

HOSPITAL MORTALITY DUE TO NEONATAL SEPSIS IN BRAZIL

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ABSTRACT

Introduction: Sepsis remains among the leading causes of neonatal mortality worldwide, constituting an important public health problem. **Objectives:** To describe and analyze mortality rates from early and late neonatal sepsis in Brazil between 2020 and 2025, showing the temporal evolution, place of occurrence, age, sex, and color/race. **Methods:** This is a quantitative, cross-sectional and retrospective study, with a survey of confirmed cases of neonatal sepsis in the last five years. Data were obtained from the Department of Informatics platform of the Unified Health System. **Results:** A total of 12,142 deaths related to neonatal sepsis were recorded in Brazil. The highest number of occurrences was recorded in 2021 (n = 2,646). As of 2022, there was a downward trend in the absolute number of deaths, with records of 2,344 in 2023 and 2,163 in 2024. Regarding geographic distribution, the Southeast Region concentrated the highest number of deaths (n = 4,582), followed by the Northeast Region. There was a predominance of deaths in the early neonatal period, especially among newborns aged between 0 and 6 days, totaling 5,757 records. **Conclusions:** The results reinforce that factors related to the biological vulnerability of the newborn, especially prematurity, remain strongly associated with fatal outcomes due to neonatal sepsis, corroborating the evidence available in the literature. These findings highlight the need to strengthen strategies for prevention, early diagnosis, and timely management of neonatal sepsis, particularly among higher-risk newborns.

Keywords: Brazil, Infant mortality, Pediatrics, Premature, Neonatal sepsis.

INTRODUCTION

Sepsis is a complex clinical syndrome resulting from a dysregulated response of the immune system to an infectious process. This phenomenon involves the simultaneous activation of pro-inflammatory pathways and immunosuppressive mechanisms, creating a state of immune imbalance that may progress to multiple organ dysfunction and high mortality. In pediatric intensive care units, this condition remains an important clinical challenge, requiring effective

strategies for early recognition and immediate therapeutic intervention.¹

Infants constitute a particularly vulnerable group, since the immune system is still undergoing maturation, which favors intensified inflammatory responses to infectious agents.² In addition, the clinical course of sepsis may occur rapidly and unpredictably, with abrupt deterioration of the clinical condition, a circumstance that contributes significantly to increased mortality.³

In the neonatal period, sepsis is characterized as a clinical syndrome associated with the presence of systemic signs of infection accompanied by the identification of pathogenic microorganisms—including bacteria, viruses, or fungi—in sterile body fluids, such as blood or cerebrospinal fluid, during the first 28 days of life.⁴ This condition remains among the leading causes of neonatal mortality worldwide, constituting an important public health problem.⁵ Studies indicate that newborns affected by sepsis have a significantly higher probability of progressing to death when compared with those who do not develop systemic infection.⁶

The epidemiological distribution of neonatal sepsis demonstrates a higher incidence in low- and middle-income countries, where socioeconomic factors, structural limitations of healthcare services, and difficulties in accessing specialized care contribute to increased neonatal mortality. It is estimated that approximately 30% to 40% of neonatal deaths in these contexts are related to systemic infectious processes. In Brazil, data from the Mortality Information System (SIM) indicate that a significant proportion of infant deaths occurs during the neonatal period, with sepsis identified as one of the main factors associated with these outcomes.⁷

Among the most relevant risk factors for the development of neonatal sepsis are prematurity and low birth weight, especially in newborns weighing less than 1,500 grams. In this population, immune immaturity, associated with a greater need for invasive interventions and prolonged hospitalization, contributes to a significant increase in susceptibility to infections. Consequently, preterm newborns have a substantially higher risk of developing sepsis when compared with term newborns.⁸

In addition to neonatal factors, maternal and perinatal conditions also play a relevant role in the occurrence of sepsis. These include the presence of maternal infections during pregnancy, preeclampsia, congenital malformations, and low Apgar scores at birth. In situations in which diagnosis is delayed or treatment is not instituted in a timely manner, the clinical course may result in progressive worsening of the condition and an increased risk of mortality. In this context, strengthening strategies aimed at prevention, epidemiological surveillance, and early detection of the disease becomes essential, especially in more vulnerable populations.³

From a clinical perspective, the initial signs of neonatal sepsis may be nonspecific, which makes early diagnosis difficult. Behavioral changes, such as decreased responsiveness to the environment, irritability, persistent crying, difficulty sucking, feeding refusal, and lethargy, may represent initial manifestations of systemic infection with potential progression to sepsis.⁹ In the presence of clinical suspicion, management should be immediate and systematic, including continuous monitoring of physiological parameters—such as heart rate, respiratory rate, blood pressure, peripheral oxygen saturation, body temperature, and urine output. In parallel, the collection of microbiological cultures from different sites before the initiation of antimicrobial therapy is recommended whenever possible.²

Empirical antibiotic therapy should be instituted early, preferably within the first hours after diagnostic suspicion, in order to reduce the risk of progression to septic shock

and organ failure. Supportive measures, such as fluid resuscitation, ventilatory support, and nutritional support, may also be necessary, and the patient should remain under continuous clinical monitoring to assess the therapeutic response and identify early the need for additional interventions, including the use of vasoactive drugs.²

Alongside treatment, preventive strategies play a fundamental role in reducing the incidence of neonatal sepsis. Strict adoption of hospital infection control measures, especially adequate hand hygiene by healthcare professionals, constitutes one of the most effective interventions for reducing the transmission of microorganisms in hospital settings. Additionally, the judicious use of invasive devices, such as venous catheters, and the appropriate indication of antibiotic prophylaxis in specific situations of infectious risk have demonstrated a positive impact on disease prevention.¹⁰

Care practices centered on humanized care, such as the kangaroo method and the encouragement of breastfeeding, have also been widely recognized for their benefits in the immunological protection of newborns, contributing to the reduction in the occurrence of neonatal infections and promoting better outcomes in child development.^{11,12}

Given the relevance of the topic, the present study aims to describe and analyze mortality rates due to early- and late-onset neonatal sepsis in Brazil between 2020 and 2025, highlighting temporal trends, place of occurrence, age, sex, and color/race.

METHODS

This is a quantitative, cross-sectional, and retrospective study, with a survey of confirmed cases of neonatal sepsis over the last five years. Data were obtained from the platform of the Department of Informatics of the Brazilian Unified Health System (DATASUS).

The study was conducted at the national level with a population (N) of 12,142 patients with neonatal sepsis. The time frame for data analysis was from 2020 to 2025 (the last five years recorded on the data platform). Deaths by occurrence caused by neonatal sepsis in newborns from 0 to the 27th day of life were analyzed, covering the Brazilian national territory, without considering differences between regions. The study was based on category P36 (Bacterial sepsis of newborn) of the International Classification of Diseases (ICD-10). The results obtained were organized in tables using Microsoft Excel software.

No exclusion criteria were considered due to the methodological nature of the study. In addition, data from all macro-regions of Brazil (North, Northeast, Southeast, South, and Central-West) were analyzed to encompass variations in population density, socioeconomic characteristics, and climate. On this platform, clinical data cannot be accessed, only the number of deaths, which can be stratified by age (age group) and location.

It was decided to study neonates (zero to 27 days of life) who had a medical diagnosis of neonatal sepsis. The main cause of death was coded according to the guidelines of the World Health Organization, following the instructions of the physician responsible in any field of the death certificate (DC), according to code P36 of the International Classification of Diseases (ICD-10).

During the study, data containing the names of the reported individuals were not exported; therefore, their identities were kept confidential, with no need for the use of the Informed Consent Form (ICF) or approval by the Research Ethics Committee (REC).

RESULTS

This is an epidemiological, quantitative, cross-sectional, and retrospective study based on the analysis of deaths due to bacterial sepsis of the newborn recorded in the Mortality Information System (SIM/DATASUS) from 2020 to 2025.

During the period analyzed, 12,142 deaths related to neonatal sepsis were recorded in Brazil. The highest number of occurrences was recorded in 2021 ($n = 2,646$), followed by 2020 ($n = 2,587$) and 2022 ($n = 2,402$). From 2022 onward, a downward trend in the absolute number of deaths was observed, with 2,344 recorded in 2023 and 2,163 in 2024 (Table 1).

Table 1. Number of deaths due to neonatal sepsis ($n = 12,142$) for the years 2020 to 2025, Brazil.

ICD-10 Category	2020	2021	2022	2023	2024	2025	Total
Bacterial sepsis of newborn	2,587	2,646	2,402	2,344	2,163	-	12,142

Source: MS/SVSA/CGIAE - Mortality Information System – SIM.

Regarding geographic distribution, the Southeast Region accounted for the highest number of deaths ($n = 4,582$), followed by the Northeast Region ($n = 3,992$). Together, these two macro-regions accounted for approximately 70% of all deaths recorded during the period analyzed, demonstrating an important spatial concentration of mortality due to neonatal sepsis in the country (Table 2).

Table 2. Number of deaths due to neonatal sepsis ($n = 12,142$) by region between 2020 and 2025, Brazil.

Categoria CID-10	Região Norte	Região Nordeste	Região Sudeste	Região Sul	Região Centro-Oeste	Total
Septicemia bacteriana do recém-nascido	1.590	3.992	4.582	1.062	916	12.142

Source: MS/SVSA/CGIAE - Mortality Information System – SIM.

Regarding the place of occurrence of deaths, there was a marked predominance of the hospital setting, accounting for 12,028 records, corresponding to almost all reported deaths. The remaining deaths occurred in other healthcare facilities, homes, public roads, or other locations, representing a residual percentage of the total records (Table 3).

Table 3. Number of deaths due to neonatal sepsis (n = 12,142) by place of occurrence between 2020 and 2025, Brazil.

Region	Hospital	Other healthcare facility	Home	Via pública	Other	Unknown	Total
North Region	1,563	7	10	6	12	-	1,598
Northeast Region	3,943	19	8	11	8	-	3,989
Southeast region	4,559	11	4	1	8	-	4,583
South Region	1,062	-	-	-	2	-	1,064
Central-West Region	901	2	2	-	2	1	908
Total	12,028	39	24	18	32	2	12,142

Source: MS/SVSA/CGIAE - Mortality Information System – SIM.

The analysis of demographic characteristics (Table 4) demonstrated a predominance of deaths in the early neonatal period, especially among newborns aged 0 to 6 days, totaling 5,757 records, compared with 5,008 deaths observed among those aged 7 to 27 days. In both age groups, the Southeast Region had the highest numbers, with 2,067 deaths among newborns aged 0 to 6 days and 1,981 among those aged 7 to 27 days.

Regarding sex, a higher frequency of deaths was observed among male newborns (n = 6,781) compared with female newborns (n = 5,344). The highest concentration of male deaths was recorded in the Southeast Region (n = 2,516), followed by the Northeast Region (n = 2,268), a pattern similar to that observed for females (Table 4).

Regarding color/race, there was a predominance of deaths among individuals classified as mixed-race (pardo) (n = 6,632), concentrated mainly in the Northeast Region (n = 2,859), followed by the Southeast Region (n = 2,024). Among individuals classified as White, 4,079 deaths were recorded, with the highest concentration also in the Southeast Region (n = 2,130), reflecting differences in demographic and population distribution among the Brazilian macro-regions (Table 4).

Table 4. Number of deaths due to neonatal sepsis (n = 12,142) by demographic profile between 2020 and 2025, Brazil.

	Region					Total
	North Region	Northeast Region	Southeast region	South Region	Central-West Region	
Age						
0 to 6 days	910	1,837	2,067	502	441	5,757
7 to 27 days	550	1,637	1,981	455	385	5,008
Sex						
Male	885	2,268	2,516	591	521	6,781
Female	712	1,710	2,063	473	386	5,344
Ignored	1	11	4	-	1	17
Color/Race						
White	211	551	2,130	890	297	4,079
Black	16	104	189	30	9	348
Asian	1	4	3	-	2	10
Mixed-race	1,152	2,859	2,024	109	488	6,632
Indigenous	98	27	9	9	31	174
Unknown	120	444	228	26	81	899

Source: MS/SVSA/CGIAE - Mortality Information System – SIM.

DISCUSSION

The present study characterized the epidemiological profile of deaths associated with neonatal sepsis in Brazil between 2020 and 2025, demonstrating that mortality remains concentrated among biologically more vulnerable newborns, especially those with low birth weight and prematurity. These findings reinforce the role of these conditions as prognostic determinants of neonatal sepsis and demonstrate that, despite advances in perinatal care, such factors remain strongly associated with fatal outcomes.

The influence of birth weight on neonatal mortality has been consistently described in the literature. Jovičić et al.¹³ demonstrated an inversely proportional relationship between birth weight and survival, showing a progressive increase in lethality as weight decreases. The authors observed that low-birth-weight newborns had a more than sixfold probability of progressing to death when compared with neonates with adequate weight. Thus, low birth weight is shown to constitute one of the main markers of clinical severity in neonatal sepsis.

Similarly, Aguiar et al.¹⁴, when analyzing deaths due to septicemia in the state of Bahia, identified a higher concentration of deaths among neonates weighing between 500 and 999 g, corroborating the pattern observed at the national level. Although the present study is unable to evaluate this variable, these studies suggest that the impact of low birth weight transcends geographic and healthcare differences, reflecting physiological limitations inherent to organ immaturity, reduced immune response, and greater susceptibility to infectious complications.

Prematurity was also closely related to the risk of mortality. The results of Afonso et al.¹⁵ indicated a significant increase in the risk of death in newborns with a gestational age of less than 37 weeks, a result consistent with the findings of this study. However, while the present study demonstrated a higher frequency of deaths among extremely preterm newborns, Afonso et al.¹⁵ observed a predominance among neonates born between 28 and 36 weeks.

On the other hand, the data presented by Aguiar et al.¹⁴ demonstrated higher mortality among extremely preterm newborns, followed by very preterm newborns, more closely resembling the profile found in the present analysis. These differences probably reflect population variations, availability of neonatal intensive care, the profile of referral services, and the classification criteria used in each investigation. Nevertheless, the three studies converge in recognizing prematurity as one of the most relevant prognostic factors for mortality due to neonatal sepsis.

In the present study, a predominance of deaths among males was observed, a result that reproduces a trend widely described in national and international epidemiological studies. The greater vulnerability of male newborns has been attributed to the interaction between hormonal, immunological, and genetic factors, including later pulmonary maturation, differences in the inflammatory response, and greater susceptibility to severe infections during the neonatal period. Thus, although biological sex does not represent a modifiable factor, its identification as a risk marker may contribute to greater clinical surveillance in vulnerable groups.

Regarding distribution by color/race, the predominance of deaths among White newborns should be interpreted in light of the demographic composition of the population studied, not necessarily indicating a greater intrinsic risk associated with this variable. As discussed by Jesus et al.¹⁶, racial inequalities observed in neonatal mortality frequently reflect structural differences related to socioeconomic conditions, timely access to specialized services, and the quality of maternal and child

healthcare. Therefore, the interpretation of racial data should simultaneously consider population distribution and the social determinants of health, avoiding simplified causal inferences.

The findings also reinforce the high lethality attributed to neonatal sepsis itself. Milton et al.¹⁷ demonstrated that all-cause mortality progressively increases from neonates with clinical suspicion of sepsis to those with microbiologically confirmed infection, demonstrating a direct relationship between the diagnosis of sepsis and worsening prognosis. This observation complements the results of the present study by indicating that, regardless of demographic characteristics, the presence of systemic infection represents an important determinant of neonatal mortality.

Although different studies use distinct methodologies, populations, and diagnostic definitions, there is notable convergence regarding the main factors associated with unfavorable outcomes, such as prematurity, low birth weight, and confirmed sepsis, which remain consistently associated with increased mortality. In contrast, the divergences observed in the magnitude of lethality rates and distribution among subgroups demonstrate that contextual factors, such as regional differences in the organization of neonatal care, availability of intensive care units, local microbiological profiles, and the diagnostic criteria employed, exert an important influence on the results found.

In this context, Fleischmann et al.¹⁸ highlight that the absence of internationally standardized definitions for neonatal sepsis and the scarcity of robust epidemiological studies hinder comparisons between countries and compromise estimates of the true global burden of the disease. This methodological heterogeneity may also explain some of the differences observed between national and international studies, reinforcing the need for standardization of diagnostic criteria and strengthening of epidemiological surveillance systems.

From a healthcare perspective, Strunk et al.¹⁹ emphasize that, although early antibiotic therapy and intensive support remain fundamental pillars of treatment, preventive strategies have even greater potential to reduce mortality. Measures such as improving the quality of obstetric and neonatal care, strengthening protocols for the prevention of healthcare-associated infections, continuous training of multidisciplinary teams, and implementation of continuous quality improvement programs have demonstrated a significant impact on reducing the incidence and lethality of neonatal sepsis.

Thus, the findings of the present study reinforce the need for public policies aimed not only at the timely treatment of established sepsis, but mainly at the early identification of newborns at greater risk and the systematic adoption of preventive strategies capable of reducing neonatal mortality on a national scale.

CONCLUSIONS

The findings of this study demonstrate that neonatal sepsis remains an important cause of mortality in Brazil, with deaths concentrated in the early neonatal period and heterogeneously distributed among the country's macro-regions. A greater magnitude of mortality was observed in the first days of life, with a predominance among male newborns and a higher concentration of deaths in the Southeast and Northeast regions, reflecting both population distribution and the particularities of the organization of neonatal care in these locations.

The results reinforce that factors related to the biological vulnerability of the newborn, especially prematurity, remain strongly associated with fatal outcomes due to neonatal

sepsis, corroborating the evidence available in the literature. These findings highlight the need to strengthen strategies for the prevention, early diagnosis, and timely management of neonatal sepsis, particularly among newborns at greater risk.

From a public health perspective, the data presented highlight the importance of improving prenatal, perinatal, and neonatal care, with emphasis on the prevention of prematurity, improvement of care for critically ill newborns, and implementation of evidence-based care protocols. In parallel, strengthening epidemiological surveillance and the quality of national information systems is essential to monitor the temporal evolution of the disease, identify priority groups, and support the planning of public policies aimed at reducing neonatal mortality.

Finally, considering the high mortality burden associated with neonatal sepsis in the country, it is essential to expand national epidemiological studies capable of integrating clinical, obstetric, and microbiological information, allowing a more precise understanding of the determinants of this condition and guiding more effective interventions to reduce neonatal morbidity and mortality in Brazil.

REFERENCES

1. Catapani EB, Menezes JDS, Guarnieri GM, Pereira AA, Sacardo Y, Parro MC. Overview of neonatal sepsis in an Intensive Care Unit: a literature review. *Res Soc Dev*. 2023;12(5):e11212540796.
2. Rodrigues LDS, Costa LC, Fontoura GMG, Maciel MCG. Trend in infant mortality rate caused by sepsis in Brazil from 2009 to 2018. *Rev Inst Med Trop Sao Paulo*. 2021 Apr;63:e26.
3. Freitas EGS, Pereira J, Bertozzi A, Nashimuta F, Ferreira R, Nascimento J. Análise epidemiológica de hospitalizações por sepse pediátrica no Brasil: estudo ecológico. *Cad Pedagog*. 2024;21(10):e8946.
4. Procianoy RS, Silveira RC. The challenges of neonatal sepsis management. *J Pediatr (Rio J)*. 2020 Oct;96(Suppl 1):80-86.
5. Celik IH, Hanna M, Canpolat FE, Pammi M. Diagnosis of neonatal sepsis: the past, present and future. *Pediatr Res*. 2022 Jan;91(2):337-50.
6. Santos ZMA, Oliveira APF, Sales TMO. Sepse neonatal, avaliação do impacto: uma revisão integrativa. *Bionorte*. 2020;9(1):47-58.
7. Oliveira SGD, Spaziani AO, Frota RS, Jacomini RP, Boschi L, Escher RSS, Souza MAG, Gomes Filho LS, Spaziani LC. Septicemia bacteriana do recém-nascido no Brasil nos anos de 2013 a 2017. *Braz J Health Rev*. 2020 Mar;3(2):1404-21.
8. Conceição HN, Diogo MPS, da Silva PJ, de Araújo LER, Dorneles IAB, Dorneles Neto JS, Hirt L, Machado FC, Misukami DR, Ramos GMF, Fuff CR, Feitoza BG. Sepse neonatal: desafios no diagnóstico e tratamento. *Braz J Implantol Health Sci*. 2024;6(2):1243-51.
9. Santos MRD, Cunha CCD, Ishitani LH, França EB. Mortes por sepse: causas básicas do óbito após investigação em 60 municípios do Brasil em 2017. *Rev Bras Epidemiol*. 2019;22(Suppl 3):e190012.
10. Lee Him R, Rehman S, Sihota D, Yasin R, Azhar M, Masroor T, Naseem HA, Masood L, Hanif S, Harrison L, Vaivada T, Sankar MJ, Dramowski A, Coffin SE, Hamer DH, Bhutta ZA. Prevention and Treatment of Neonatal Infections in Facility and Community Settings of Low- and Middle-Income Countries: A Descriptive Review. *Neonatology*. 2025;122(Suppl 1):173-208.
11. Sivanandan S, Sankar MJ. Kangaroo mother care for preterm or low birth weight infants: a systematic review and meta-analysis. *BMJ Glob Health*. 2023 Jun;8(6):e010728.
12. Fontes NO, Fonseca BS, Rennó GAS, Marques MVP, Rocha LF. Sepse neonatal: abordagens diagnósticas e estratégias de tratamento. *Rev Ibero-Am Humanid Cienc Educ*. 2024;10(10):1386-95.
13. Jovičić M, Milosavljević MN, Folić M, Pavlović R, Janković SM. Predictors of mortality in early neonatal sepsis: a single-center experience. *Medicina (Kaunas)*. 2023 Mar 18;59(3):604.
14. Aguiar KVCS, Souza GKO, Rabelo MF, Carvalho JJ, Sampaio TF, Saba JMB, Borges K, Oliveira LSL, Antunes MVM. Aspectos epidemiológicos dos óbitos por sepse

neonatal no Estado da Bahia. Rev Eletr Acervo Saude. 2021 Jun 3;13(6):e7630.

15. Afonso E, Smets K, Deschepper M, Verstraete E, Blot S. The effect of late-onset sepsis on mortality across different gestational ages in a neonatal intensive care unit: a historical study. Intensive Crit Care Nurs. 2023 Aug;77:103421.

16. Jesus LC, Benedet IB, Cadorin EM, Zavarise GB. Perfil epidemiológico da mortalidade neonatal entre 2011 e 2021 em Santa Catarina. Inova Saude. 2025;15(4):47-52.

17. Milton R, Gillespie D, Dyer C, Taiyari K, Carvalho MJ, Thomson K, Sands K, Portal EAR, Hood K, Ferreira A, Hender T, Kirby N, Mathias J, Nieto M, Watkins WJ, Bekele D, Abayneh M, Solomon S, Basu S, Nandy RK, Saha B, Iregbu K, Modibbo FZ, Uwaezuoke S, Zahra R, Shirazi H, Najeeb SU, Mazarati JB, Rucogoza A, Gaju L, Mehtar S, Bulabula ANH, Whitelaw AC, Walsh TR; BARNARDS Group; Chan GJ. Neonatal sepsis and mortality in low-income and middle-income countries from a facility-based birth cohort: an international multisite prospective observational study. Lancet Glob Health. 2022 May;10(5):e661-e672.

18. Fleischmann C, Reichert F, Cassini A, Horner R, Harder T, Markwart R, Tröndle M, Savova Y, Kissoon N, Schlattmann P, Reinhart K, Allegranzi B, Eckmanns T. Global incidence and mortality of neonatal sepsis: a systematic review and meta-analysis. Arch Dis Child. 2021 Jul 19;106(8):745-752.

19. Strunk T, Molloy EJ, Mishra A, Bhutta ZA. Neonatal bacterial sepsis. Lancet. 2024 Jul 20;404(10449):277-293. doi: 10.1016/S0140-6736(24)00495-1. Epub 2024 Jun 26. Erratum in: Lancet. 2025 Apr 26;405(10488):1467.

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