatal complications and gestational age.

All authors approved the final version of the manuscript and declare no conflicts of interest.

Data Availability

The full dataset supporting the results of this study is contained within the article.

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