

ASPECTOS EPIDEMIOLÓGICOS DA MORTALIDADE INFANTIL
EPIDEMIOLOGICAL ASPECTS OF CHILD MORTALITY
ASPECTOS EPIDEMIOLÓGICOS DE LA MORTALIDAD INFANTIL

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RESUMO

Objetivo: analisar a taxa de mortalidade infantil no Brasil, por regiões. **Método:** trata-se de um estudo quantitativo, descritivo, retrospectivo, epidemiológico, transversal. Compôs-se a amostra por todos os nascidos vivos e óbitos de crianças menores de um ano registrados no SINASC e SIM, respectivamente. Obtiveram-se os dados por meio da plataforma digital DATASUS. **Resultados:** registraram-se 128.332 óbitos infantis na região Nordeste durante esse período, tendo como seus principais fatores a idade materna menor de 14 anos, mães sem escolaridade, gestações com duração de 22 a 27 semanas, crianças nascidas de parto vaginal, sexo masculino, cor/raça indígena, peso ao nascer menor que 999 gramas e baixa atenção à mulher na gestação. **Conclusão:** concluiu-se que grande parte dos óbitos infantis no Nordeste está ligada a causas maternas, evidenciando-se falha na assistência de saúde. Podem-se alterar esses números por meio de uma assistência pré-natal adequada, planejamento familiar e qualificação da promoção de saúde.

Descritores: Mortalidade Infantil; Epidemiologia; Criança; Saúde Pública; Estudos Transversais; Fatores de Risco.

ABSTRACT

Objective: to analyze the infant mortality rate in Brazil, by regions. **Method:** it is a quantitative, descriptive, retrospective, epidemiological, cross-sectional study. The sample was composed by all live births and deaths of children under one year of age registered in SINASC and YES, respectively. The data were obtained through the DATASUS digital platform. **Results:** there were 128,332 infant deaths in the Northeast region during this period, the main factors being maternal age under 14, mothers without schooling, pregnancies lasting from 22 to 27 weeks, children born vaginally, male, indigenous color/race, weight at birth less than 999 grams and low attention to women in pregnancy. **Conclusion:** It was concluded that a large part of the childhood deaths in the Northeast are linked to maternal causes, showing a failure in health care. These numbers can be changed through adequate prenatal care, family planning and health promotion qualification.

Descriptors: Infant Mortality; Epidemiology; Child; Public Health; Cross-Sectional Studies; Risk Factor.

RESUMEN

Objetivo: analizar la tasa de mortalidad infantil en Brasil, por región. **Método:** se trata de un estudio cuantitativo, descriptivo, retrospectivo, epidemiológico, transversal. La muestra estuvo compuesta por todos los nacidos vivos y defunciones de niños menores de un año registrados en SINASC y SIM, respectivamente. Los datos se obtuvieron utilizando la plataforma digital DATASUS. **Resultados:** se registraron 128,332 muertes infantiles en la región Noreste durante este período, siendo los principales factores la edad materna menor de 14 años, madres sin educación, embarazos de 22 a 27 semanas, niños nacidos por parto vaginal, varones, color / raza indígena, peso al nacer menor a 999 gramos y poca atención a la mujer durante el embarazo. **Conclusión:** se concluyó que gran parte de las muertes infantiles en el Noreste está relacionada a causas maternas, evidenciando una falla en la atención de salud. Estos números pueden modificarse mediante una atención prenatal adecuada, planificación familiar y calificación de la promoción de la salud.

Descritores: Mortalidad Infantil; Epidemiología; Niño; Salud Pública; Estudios Transversales; Factores de Riesgo.

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INTRODUCTION

It is the Infant Mortality (IM) of the number of deaths of children under one year in a given region. In Brazil, despite the advances made in recent decades, IM continues to be a public health problem, since it represents an unwanted event and is about early deaths, mostly from preventable

causes. The Infant Mortality Rate (IMR) is standardized internationally as the number of deaths of children under one year on the number of live births (multiplied by one thousand), indicating the risk of a live birth (LB) evolving to death.¹

IMR is responsible, among the several indicators used to evaluate the health care provided to the population, for revealing the socioeconomic conditions of a certain territory and measuring the quality of the care aimed at the maternal-infant public.² The reduction of infant mortality has gained great international prominence after its inclusion as one of the millennium goals proposed by the United Nations (UN) in the 2000s. The idea was to reduce the IMR to levels below 15.7 deaths per thousand LB by 2015, and Brazil managed to achieve the goal in advance in 2011, by reaching the rate of 15.3.³

Of the five regions of Brazil, the lowest infant mortality rates are found in those with the best economic development: South and Southeast regions. In the Center-West, the intermediate value rate is presented, while in the North and Northeast regions, the highest infant mortality rates are found in Brazil, with the North occupying the first place in the ranking of children under one year of age.

It is understood, in line with the above, that researching which factors are involved in infant deaths is of extreme interest for taking action in reducing the cases and, respectively, the infant mortality rate.

OBJECTIVE

To analyze the infant mortality rate in Brazil, by regions.

METHOD

It is a quantitative, descriptive, retrospective, epidemiological and cross-sectional study on infant mortality in Brazil, from 2008 to 2017, with emphasis on the Northeast region. The Mortality Information System (MIS) and the Live Births Information System (SINASC) available at the UHS Informatics Department (DATASUS) platforms were used for the collection.⁴ Electronic data collection was carried out between September and October 2019.

In the MIS, the alternative "child deaths" was chosen in the mortality option and "Brazil by region and federation unit" was selected in the geographic coverage tab. All infant deaths by residence in the aforementioned period were included, and later the columns "ICD-10 chapter", "avoidable causes", "sex", "color/race", "maternal age", "maternal schooling", "duration of pregnancy", "type of delivery" and "weight at birth" were activated for the evaluation of causes of deaths in the Northeast region. In SINASC, the option "born alive" was selected and then "Brazil by region and unit of the federation" in the geographical scope, in the same period.

The data was organized, after the electronic collection, through spreadsheets in Microsoft Excel 2018. The infant mortality rate for Brazil per year and region was calculated for the analysis. The variables were submitted to simple percentage calculations in the Microsoft Excel 2018 program according to the total child deaths per year and region of the federation evaluated. The results were exposed by means of line graphs and figures.

RESULTS

Table 1 shows the infant mortality rate in the five regions of Brazil from 2008 to 2017. For the calculation of the rate, the formula "number of deaths of residents under one year of age" divided by the "total number of live births of resident mothers" was used, multiplied by one thousand. Infant mortality rates are generally classified as high (50 or more), medium (20-49) and low (less than 20), depending on the proximity or distance of values already reached in more developed societies.

There were 128,332 infant deaths registered in the MIS, in the Northeast region, referring to 89,805 neonatal and 37,451 postnatal cases, and 8,392,513 live births were registered in SINASC during the period studied.

Year	Region				
	North	Northeast	Southwest	South	Midwest
2008	17.62	17.13	13.51	12.64	14.47
2009	17.98	17.02	13.18	11.87	14.41
2010	17.26	15.68	12.56	11.40	13.78
2011	16.23	15.28	12.39	11.62	13.46
2012	16.58	15.04	12.24	11.10	13.59
2013	16.48	15.48	11.97	10.70	13.62
2014	15.71	14.53	11.67	10.75	13.02
2015	15.18	13.97	11.32	10.39	12.24
2016	15.51	14.45	11.70	9.96	12.68
2017	15.43	14.05	11.31	10.14	11.65

Figure 1: Infant mortality rate in Brazil by region from 2008 to 2017. Parnaíba (IP), 2018. Source:⁴

Figure 1 shows the reduction in the infant mortality rate in all regions of the country over the years, but the Northeast region continues to occupy the 2nd place in the ranking of the highest rates in the country.

Table 1 shows the variables related to the registered child deaths, the points "maternal age", "maternal education", "duration of pregnancy", "type of delivery", "sex", "color/race", "weight at birth" and "avoidable causes", accompanied by its IMR calculated according to the quantity of live births and specific deaths of each variable.

Table 1. Infant mortality rate in the Northeast Region by variables from 2008 to 2017. Parnaíba (PI), 2018.

Variable	IMR
Maternal age	
Under 14 years of age	21.95
From 15 to 19 years	14.30
From 20 to 24 years	12.10
From 25 to 29 years	11.26
From 30 to 34 years	11.79
From 35 to 39 years	14
Over 40 years old	19.89
Maternal education	
None	51.42
Up to 7 years	14.09
8 to 11 years	9.63
Over 12 years	9.10
Length of gestation	
From 22 to 27 weeks	548.93
From 28 to 31 weeks	213.76
From 32 to 36 weeks	30.09
From 37 to 41 weeks	4.77
42 weeks or more	5.47
Type of childbirth	
Vaginal	15.43
Cesarean	10.73
Sex	
Male	16.54
Female	13.72
Color/race	
White	22.21
Black	7.95
Yellow	7.86
Brown	12.56
Indigenous	22.58
Birth weight	
Up to 999g	607.40
1000 to 1499g	266.18
1500 to 2499g	41.24
2500 to 2999g	7.75
3000g to 3999g	4
4000g or more	5.13

Avoidable causes

Immunization actions	0.01
Care for women during pregnancy	3.94
Care for the woman in childbirth	1.85
Newborn care	3.07
Actions, diagnosis and treatment	1.05
Actions linked to PHC	0.90
Poorly defined causes	0.41
Other causes	4.02
TOTAL	15.29

Source: ⁴

Among the highest IMR recorded according to the variables, maternal age under 14 years, mothers without schooling, pregnancies lasting from 22 to 27 weeks, children born in vaginal delivery, male, indigenous color/race, weight at birth less than 999 grams and, as for avoidable causes, the attention to women in pregnancy was the highest rate.

Figure 1 shows the main causes of death according to the chapters of ICD-10. It is inferred, therefore, that disorders originated in the perinatal period are the most frequent causes of infant mortality (9.35), followed by congenital malformations, chromosomal deformities and anomalies (2.77) and infectious and parasitic diseases (0.85).

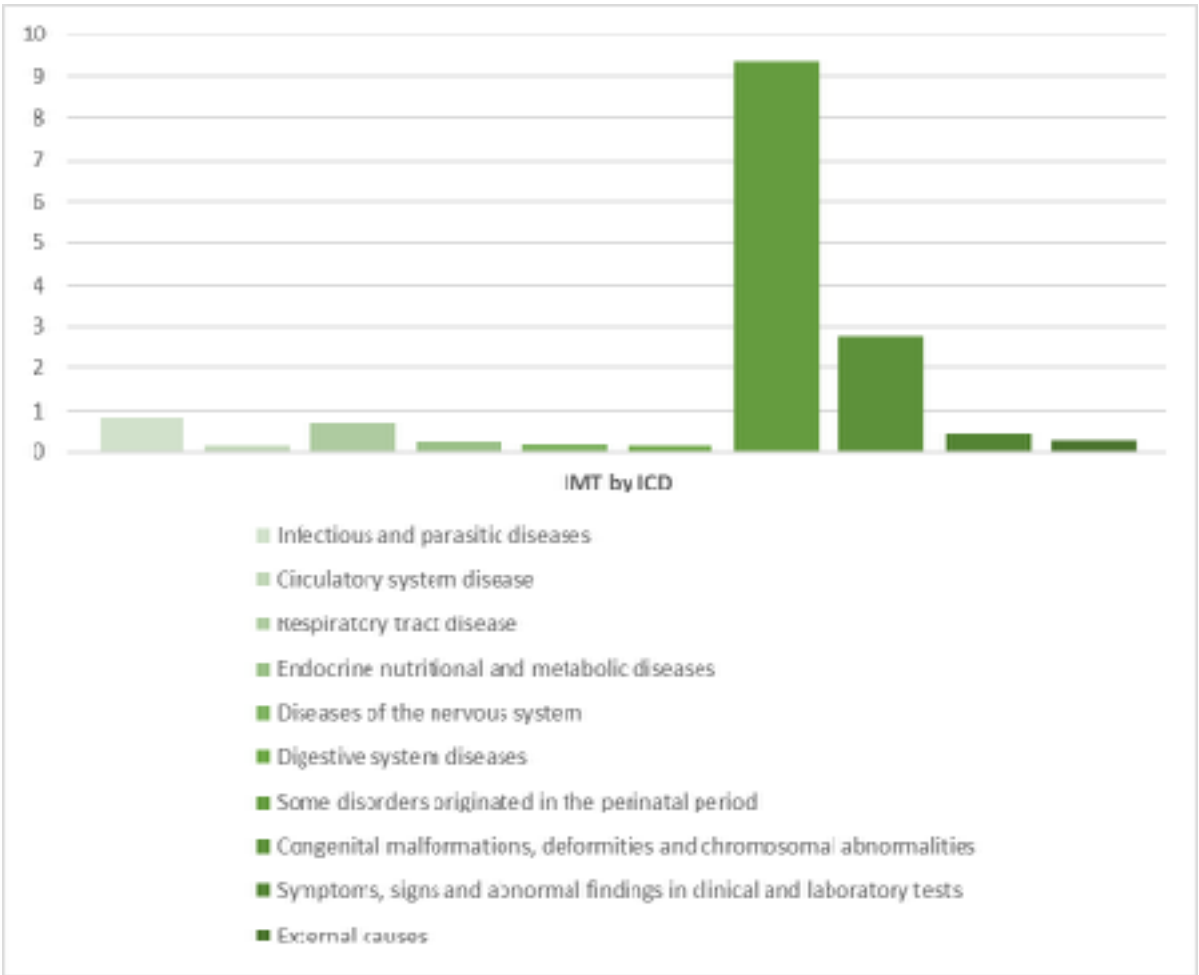


Figure 2: Infant mortality rate in the Northeast region per ICD-10 chapter from 2008 to 2017. Parnaíba (IP), 2018. Source: ⁴

DISCUSSION

A study was carried out to evaluate the impact of the Family Health Program on child mortality in the Northeast region of Brazil, and the data 1 by these authors corroborate this study, pointing to a reduction in IMR in this region. It is also pointed out that the expansion of the program in the region helps in the reduction of mortality and improvement of the child health indicators through the monitoring of the woman still pregnant until the first years of life of the child.⁵

It is warned, however, that the deaths of children under one year of age represent more than 85% of the deaths of children under five in Brazil. This number is closely linked to the development of the country, since for every thousand deaths of children under one year of age that occur every day in the world, around 99% are in developing countries.⁶

It is also necessary to reach, taking into account the degree of development of the country, an important point in Brazil, which is the reduction of regional inequalities and inequalities related to specific social groups. It is understood that IMR is also associated with low socioeconomic conditions, which leads to this great variability in different regions of the country, often in the same municipality or state.⁷

Children's deaths are associated, by individual and ecological analysis studies, with socioeconomic conditions, the most frequently cited being: availability of basic sanitation; mother's schooling; race/colour; average residents per household; residence in urban/rural areas and level of income.⁶

It is revealed, when scoring the factors "maternal age" and "maternal schooling", that the trend of late reproduction perceived in recent decades in Europe has not been found in regions with great social inequalities, where fertility rates are close to or below the level of population replacement, as is the case of the Northeast region. It is added that, in developed countries, the fall in fertility happened along with the increase in the average age of maternity.⁸ The importance of late reproduction is perceived, since the highest mortality rates were found in children born to mothers under 14 years of age.

It is pointed out that, although Brazil has shown an increase in the proportion of births of the first children at ages above 30, this behavior has only been observed among women with higher levels of schooling and income, while those with lower income and low schooling are still young mothers, also presenting greater chances of reaching the end of reproductive age with a greater number of children and increased neglect of care.⁹ It is described, considering maternal schooling as a potential risk factor for the child, that this study presented results concordant to those found in the literature.

Premature birth is defined as the birth before 37 complete weeks of gestation, as a consequence of maternal prenatal factors or spontaneously, without apparent precipitating factors.¹⁰ Premature

birth is subclassified according to gestational age into: extreme premature (below 28 weeks of gestation); severe (between 28 and 31 weeks and six days of gestation); moderate (between 32 weeks and 33 weeks and six days of gestation) and mild (between 34 weeks and 36 weeks and six days of gestation).¹¹

It is shown in the analysis of the main causes of IM in Brazil, between 2000 and 2010, that throughout the country, prematurity is the main cause of child death in the first week of life. According to a report published by the UN, the complications related to premature birth are the second leading cause of death among children under five years of age in the world.¹²

Premature babies of low social class represent the highest rates of deaths related to prematurity. It is warned that, in poor countries, about 90% of premature babies die with less than 28 days of life, while in rich countries; this number does not reach even 10%.¹³

It has been demonstrated in recent studies that, in relation to the type of delivery, the infant mortality coefficient is higher for vaginal delivery, corroborating the results obtained in this study.¹⁴ On the other hand, a study produced in Spain showed a negative impact on the health of newborns after cesarean sections without medical indication, measured by the Apgar index.¹⁵ The higher IMR related to vaginal delivery can be associated with the quality of care, since most cesarean deliveries are performed by women with better purchasing power and in the private health service.

It was evidenced, in relation to the sex, that the male sex presents superior values of IMR. The literature describes the male sex as a strong prognostic variable of infant deaths in the first year of life, relating this sex to late maturation of the lungs, consequently increasing the involvement of respiratory problems.¹⁶

Within the "race/color" variable, it is revealed that there are few studies aimed at comparative analysis of infant mortality according to the ethnic-racial cut-off in Brazil, however, this issue has received increasing prominence within the debates on social determinants. It is pointed, in a general way, by the analyses, to higher IMR values in the case of children classified as black, brown and indigenous¹⁷ and, as far as IMR is concerned, the indigenous population presented the highest index in the Northeast region. It has been possible, by the inclusion of the category "indigenous" in the race/color of the research census, an important expansion of data sources on this population segment.

Among the other factors, birth weight is recommended as a parameter used not only to indicate the intrauterine conditions in which the child was submitted during the gestational period, but also to evaluate the newborn's health and be one of the main determinants for the survival of the newborn.¹⁸ This may cause several problems for the health of the child, among them, a greater predisposition to mortality in the first weeks of life.¹⁹

The highest rate (3.94) was found within IM for avoidable causes, due to attention to women during pregnancy. Prenatal care was constituted in a set of actions that are simultaneously preventive, health promoting, diagnostic and curative, aiming at a good pregnancy outcome for the woman and her child(ren). Important regional variations were presented by prenatal care. It is noted that, despite the high coverage, the proportion of women without any prenatal care was 60% higher in the North than the national average, with the Northeast in second with 13%. In addition, the Southeast, South, and Center-West regions had a higher prevalence of women with early prenatal care, and the Southeast had a higher coverage of women with at least six prenatal care consultations.²

In relation to prenatal adequacy, which considered both the early onset and the minimum number of consultations, by the Southeast and South regions, the greatest prevalences were presented; for global adequacy 1 (women who had prenatal care and were given the prenatal card on admission to labor), the prevalence dropped substantially in all regions and, considering the more restricted criterion, for global adequacy 2 (women who had prenatal care, were given the prenatal card on admission to labor and were given guidance on the maternity care reference), the prevalence in the country was only 16%, with the Northeast region having the worst result, 10%.²⁰

Similar to that found in the Northeast region regarding deaths related to ICD-10, it is noted that a study carried out in the South, with the objective of knowing the main causes of deaths in children under five years of age in the municipality of Lages (SC), found that the diseases originated in the perinatal period were responsible for 16% of the deaths that occurred.²¹

CONCLUSION

This study concludes that the infant mortality rate in the Northeast region has been reduced considerably over the years, as in other regions of Brazil, but still has rates above those recommended by the World Health Organization. It was verified, as to the causes, the diversity of factors contributing to infant mortality, with emphasis on maternal factors, such as extremes of age and level of education, in addition to the modifiable causes that indicate deficit in health care.

It becomes the promotion of health in schools fundamental to the awareness of the risks of teenage pregnancy. It is understood that government programs are also essential to encourage the non abandonment of studies and access to family planning for all age groups of both sexes. The importance of professional training to ensure quality prenatal care, with early detection of complications and timely interventions is also highlighted. These changes become indispensable for a safe delivery and a healthy birth, with consequent impact in the reduction of infant mortality.

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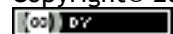
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