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ORIGINAL ARTICLE

Infant mortality among indigenous people in the state of Pará

Mortalidade infantil entre indígenas no estado do Pará

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ABSTRACT

Objective: To analyze the profile of indigenous infant mortality. **Method:** Cross-sectional epidemiological study conducted with 254 deaths in indigenous children under one year of age, notified to the Indigenous Health Care Information System, in the state of Pará, from 2013 to 2018. **Results:** A higher proportion of deaths in male children (53.9%; n=137), Kaiapó (38.2%; n=97), Munduruku (27.6%; n=70) and Xicrim (13.8%; n=35) were identified. The deaths occurred in hospitals (53.9%; n=137), and in homes (24%; n=61), and the main causes were: perinatal diseases (27.2%; n=69); respiratory system diseases (18.9%; n=48), infectious and parasitic diseases (15.7%; n=40). **Conclusion:** The indigenous infant mortality is higher in some ethnicities, which favors actions of confrontation in those more affected. It is necessary to value the indigenous culture and recognize the socioeconomic problems to be contemplated in an action plan to reduce this indicator.

Descriptors: Infant Mortality; Population Groups; Epidemiology; Public Health.

RESUMO

Objetivo: Analisar o perfil de mortalidade infantil indígena. **Método:** Estudo epidemiológico, transversal realizado com 254 óbitos em crianças indígenas menores de um ano, notificadas ao Sistema de Informação da Atenção à Saúde Indígena, no estado do Pará, no período de 2013 a 2018. **Resultados:** Identificou-se proporção maior de óbitos em crianças do sexo masculino (53,9%; n=137), nas etnias Kaiapó (38,2%; n=97), Munduruku (27,6%; n=70) e Xicrim (13,8%; n=35). Os óbitos ocorreram nos hospitais (53,9%; n=137), e nos domicílios (24%; n=61), e as principais causas foram: as afecções perinatais (27,2%; n=69); as doenças do aparelho respiratório (18,9%; n=48), doenças infecciosas e parasitárias (15,7%; n=40). **Conclusão:** A mortalidade infantil indígena é mais elevada em algumas etnias, o que favorece ações de enfrentamento naquelas mais acometidas. É necessário a valorização da cultura indígena e o reconhecimento dos problemas socioeconômicos a serem contemplados num plano de ação para redução desse indicador.

Descritores: Mortalidade Infantil; População Indígena; Epidemiologia; Saúde Pública.

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INTRODUCTION

Infant mortality is an important indicator, serving as a tool to evaluate the health panorama of a given population and corresponding to the sum of deaths occurring in the early (0–6 days), late (7–27 days) and post-neonatal (28 days or more) periods[1]. Thus, it translates the number of children who die as a result of illness or other factors in a given population group, being recognized as one of the most sensitive health indicators of a country.

According to the Department of Information Technology of the Brazilian Unified Health System, in 2007, 1,047,824 deaths per residence were registered in Brazil, of which 45,370 were deaths of children under one year. In 2017, 1,312,663 deaths were registered per residence, 36,223 of which were in children under one year old, of which 626 were in indigenous children. In these 10 years, a decline of 23.54% of child deaths per residence in the country can be observed[2].

However, despite the considerable reduction identified in the decade, both in the national and global context, the behavior of the event in the indigenous population remains of concern to health authorities, since in Brazil the infant mortality rate (IMR) is twice as high as in the general population[3].

A study[4] conducted in Brazil, based on the latest demographic census, showed that deaths of children under one year of age were 60% more frequent among indigenous people than other children. In addition, it ratifies that the chances of indigenous children under one year of age to die were more expressive than for non-indigenous children.

In the state of Pará, the number of child deaths reported between 2011 and 2017 was 15,812, with an annual average of 2,259 deaths per year. Among the indigenous people, 356 deaths were registered, with higher rates in the years 2012, with IMR=50.62 (n=61 deaths) and 2013, with IMR=49.74 (n=60 deaths)[5].

The indigenous infant mortality deserves a differentiated look by health managers and researchers due to the population contingent and the cultural peculiarities that frame the way of life of these peoples. According to the 2010 demographic census, the population of indigenous Brazilian children from zero to nine years of age represented, at that time, 49.2% of the total indigenous population in the country, a percentage that reflects the high fertility rate[6].

However, there are great challenges to manage health services directed to these people, such as the need to know habits and customs, the local reality, the vulnerability of the population, the health needs, and the ways to access health services, among others. The multi-professional team's appropriation of these aspects will provide the opportunity for planning and executing actions in a more qualified way to reduce unfavorable indicators, such as infant mortality[7].

The objective for this study was to analyze the profile of indigenous infant mortality in children under one year.

METHODOLOGY

Epidemiological study, conducted across 254 cases of deaths in indigenous children under one year of age, notified to the Health Care Information System for Indigenous People (SIASI), from 2013 to 2018, in the state of Pará. The 2013 election was motivated by the improvement of the system, with the launch of SIASI 4.0, which provided more completeness and reliability to the data.

The SIASI is a system that contains data produced in Primary Health Care (PHC) fed by the Primary Health Care Multidisciplinary Teams (MPHCT) of the Special Indigenous Health Districts (SIHD) and managed by the Special Indigenous Health Secretariat (SIHS)[8].

Pará is in the northern region of Brazil and has as geographical limits the countries Suriname and Guyana, the Atlantic Ocean, the states of Amapá, Maranhão, Tocantins, Mato Grosso do Sul, Amazonas and Roraima. It is the second largest state in the country, in territorial extension, with 1,245,870,798 km², and the most populous in the North region, with an estimated population, in 2020, of 8,602,798 inhabitants[9] distributed in 144 municipalities. According to the demographic census conducted in 2010, 51,217 people declared themselves indigenous and of these 35,816 (69.9%), are inhabitants of indigenous lands[9].

The state of Pará has four SIHD: SIHD Altamira, SIHD Guamá-Tocantins, SIHD Rio Tapajós and SIHD Kaiapó do Pará. It is an organizational structure created by Federal Law nº 9,836 of 1999, according to epidemiological, geographic and ethnographic criteria. They are linked to SIHS and develop PHC actions in line with the policies and programs of the Unified Health System (SUS), observing traditional indigenous health practices. For those services that require greater complexity, they use the SUS network of services, ensuring removal according to local culture[10,11].

The SIHD Altamira has a general population of 3,974 indigenous people, 10 ethnic groups, 60 villages, one base center, a Casa de Atenção à Saúde Indígena (IHC) and covers five municipalities, Altamira being the host municipality. In the SIHD Guamá-Tocantins, the general population is 13,913 indigenous people, with 38 ethnic groups, 153 villages, eight base poles, five IHC, and 17 municipalities, with the capital, Belém as its headquarters. The SIHD Rio Tapajós has a general population of 12,722 indigenous people, four ethnic groups, 141 villages, 11 base poles, four IHC, and four municipalities, with Itaituba as its headquarters. The DSEI Kaiapó of Pará has a general population of 5,796 indigenous people, one ethnicity, 50 villages, four base poles, four IHC, and covers six municipalities, and the headquarters is in Redenção[10].

The registered deaths in indigenous children were included in the study, observing the completeness of the data, not being made any exclusion. The variables studied were infant

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mortality rate (IMR); age; sex; ethnicity; DSEI of residence; causa mortis; and place of death.

The data were obtained from SESAI and originated from SIASI, the health information system that stores the data produced in the villages, among them, infant mortality[7]. The deaths were grouped according to the International Classification of Diseases (ICD 10).

The analysis was carried out in three steps: in the first, the data was debugged using *Microsoft Office Excel*® 2013 to filter the set of variables of interest and exclude those that could cause bias in the results, grouping them by SIHD. This analysis was done by descriptive statistics whose results are expressed in relative and absolute frequencies. In the second step, the second year of notification IMR were calculated for trend analysis according to a simple linear regression model, considering the IMR as dependent variables and the years of notification as independent. This statistical model allowed the visualization of the behavior of the indigenous IMR over the years and the linear association between time (years) and the infant mortality coefficient. In the third, we calculated the MRI by SIHD of the state of Pará.

The study was approved by the Research Ethics Committee (REC) of the Undergraduate Nursing Course of the University of the State of Pará (UEPA) under number 3,286,923 on April 26, 2019 and by the National Commission on Ethics in Research (CONEP) under number 3,360,570 on June 3, 2019.

RESULTS

According to Table 1, there was a predominance of male deaths (53.9%; n=137). With higher occurrence in the post-neonatal period (53.5%; n=136), followed by the neonatal period (35%; n=89), and finally the late neonatal (11.4%; n=29). Among the 14 ethnic groups that inhabit the territories of the SIHD located in Pará, three congregated almost all of the deaths (79.2%; n=201): Kaiapó (38.2%; n=97), Munduruku (27.6%; n=70) and Xicrim (13.8%; n=35).

It was also identified that most deaths occurred in hospital (53.9%; n=137), being also significant deaths at home (24%; n=61). In addition, it was identified the occurrence of deaths in other places and even inside means of transportation, certainly at the time of displacement (16.6%; n=42).According to Table 2, the main causes of death in indigenous children were: disorders originating in the perinatal period (27.2%; n=69); respiratory system diseases (18.9%; n=48); infectious and parasitic diseases (15.7%; n=40), and symptoms, signs, and abnormal findings from clinical and laboratory tests, not classified as another cause (15.4%; n=39).

According to Graph 1, the IMR showed fluctuations during the study period, being the highest register in the year 2016, with 40.1/1000 live births. It was also observed that the lowest mortality rates occurred in the years 2015 and 2017, respectively, with 26.6 and 29.8 /1000 live births.

IMR has identified a downward trend over the years. The linear regression model estimated that for each time unit

Table 1. Profile of the occurrence of indigenous infant mortality in children under one year of age in the state of Pará, from 2013 to 2018.

Variable	Freq. n=254	%
Gender		
Male	137	53.9
Female	117	46.1
Age (in days)		
0–6 (Premature Neonatal)	89	35.0
7–27 (Late Neonatal)	29	11.4
28–364 (Post-Neonatal)	136	53.5
Ethnicity		
Kayapó	97	38.2
Munduruku	70	27.6
Xicrin	35	13.8
Assurini	10	3.9
Wai wai	9	3.5
Araweté	8	3.1
Parakanã	7	2.8
Tembé	4	1.6
Amanaye	2	0.8
Gavião	2	0.8
Arara	1	0.4
Suruí	1	0.4
Zo'é	1	0.4
Not informed	7	2.8
Place of occurrence		
Hospital	137	53.9
Home	61	24.0
Others	22	8.7
Ignored	14	5.5
Other healthcare facilities	13	5.1
Public/Transport	7	2.8

Freq.: frequency.
Source: SESAI/SIASI, 2019.

there was a decline of 1.6 each year and the coefficient of determination (R^2) showed that 26.04% of the variation in the IMR is explained by the time variation.

Data from Graph 2 show that in the period 2013-2018, the DSEI Kaiapó do Pará had the highest IMR (57.1/1000 live births), followed by the SIHD Altamira (43.0/1000 live births), SIHD Rio Tapajós (33.8/1000 live births), and finally, the SIHD Guamá-Tocantins (17.0/1000 live births). It was identified that the SIHD Kaiapó do Pará presented the highest rates in the years 2013 (65.9/1000 live births), 2016 (72.7/1000 live births), 2017 (40.0/1000 live births) and 2018 (85.3/1000 live births). In the years 2014 and 2015 the highest IMR were identified at SIHD Altamira, with 69.8/1000 live births and 44/1000 live births, respectively. And the lowest TMI in almost the entire period were found in the SIHD Guamá-Tocantins, with 20.9/1000 live births in 2013, 18.4/1000 live births in 2014, 25.5/1000 live births in 2016, 8.5/1000 live births in 2017 and 5.4/1000 live births in 2018.

Table 2. Distribution of causes of death in indigenous children under one year of age in the state of Pará, from 2013 to 2018.

Causes of death	Freq. n=254	%
Some affections originated in the perinatal period	69	27.2
Respiratory tract diseases	48	18.9
Some infectious and parasitic diseases	40	15.7
Symptoms, signs and abnormal findings of clinical and laboratory tests not elsewhere classified	39	15.4
Congenital malformations, deformities and chromosomal abnormalities	12	4.7
Endocrine, nutritional and metabolic diseases	12	4.7
Circulatory system diseases	11	4.3
Hematopoietic blood and organ diseases and some immune disorders	5	2.0
Diseases of the nervous system	5	2.0
Injuries, poisoning and some other cause consequences	8	3.2
External mortality and morbidity	2	0.8
Digestive system diseases	2	0.8
Genitourinary system diseases	1	0.4

Freq.: frequency.
Source: SESAI/SIASI, 2019.

DISCUSSION

Indigenous IMR were high throughout the study period (34.1/1000 live births), higher than the national average and the state average for children in general, which are 12.39/1000 live births and 15.40/1000 live births, respectively[1]. The most significant were those of the post-neonatal period, possibly attributable to avoidable causes. The most significant contribution to these findings were the deaths at the SIHD Kaiapó do Pará, and the three ethnicities with the highest number of records were: Kaiapó, Munduruku and Xicrim.
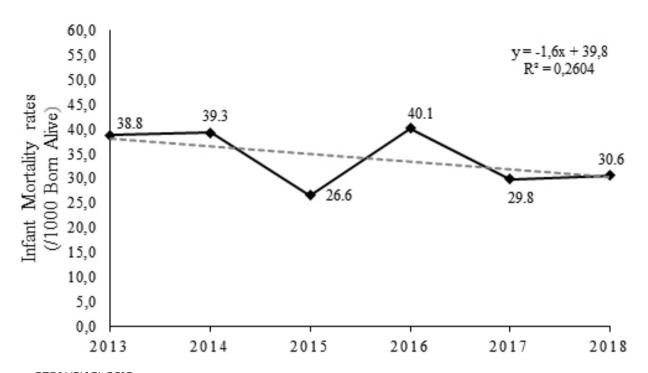
A study[11] conducted with data on infant mortality in the state of Pará, identified that, in the indigenous population, the IMR is about six times higher than in the general population, corroborating the high rates found in this research. In another study[12] conducted with national data, it was identified expressive discrepancy in the indigenous IMR, when comparing with the rates in non-indigenous, evidencing that among the microregions of the country, in which the indigenous represent at least 10% of the population, the deaths of children under one year were 60% more frequent than among the other children. These findings reinforce the importance of studying the death of indigenous children in a geographically stratified manner, in order to relate the event to locoregional contexts, given the social, economic and cultural diversity of the country.

Regarding the social profile, the findings of this study show a predominance of deaths in male children, like those found in a study that identified a higher risk of death on the first day of life among live male births. And presented as possible explanations: higher occurrence of congenital anomalies, greater need for auxiliary ventilation; low Apgar rate; and, respiratory discomfort syndrome in boys, if compared with girls[13,14].
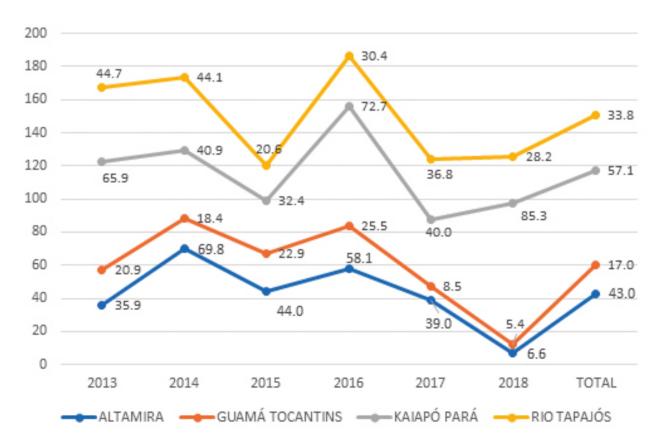
Regarding the high number of deaths occurring in the post-neonatal period, the evidence relates to the difficult access to health care by the indigenous population, making timely interventions difficult[15]. In addition, these rates may result from unfavorable living conditions in the villages, precarious prenatal care, and intercurrence at delivery[16].

The relevant percentage of deaths in hospital environment and at home, found in this study, was also evidenced in a survey conducted in the state of Mato Grosso, which identified a proportion of 29.37% of deaths in hospitals and 16.8% in homes[17]. It should be emphasized that deaths at home can characterize death without biomedical care.

The main cause of death was identified as disorders originating in the perinatal period, detailed in a study performed in eight federal units in Brazil, such as: the newborn respiratory distress syndrome (8.9%); extreme immaturity when the newborn presents less than 28 weeks of gestational age (5.2%); and very low birth weight, corresponding to less than 1,000g (5.2%)[13].

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Source: SESAI/SIASI, 2019.
Graph 1. Indigenous Child Mortality Rate, second reporting year. Pará, Brazil, 2013 to 2018.

Source: SESAI/SIASI, 2019.
Graph 2. Indigenous infant mortality rate by DSEI of the state of Pará, Brazil, from 2013 to 2018.

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Another important cause of death identified in this study were diseases of the respiratory system, also evidenced in research conducted with the Guarani ethnicity, living in 83 villages in the states of Rio de Janeiro and Rio Grande do Sul. The most prevalent diseases were Acute Lower Respiratory Infection (ALRI) with 167 records of the 211 children studied (79.2%) followed by Acute Viral Bronchiolitis (AVB) that affected 20 children (9.7%)[18].

Besides these, another finding that deserves to be highlighted in this study are the infectious and parasitic diseases that persist in the village scenario. National and international studies[19-21] have identified, by means of parasitological examination of feces, a high prevalence of intestinal parasitosis, with a higher proportion of helminths, highlighting *Ascaris lumbricoides*, *Trichuris trichiurid* and *Ancylostomiasis* and protozoa such as *Giardia intestinalis* and *Entamoeba spp*. The researchers attributed the high incidence of diseases caused by enter parasites, among others, to the consumption of water from rivers and sources that are often contaminated, the limited access to health services and the precarious conditions in which many indigenous communities live.

Nevertheless, the results of this study also revealed death from other clinical findings such as bradycardia, respiratory arrest, cardiogenic shock and hypovolemic shock; adverse events such as unknown causes, unassisted death and ill-defined causes, reverberating in the significant numbers of deaths at home. It is possible to relate such findings to the condition of life in the villages, often with health services without adequate structure and complex accessibility, possibly corroborating the occurrence of unassisted deaths.

The calculation of the IMR, showed a discrete tendency to fall, however, with high annual rates throughout the period studied, denoting little impact of the actions established by the National Policy of Health Care for Indigenous Peoples (NPHCIP). It is also attributed the possible difficulty to implement the guidelines and health plans, since such indexes express the precariousness with which they are effective in the routine of the indigenous peoples[22].

The drop in IMR was also identified in a study conducted at the SIHD Xingu, which found an increase in the indicator from 2013 on, and attributed to changes in the health supply, with centralization in medical care and irregular supply of inputs, equipment and drugs, causing low resolution of the services offered, evidencing the impact that can occur when there is no quality in the actions or absence of materials[23].

When analyzing the distribution of infant mortality in the four SIHD of Pará, higher numbers were identified in the villages of the SIHD Kaiapó do Pará, a fact already identified in a previous study, carried out in the period from 2000 to 2002, when in the national context, this SIHD assumed epidemiological leadership, with an average TMI of 123.63/1000 live births. This is worrying evidence, since almost 20 years ago, the Kaiapó do Pará exhibits the highest rates of infant mortality, in the ranking not only in the state of Pará, but in the country[24].

The mortality profile in the ethnic groups indicates higher rates in Kaiapó, Munduruku and Xicrim, which inhabit lands of the Kaiapó SIHD of Pará; Tapajós River; Altamira and Guamá-Tocantins. Thus, these are the groups that contribute most significantly to the profile of indigenous child deaths in Pará. In the SIHD Kaiapó do Pará and Rio Tapajós inhabit almost exclusively, Kaiapó and Munduruku, respectively, while in the SIHD Altamira and Guamá-Tocantins there is greater ethnic variety, among which the Xicrim, which has been determining the rates identified in these two SIHD.

These high mortality rates identified may be a consequence of the difficulty of assistance to indigenous peoples, caused by high turnover of health professionals, difficult access to villages in some regions, precarious health structures, and scrapped inputs and tools, thus reflecting negatively on the quality of health care provided[22]. It is noteworthy that the dynamics and logistics of work in indigenous lands vary according to the organization of the SIHD, and differ in the various villages, resulting even from non-geographic factors that compromise the displacement of health teams.

The limitations of this study are related to the use of secondary data, whose records may be omitted or even misinterpreted, considering that signs and symptoms do not constitute criteria for completion of the death declaration, as well as the probability of occurrence of sub notifications[11]. Another aspect to be considered is that this study addresses the deaths of children living in villages, which may not reflect the full extent of mortality among indigenous people in view of the displaced.

CONCLUSION

The indigenous infant mortality has shown to be quite high, demanding more effective public policies, which should begin with prenatal care of the pregnant woman, followed by childcare. It is a challenge for the health team to add biomedical knowledge to the native practice of indigenous culture that permeates the birth, mother-child relationship and the first care with the newborn.

It is a fact that child death in villages involves factors of the most diverse orders, going through economic, social and environmental issues, and must be treated in all its dimensions, taking into consideration cultural differences, for the establishment of control measures. In this sense, it is fundamental to implement institutional partnerships and intersectoral actions, since these are people with low socioeconomic conditions, requiring joint efforts to address the problem and reverse the indicators.

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The indigenous infant mortality is higher in some ethnic groups, which favors the action of confrontation by SSIH and the respective SIHD, directed to the villages with more unfavorable data. It is necessary to value the local indigenous culture and recognize the social and economic problems present in the villages to be contemplated in an action plan to minimize the suffering indicators.

It is essential that data related to race/color characteristics be properly valued and recorded in official birth and death documents, as well as the cause of death, in order to have a real dimension of vital statistics related to indigenous peoples. These are fundamental data for the (re)organization of health care networks and the evaluation of the potentialities and weaknesses of the system.

Considering the sensitivity of the infant mortality indicator, this study highlighted the need to establish a broader view of indigenous peoples, especially children, in order to minimize the differences and inequalities, still so prevalent in the 21st century, compromising equity in health.

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