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Escalating Health Crisis: Dissecting Mortality Causes and Trends Among Indigenous Populations in Northeast Brazil

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Abstract

Objectives: In Northeast Brazil, the poorest region of the country, indigenous communities face critical health care challenges. Despite legal entitlements to the Unified Health System (SUS), systemic barriers persist, exacerbating health disparities and mortality. This ecological study analyzed mortality trends and causes of death within the Special Indigenous Sanitary District (DSEI) Alagoas-Sergipe over a decade.

Methods: Data on deaths from 2012 to 2022 were obtained from the Indigenous Health Secretariat. Causes of death were classified into 13 categories. Mortality rates per 1,000 indigenous inhabitants were calculated, and trends were analyzed using the Mann-Kendall test. The study also compared causes of death by age group.

Results: Mortality rates ranged from 3.3 to 5.2 per 1,000, showing a moderate upward trend over time ($\tau = 0.5$, $p = 0.042$). Predominant causes included heart and vascular disorders (24.3%), external causes (12.4%), respiratory issues (11.1%), and infections (10.9%). About one-third of pediatric deaths were associated with general neonatal complications.

Conclusions: This study highlights increasing mortality in indigenous communities in Northeast Brazil. The predominant causes of death reflect broader public health concerns. These trends emphasize the urgency for more effective, culturally sensitive public health policies and improved health care access.

Dear Editor,

The rights of Indigenous communities in Brazil, particularly in health-care provision, have historically been overlooked. Although legal frameworks promise comprehensive access to the Unified Health System (SUS), Indigenous populations face systemic barriers in accessing adequate health care. This discrepancy between their rights and the actual services received has contributed to an increase in mortality rates.¹ Key factors include violence, a rise in infectious and noncommunicable diseases, prevalent malnutrition, and the aggravating impact of the COVID-19 pandemic.^{2,3} Additionally, public health policies fail to adequately meet the distinct cultural and social requirements of these communities, compounded by a lack of sufficient investment in health-care infrastructure.

Health care for Indigenous groups is managed by 34 Special Indigenous Sanitary Districts (*Distrito Sanitário Especial Indígena*, DSEI), structured around geographical, cultural, and demographic factors. The DSEIs have specific infrastructures, including Base Poles and Indigenous Health Houses (*Casas de Saúde Indígena*, CASAI). The Base Poles serve as the first point of reference for the Multidisciplinary Indigenous Health Teams that operate directly in the villages, providing primary care and facilitating referrals to more complex services when necessary. Meanwhile, CASAIs are essential structures to ensure that Indigenous people have access to secondary and/or tertiary care, acting as a link between the communities and more advanced health-care services.

Among the 34 DSEIs in Brazil, six are situated in the Northeast region (Alagoas-Sergipe, Bahia, Ceará, Pernambuco, Potiguara, and Maranhão), recognized as the poorest in the country. This implies additional challenges in ensuring adequate and efficient health-care assistance for the Indigenous populations of this region, demanding specific public health policies and

strategies that take into account the resource and infrastructure limitations. However, despite the recognized obstacles in providing health-care assistance to Indigenous populations in the Northeast, there are few published studies detailing the mortality rates and causes of death in these communities. This lack of scientific data and comprehensive research constitutes a significant barrier to the formulation and implementation of effective public policies adapted to the needs of these Indigenous populations.

In this context, this ecological study estimated mortality rates in DSEI Alagoas-Sergipe from 2012 to 2022, analyzing their trend over time and the specific causes of death. Covering 13 Base Poles with a population of 12 534 individuals, we obtained death data from the microdata catalog of the Indigenous Health Secretariat (*Secretaria de Saúde Indígena*, SESAI), spanning January 1, 2012, to December 31, 2022. The causes of death were categorized into 13 groups and stratified by age, distinguishing between the pediatric population (0 to 19 years) and adults (20 years and older). For statistical analysis, annual mortality rates were calculated per 1000 Indigenous inhabitants, and the trend over time was assessed using the Mann-Kendall test (τ). Additionally, differences in causes of death by age group were analyzed using a test for comparison between two proportions. The statistical significance level adopted was 5%. All analyses were performed using the R software (R Foundation for Statistical Computing in Vienna, Austria).

From 2012 to 2022, 605 deaths were recorded in DSEI Alagoas-Sergipe. Of these, 361 (59.7%) occurred in the Base Poles of Wassu Cocal (106), Jeripankó (101), Kariri-Xocó (81), and Xucuru-Kariri (73) (Figure 1A). In the age distribution, 528 (87.3%) deaths occurred in the adult population, whereas 77 (12.7%) were in the pediatric population. Among pediatric deaths, 41 (53.2%) of affected children were under one year old. Mortality rates per 1000 Indigenous individuals ranged from 3.3 (in 2012 and 2013) to 5.2 (in 2020), indicating a moderate trend of increasing mortality over time ($\tau = 0.5$, $p = 0.042$), as illustrated in Figure 1B. Leading causes were heart and vascular disorders (24.3%), external causes (12.4%), respiratory problems (11.1%), and infections (10.9%). External causes included especially gunshot wounds, bladed weapons, drowning, hanging, and trauma from a traffic accident involving a car or motorcycle. Heart and vascular issues were more prevalent in adults ($p = 0.002$), whereas children faced significant nutritional challenges ($p < 0.001$). About one-third of pediatric deaths were associated with general neonatal complications, including congenital malformations, respiratory distress syndrome, neonatal aspiration, hypoxia, asphyxia, and other causes (Table 1).

The present study provided a detailed understanding of the health conditions among Indigenous peoples of Northeast Brazil. Our findings indicate a worrying trend of increasing mortality among the Indigenous population in Alagoas e Sergipe states,

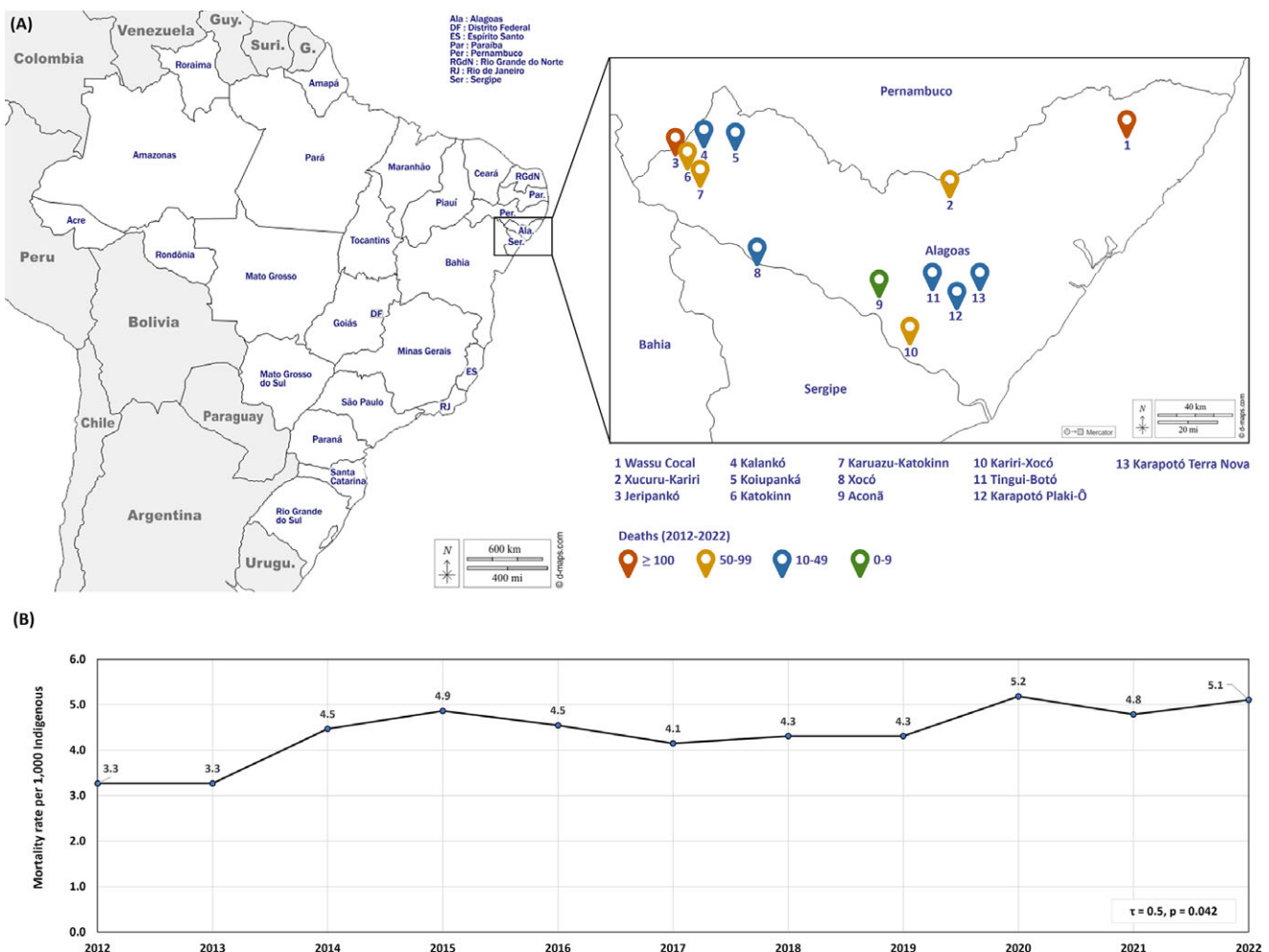


Figure 1. (A) Distribution of deaths by Indigenous village in Sergipe and Alagoas, Northeast of Brazil; (B) Mortality rates per 1000 Indigenous people from 2012 to 2022.

Table 1. Distribution of causes of death by age group in Indigenous communities of Sergipe and Alagoas, Northeast of Brazil, from 2012 to 2022

Causes of death	Total (n = 605)	0-19 years (n = 77)	≥ 20 years (n = 528)	p-value
External causes	75 (12.4%)	12 (15.6%)	63 (11.9%)	0.100
Pulmonary and respiratory tract disorders	67 (11.1%)	5 (6.5%)	62 (11.7%)	0.174
Heart and blood vessel disorders	147 (24.3%)	8 (10.4%)	139 (26.3%)	0.002*
Brain, spinal cord, and nerve disorders	51 (8.4%)	3 (3.9%)	48 (9.1%)	0.125
Digestive disorders	18 (3.0%)	3 (3.9%)	15 (2.8%)	0.594
Nutritional disorders	6 (1.0%)	4 (5.2%)	2 (0.4%)	<0.001*
Hormonal and metabolic disorders	27 (4.5%)	1 (1.3%)	26 (4.9%)	0.152
Kidney and urinary disorders	15 (2.5%)	0 (0.0%)	15 (2.8%)	0.137
Liver and gallbladder disorders	10 (1.7%)	0 (0.0%)	10 (1.9%)	0.223
Infections	66 (10.9%)	8 (10.4%)	58 (11.0%)	0.875
Cancer	43 (7.1%)	5 (6.5%)	38 (7.2%)	0.824
General problems in newborns	25 (4.1%)	25 (32.5%)	–	–
Other defined causes	18 (3.0%)	2 (2.6%)	16 (3.0%)	0.846
Ill-defined causes	37 (6.1%)	1 (1.3%)	36 (6.8%)	0.060

*p-values less than were considered statistically significant.

suggesting deteriorating health conditions and unmet health-care needs despite legal guarantees.^{4,5} Specifically, the predominance of deaths due to heart and vascular disorders, respiratory problems, and external causes reflects trends observed in other Indigenous populations, where noncommunicable diseases and violence have increased significantly,⁶ often due to lifestyle changes, limited access to preventive and high-quality health services, and a lack of public safety policies for this population.

The analysis of death causes among different age groups in the studied Indigenous populations reveals distinct patterns and specific challenges. Nutritional issues are more prevalent among children, whereas adults are more affected by heart and vascular disorders. There is evidence that lifestyle and environmental changes due to urbanization added to suboptimal health care have increased the cardiovascular risk in traditional tribes in Brazil.⁷ Our findings are also consistent with the literature that highlights the specific vulnerabilities of Indigenous children to adverse health conditions, often exacerbated by malnutrition and insufficient access to quality neonatal and pediatric care in remote Indigenous communities.^{8,9} Additionally, the high prevalence of infection-related deaths, exceeding national averages,¹⁰ suggests broader public health concerns driven by poor living conditions, low vaccination rates, and environmental challenges, underlining the need for more effective health policies.

In conclusion, the study underscores the increase in preventable mortality among Indigenous communities in Alagoas and Sergipe. These results underline the critical challenges of limited health-care access and poor living conditions, necessitating more efficient and culturally sensitive public health policies. Implementing strategies to improve health-care access, living conditions, health education, nutrition, and vaccination coverage is imperative to address health disparities and enhance health indicators in these communities. Future studies should aim to compare these findings with those of other Indigenous communities and the general Brazilian population to better understand the broader context of health disparities and inform targeted health interventions.

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