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Epidemiological characterization of deliveries and births: ecological study based on an information system

Caracterización epidemiológica de partos y nacimientos: estudio ecológico basado en un sistema de información

Caracterização epidemiológica de partos e nascimentos: estudo ecológico com base em um sistema de informação

Aline Cristina Jardim Machado[1]
ORCID: 0009-0001-4326-8918
Esthefani de Souza Alves[1]
ORCID: 0009-0002-2196-5189
Fabiana Bezerra de Oliveira Domingo[1]
ORCID: 0009-0007-0611-0613
Fran Carlos Chagas Lopes[1]
ORCID: 0009-0003-5899-3826
Antonio da Silva Ribeiro[2]
ORCID: 0000-0003-1888-1099
Cristiano Bertolossi Marta[2*]
ORCID: 0000-0002-0635-7970
Rosangela da Silva Ribeiro[1]
ORCID: 0009-0003-4750-6447
Priscilla Oliveira da Silva[3]
ORCID: 0000-0002-6960-9899
Bárbara Bertolossi Marta de Araújo[4]
ORCID: 0000-0001-9421-0161
Rodrigo Oliveira de Carvalho da Silva[1]
ORCID: 0000-0002-6143-7340

[1]Centro Universitário Maurício de Nassau. Rio de Janeiro, Brazil.
[2]Conselho Regional de Enfermagem. Rio de Janeiro, Brazil.
[3]Universidade Veiga de Almeida. Rio de Janeiro, Brazil.
[4]Universidade do Estado do Rio de Janeiro. Rio de Janeiro, Brazil.

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***Corresponding author:**
cristianobertol2014@gmail.com

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Abstract

This study aimed to update the epidemiological characterization of deliveries and births in Rio Grande do Norte between 2012 and 2022, using secondary data from the Live Birth Information System (SINASC). The methodology consisted of an ecological study with a quantitative approach, analyzing maternal, neonatal, and spatial variables through TabNet (DATASUS) and Excel. The results showed 507,611 live births during the period, with a predominance in the metropolitan region of Natal (over 50% of deliveries). Most mothers were between 20 and 29 years old (49.1%), had 8 to 11 years of schooling (55.5%), and had seven or more prenatal consultations (64.6%). Regarding the type of delivery, 62% were cesarean sections, exceeding the WHO recommendation. The newborns presented adequate birth weight (64.7% between 3,000 and 3,999 g) and satisfactory Apgar scores (87.4% with 8-10 at 1 minute). Congenital anomalies were underreported, indicating flaws in the completion of the Live Birth Certificate. The discussion highlighted the need for improvements in obstetric care, reduction of the overmedicalization of childbirth, and strengthening of prenatal care. The conclusion is that, although advances have been made in prenatal coverage, challenges such as the high rate of cesarean sections and underreporting of anomalies persist, requiring more effective public policies to ensure humane and evidence-based care.

Descriptors: Humanized Delivery; Health Information Systems; Live Birth; Prenatal Care; Epidemiology, Descriptive.

Resumén

Este estudio tuvo como objetivo actualizar la caracterización epidemiológica de los partos y nacimientos en Rio Grande do Norte entre 2012 y 2022, utilizando datos secundarios del Sistema de Información de Nacidos Vivos (SINASC). La metodología consistió en un estudio ecológico con un enfoque cuantitativo, analizando variables maternas, neonatales y espaciales mediante TabNet (DATASUS) y Excel. Los resultados mostraron 507.611 nacidos vivos durante el período, con predominio en la región metropolitana de Natal (más del 50% de los partos). La mayoría de las madres tenían entre 20 y 29 años (49,1%), tenían de 8 a 11 años de escolaridad (55,5%) y habían tenido siete o más consultas prenatales (64,6%). En cuanto al tipo de parto, el 62% fueron cesáreas, superando la recomendación de la OMS. Los recién nacidos presentaron un peso adecuado al nacer (64,7% entre 3000 y 3999 g) y un puntaje de Apgar satisfactorio (87,4% con 8-10 al minuto). El subregistro de anomalías congénitas indicó deficiencias en el llenado del Certificado de Nacido Vivo. El debate destacó la necesidad de mejorar la atención obstétrica, reducir la sobremedicalización del parto y fortalecer la atención prenatal. La conclusión es que, si bien se han logrado avances en la cobertura prenatal, persisten desafíos como la alta tasa de cesáreas y el subregistro de anomalías, lo que requiere políticas públicas más efectivas para garantizar una atención humana y basada en la evidencia.

Descriptores: Parto Humanizado; Sistemas de Información Sanitaria; Nacido Vivo; Atención Prenatal; Epidemiología Descriptiva.

Resumo

Objetivou-se atualizar a caracterização epidemiológica de partos e nascimentos no Rio Grande do Norte entre 2012 e 2022, utilizando dados secundários do Sistema de Informações sobre Nascidos Vivos (SINASC). A metodologia consistiu em um estudo ecológico com abordagem quantitativa, analisando variáveis maternas, neonatais e espaciais por meio do TabNet (DATASUS) e *Excel*. Os resultados mostraram 507.611 nascidos vivos no período, com predominância na região metropolitana de Natal (mais de 50% dos partos). A maioria das mães tinha entre 20 e 29 anos (49,1%), 8 a 11 anos de escolaridade (55,5%) e realizou sete ou mais consultas de pré-natal (64,6%). Quanto ao tipo de parto, 62% foram cesáreas, ultrapassando a recomendação da OMS. Os recém-nascidos apresentaram peso adequado (64,7% entre 3.000-3.999g) e Apgar satisfatório (87,4% com 8-10 no 1º minuto). As anomalias congênitas foram subnotificadas, indicando falhas no preenchimento da Declaração de Nascido Vivo. A discussão destacou a necessidade de melhorias na assistência obstétrica, redução da medicalização excessiva do parto e fortalecimento do pré-natal. Conclui-se que, embora haja avanços na cobertura pré-natal, persistem desafios como a alta taxa de cesáreas e a subnotificação de anomalias, exigindo políticas públicas mais eficazes para garantir uma assistência humanizada e baseada em evidências.

Descritores: Parto Humanizado; Sistema de Informação em Saúde; Nascimento Vivo; Cuidado Pré-Natal; Epidemiologia Descritiva.

Introduction

A woman's gestational process up until the moment of birth causes a significant impact, both physically and emotionally, that can last a lifetime. As technology advances, society adapts, and healthcare services are inevitably transformed as well. Increasingly, external factors - both social and cultural - influence pregnancy and even the upbringing of their babies. But to what extent is women's role overshadowed and neglected when these factors gain prominence?

Currently, it can be said that hospitals have increasingly greater autonomy in decision-making regarding the lives of mothers and their families, including their babies. The right to choose who participates in the birth and who remains in their lives afterward. The way they deem best to bring this newborn into the world, often disregarding the opinion of the protagonist in the situation, the mother, leads to a dehumanization of this process, resulting in a decline in the quality of care services offered. In Brazil, the doctor acts as the primary source of control in the birth process, further stripping the mother of her power of choice. This ultimately promotes the "outsourcing of childbirth," meaning that control that should be physiological, exercised by the mother, becomes exclusively technical. This led to the need to encourage the humanization of the entire process, aiming to combat this technical model of obstetric care. This was supported by the Ministry of Health, which established the Humanization of Prenatal and Birth Program (PHPN) through Ordinance/GM No. 569 of June 1, 2000. The program guarantees the right to effective monitoring for all women during pregnancy, childbirth, and the postpartum period, access to maternity wards, and care for both mothers and newborns[1,2].

The shift toward a return to humanized care is a long but possible and extremely important path, especially for the first moments between mother and baby, which are the focus of the process. The delivery method must be modified to ensure greater respect and safety during maternity. Furthermore, a reorganization of the quality of childbirth care is necessary, investing in training and professionals capable of adopting the new humanized model and disseminating their knowledge and experience to the rest of the healthcare team. Therefore, the role of nurses is essential to the effectiveness and consolidation of these obstetric services. Furthermore, research should be focused on developing management strategies and improving pregnancy and childbirth care[2].

The aim was to update the deliveries and births that occurred in the state of Rio Grande do Norte that were characterized in the cited article.

Methodology

Ecological study, with a quantitative approach, is based on secondary data on live births in the state of Rio Grande do Norte, from 2012 to 2022. Rio Grande do Norte is in the Northeast region of Brazil and has an area of 52,809.599 km², according to the Brazilian Institute of Geography and Statistics[3]. In 2022, it had a population of 3,302,729 inhabitants, of which 1,703,967 were women, distributed across 167 municipalities. The state capital is the city of Natal.7 The information collected came from the Live Birth Information System (SINASC). SINASC provides access to data on births in Brazil and is updated through a standard document, the live birth certificate. Therefore, this document is of great importance in statistical, epidemiological, and demographic terms.

The variables analyzed were grouped according to three aspects: spatial characteristics (regional health care and place of birth); maternal characteristics (age, education, marital status, length of gestation, type of pregnancy, type of delivery, and prenatal consultation); and newborn characteristics (sex, race/ethnicity, Apgar scores at 1 and 5 minutes, birth weight, and presence and type of congenital anomaly). Data processing and analysis were performed using TabNet (DATASUS) and Excel (Microsoft®) software and were expressed in tables, considering descriptive statistics. This study was conducted with public domain data from SINASC, and the subjects were not identified[4].

Results

Spatial characteristics

During the period evaluated, the presence of 507,611 live births was identified in the state of Rio Grande do Norte, with a variation from 48,242 (2012) to 50,214 (2022) and an annual average of 46,146 live births. As for the health region, this presented the highest number of live births, with Greater Natal standing out, which is composed of six municipalities, namely: Ceará-Mirim, Extremoz, Macaíba, Natal, Parnamirim and São Gonçalo do Amarante. This region presented percentages above 50% of the births occurred in the state, with the highest value being observed in 2015, the year in which Greater Natal was responsible for the birth of 53.0% of newborns (Tables 1 and 2). The hospital was the main place where births occurred, obtaining percentages above 97.6%. Home births accounted for less than 0.1% of all live births (Tables 3 and 4)[3,4].

Maternal characteristics

The most prevalent age range among mothers who gave birth in the state of Rio Grande do Norte was between 20 and 24 years (24.7%) and 25 and 29 years (24.4%). A total of 88,310 women were under 20 years of age, with a predominance of those between 15 and 19 years (16.4%). The most common educational level among mothers was 8 to 11 years of schooling (55.5%) and 4 to 7 years (22.9%). Only 2,673 women (0.5%) had no education. Most mothers were single (28.0%), and 28.0% declared themselves married. In 80.8% of cases, the pregnancy lasted 37 to 41 weeks, and in 98.0% of cases, the pregnancy was single. Regarding the type of delivery, it was identified that 38% occurred vaginally. In terms of the number of consultations carried out during prenatal care, 64.6% of women had 7 or more consultations. In turn, 5,603 (1.1%) did not have any consultations[3,4].

Newborn characteristics

Regarding the characteristics of the newborns, there was a predominance of males (51.2%) and brown skin

color/race (65.9%). A weight of 3,000 to 3,999 g was identified in 64.7% of the newborns, 21% weighed 2,500 to 2,999 g, and 0.1% weighed less than 500 g. Only 6% weighed 4,000 g or more. The Apgar score at 1 minute was 8 to 10 points in 87.4% of deliveries. At 5 minutes, this percentage rose to 97.2% (Table 3). Congenital anomalies affected 3,936 newborns when the types of anomalies were sought; the total recorded in SINASC denotes incomplete information. Considering this last value, a higher frequency of anomalies classified as other malformations and congenital deformities of the feet (15.4%) and congenital deformities of the feet (24.4%) was observed[3,4].

Table 1. Live births in the health regions of the state of Rio Grande do Norte by year of occurrence. Rio de Janeiro, RJ, Brazil, 2024 (n = 507,611)

Regional de	2012		2013		2014		2015		2016		2017	
Saúde	n	%	n	%	n	%	n	%	n	%	n	%
I	2.959	6,2	3.183	6,7	3.666	7,1	3.577	7,2	3.684	8,0	3.380	7,2
II	6.928	14,7	7.085	15,0	7.240	15,0	7.534	15,2	7.240	15,8	7.596	16,3
III	1.604	3,3	1.410	3,0	2.079	4,3	1.846	3,7	1.016	2,2	974	2,1
IV	3.652	7,7	3.451	7,3	3.213	6,6	3.257	6,6	2.819	6,1	2.706	5,8
V	1.749	3,7	2.088	4,4	2.382	5,0	2.186	4,4	2.492	5,4	2.884	6,2
VI	3.749	7,9	3.525	7,5	3.776	8,0	3.772	7,6	3.513	7,5	3.415	7,3
VII	25.394	53,4	25.150	53,2	24.989	51,0	26.219	53,0	24.245	53,0	24.834	53,1
VII	1.493	3,1	1.375	2,9	1.290	3,0	1.136	2,3	900	2,0	920	2,0
Total	**47.528**	**100,0**	**47.267**	**100,0**	**48.635**	**100,00**	**49.527**	**100,0**	**45.909**	**100,0**	**46.709**	**100,0**

Source: Live Birth Information System (SINASC).
Note: Regional de Saúde: Regional Health.

Table 2. Live births in the health regions of the state of Rio Grande do Norte by year of occurrence. Rio de Janeiro, RJ, Brazil, 2024 (n = 507,611)

Regional de	2018		2019		2020		2021		2022	
Saúde	n	%	n	%	n	%	n	%	n	%
I	3.839	7,9	3.869	8,7	3.580	8,1	3.490	7,9	3.321	8,2
II	7.924	16,3	7.827	17,5	7.999	18,1	7.970	18,1	7.573	18,7
III	1.268	2,6	1.309	2,9	2.027	4,6	2.117	4,8	2.303	5,7
IV	2.607	5,4	2.529	5,7	2.401	5,4	2.325	5,3	1.990	4,9
V	3.117	6,4	2.819	6,3	2.718	6,7	2.599	5,9	2.408	5,9
VI	3.687	7,6	3.435	7,7	3.194	7,2	3.240	7,3	2.884	7,1
VII	25.345	52,0	22.374	50,1	21.977	49,5	22.275	50,5	20.043	49,4
VII	854	1,8	461	1,1	188	0,4	100	0,2	50	0,1
Total	**48.641**	**100**	**44.623**	**100**	**44.084**	**100**	**44.116**	**100**	**40.572**	**100**

Source: Live Birth Information System (SINASC).
Note: Regional de Saúde: Regional Health.

Table 3. Places of birth in the state of Rio Grande do Norte by year of occurrence. Rio de Janeiro, RJ, Brazil, 2024 (n = 507,611))

Local da ocorrência	2012		2013		2014		2015		2016		2017	
	n	%	n	%	n	%	n	%	n	%	n	%
Hospital	46714	98,3	46042	97,4	47402	97,5	48320	97,6	44803	97,6	45958	98,4
OES	668	1,4	1073	2,3	1092	2,2	1018	2,1	920	2,1	580	1,3
Domicílio	85	0,2	84	0,2	59	0,1	83	0,1	72	0,1	71	0,1
Outro	58	0,1	67	0,1	71	0,1	101	0,2	111	0,2	100	0,2
Ignorado	3	0	1	0	11	0,02	5	0	3	0	0	0
Total	**47528**	**100,0**	**47267**	**100,0**	**48635**	**99,92**	**49527**	**100,0**	**45909**	**100,0**	**46709**	**100,0**

Source: Live Birth Information System (SINASC).
Note: Local da ocorrência: Location of occurrence. Domicílio: Home. Outro: Other. Ignorado: Ignored.

Table 4. Places of birth in the state of Rio Grande do Norte by year of occurrence. Rio de Janeiro, RJ, Brazil, 2024 (n = 507,611)

Local da ocorrência	2018		2019		2020		2021		2022	
	n	%	n	%	n	%	n	%	n	
Hospital	48.108	98,9	44.186	99,0	43.607	99	43.624	98,9	40.110	99,0
OES	366	0,8	264	0,6	290	0,6	272	0,6	254	0,5
Domicílio	74	0,1	73	0,2	92	0,2	93	0,2	84	0,2
Outro	90	0,2	97	0,2	94	0,2	125	0,3	120	0,3
Ignorado	3	0	3	0	1	0	2	0	4	0
Total	**48641**	**100,0**	**44623**	**100,0**	**44084**	**100,0**	**44116**	**100,0**	**40572**	**100,0**

Source: Live Birth Information System (SINASC).
Note: Local da ocorrência: Location of occurrence. Domicílio: Home. Outro: Other. Ignorado: Ignored.

Discussion

The state of Rio Grande do Norte is divided into seven Health Regions. The Metropolitan Region stands out among them because it includes the state capital, which is a reference health center for the metropolitan region and the interior, with eight hospitals. Due to the lack of adequate obstetric care in the interior, many pregnant women travel to the metropolitan region in search of better care during childbirth, which overloads the capital's obstetric services and compromises the quality of care[5].

The predominance of hospital births reflects historical changes in the birth process, where childbirth ceased to be a home event and began to occur in hospitals, with health professionals taking control of the process.

Regarding the age of women giving birth, most are between 20 and 24, a period of high fertility, but the number of births among adolescents (17.3%) is concerning. Teenage pregnancy can have significant social impacts, highlighting the need for educational programs on sexuality and contraceptive methods to prevent unplanned pregnancies. Most women have between 8 and 11 years of schooling, which helps them understand the necessary care during pregnancy. However, low education, identified as a risk factor, allows pregnant women to receive primary care. Marital instability, present in most single women, is another risk factor, as it can make raising children difficult without the support of a partner.

Most pregnancies last between 37 and 41 weeks, classifying newborns as full-term, which is positive, as prematurity can cause serious complications and require specialized medical resources, in addition to having a financial and social impact on families. The state's high C-section rate is far from the 15% limit recommended by the WHO, and this is not just a statewide problem, but a national one. The Ministry of Health's Prenatal and Birth Humanization Program recommends at least six prenatal appointments, but 1.6% of pregnant women (7,895 women) did not reach this number, which is worrying.

Birth weight is an indicator of fetal health, with 65.7% of newborns having an adequate birth weight. However, more than 25% were underweight, increasing the risk of mortality. Newborns weighing less than 2,500g have a fivefold higher risk of mortality in the first year of life. The Apgar score, which assesses the newborn's condition in the first minutes of life, should be continuously monitored, as low scores are an indicator of infant mortality risk.

Musculoskeletal anomalies are easily diagnosed due to the visibility of the malformations. The underreporting of these anomalies may be linked to the way the live birth certificate is structured, with an open-ended question that makes it difficult to complete. It is essential to find mechanisms to reduce underreporting and promote prevention and early diagnosis of malformations.

Conclusion

The results of this study highlight advances in labor and birth care in Rio Grande do Norte, such as widespread prenatal coverage and the predominance of full-term births. However, significant challenges remain, such as the high rate of cesarean sections (62%), which exceeds the WHO recommended limit by more than four times, and the underreporting of congenital anomalies, indicating deficiencies in the quality of data recording. The concentration of births in the Natal metropolitan region reflects inequalities in the distribution of health services, overloading referral hospitals, and compromising the quality of care. Furthermore, teenage pregnancy (17.3%) and low prenatal care adherence among some pregnant women (1.1% without appointments) reinforce the need for public policies aimed at sexual and reproductive health education. To improve obstetric care, it is essential to strengthen the humanization of childbirth, reduce unnecessary interventions, and invest in the training of health professionals. Intersectoral actions that integrate epidemiological surveillance, primary care, and health education are essential to ensure safe and respectful motherhood, aligned with the guidelines of the Prenatal and Birth Humanization Program.

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