

Fatores epidemiológicos e incidência de hanseníase no estado da Bahia

Epidemiological factors and incidence of hansen's disease in the state of Bahia

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ABSTRACT

This work aims to analyze the epidemiological endemicity of Hansen's disease in the State of Bahia. The study is configured as a quantitative epidemiological descriptive character with a cross-section of Hansen's disease cases from 2011 to 2021. 26,977 cases were identified in the State of Bahia, with an upward trend in the male population. It is noteworthy that the brown race was the most affected, which can be attributed to

socioeconomic factors and people with low education are part of the most vulnerable segment. Concluding, the infectivity rate of Hansen's disease is still high in the state of Bahia.

Keywords: epidemiology, *mycobacterium leprae*, risk factors, public health, hansen's disease.

RESUMO

Este trabalho tem como objetivo analisar a endemicidade epidemiológica da hanseníase no Estado da Bahia. O estudo configura-se como um quantitativo de caráter epidemiológico descritivo com corte transversal dos casos de hanseníase na Bahia no período de 2011 a 2021. Foram identificados 26.977 casos no Estado da Bahia, com tendência de aumento na população masculina. Vale ressaltar que a raça parda foi a mais acometida, o que pode ser atribuído a fatores socioeconômicos e as pessoas com baixa escolaridade fazem parte do segmento mais vulnerável. Concluindo, a taxa de infectividade da hanseníase ainda é alta no estado da Bahia.

Palavras-chave: epidemiologia, *mycobacterium leprae*, fatores de risco, saúde pública, hanseníase.

1 INTRODUCTION

Hansen's Disease is a contagious granulomatous disease of ancient origin with chronic evolution caused by *Mycobacterium leprae*¹. It is a bacillus with great power of resistance to acid-alcohol, characterized by inducing acute inflammatory conditions related to tropism for skin cells and cells of the peripheral nervous system - characterizing involvement of the nerves of the sensory system².

Humans are the main host for Hansen's disease³. Animals such as armadillos also have a predisposition as a reservoir of the disease⁴. The symptomatology may vary according to the host's immunological window, allowing the incubation period to vary from two years to a decade, given its slow bacillary growth rate³. Even so, it has high infectivity and low pathogenicity⁵.

The disease is characterized by presenting different forms, according to the degree of infection and the degree of the immune response, with the following operational classes: paucibacillary and multibacillary⁶. Patients classified as paucibacillary (PB) have from one to five skin lesions, whereas patients with more than five skin lesions are called multibacillary (MB) patients and may have nerve lesions in the peripheral system⁷.

According to the Madrid classification, Hansen's disease can be classified into indeterminate leprosy (paucibacillary), tuberculoid (paucibacillary), borderline (multibacillary), and lepromatous (multibacillary)⁸. The illness phenomena are varied,

related to neurological and dermatological involvement, presenting symptoms such as cramps, muscle pain, nerve thickening, visual alterations with the delimitation of vision, and shortening of muscles and joints⁹.

The disease transmission occurs through close and prolonged contact with the individual infected in the multibacillary form, which is not undergoing treatment, usually affecting family members¹⁰. This transmission occurs through direct contact with droplets of saliva or nasal secretions¹¹. In Brazil, there is excellent relevance about the non-achievement of the goal of Hansen's control due to operational failures in government management and planning, weaknesses in the Care Network in Health, abandonment of treatment, and scenarios of high social vulnerability¹². It is noteworthy that Hansen's disease has become a public health problem due to its high incidence and endemicity in the country¹³. The state of Bahia, located in the south of the northeast region, is one of the most endemic states in Brazil¹⁴.

In this perspective, the present study aims to characterize the endemicity of Hansen's disease transmission in the state of Bahia between the years 2011 to 2021, highlighting the most affected macro-regions according to variables of interest.

2 METHODS

This is an epidemiological descriptive quantitative study with a cross-sectional view of Hansen's cases in the state of Bahia in the period from 2011 to 2021. Data were collected at the information department of the Brazilian Unified Health System (DATASUS), in the Information System of advances in the control of infectious diseases (TABNET), and the information system for notifiable diseases (SINAN). The analysis involved the discussion of epidemiological indicators, namely: infected by macro-region, sex, race, and education. The data obtained through Sinan were available in table format on the website.

Table 1 – Summary of variables obtained from the information system on injuries and notifications-Sinan net.

VARIABLES	UNIT/CATEGORY
Macro-regions	Ilheus, Vitoria da Conquista, Barreiras, Juazeiro, Alagoinhas, Salvador, Teixeira de Freitas, Feira de Santana, Jacobina
Sex	Male/ Female
Race	Non/White, Black, Yellow, Indigenous, and Brown
Education	Illiterate, incomplete 1st to 4th grade of elementary school, complete 4th of

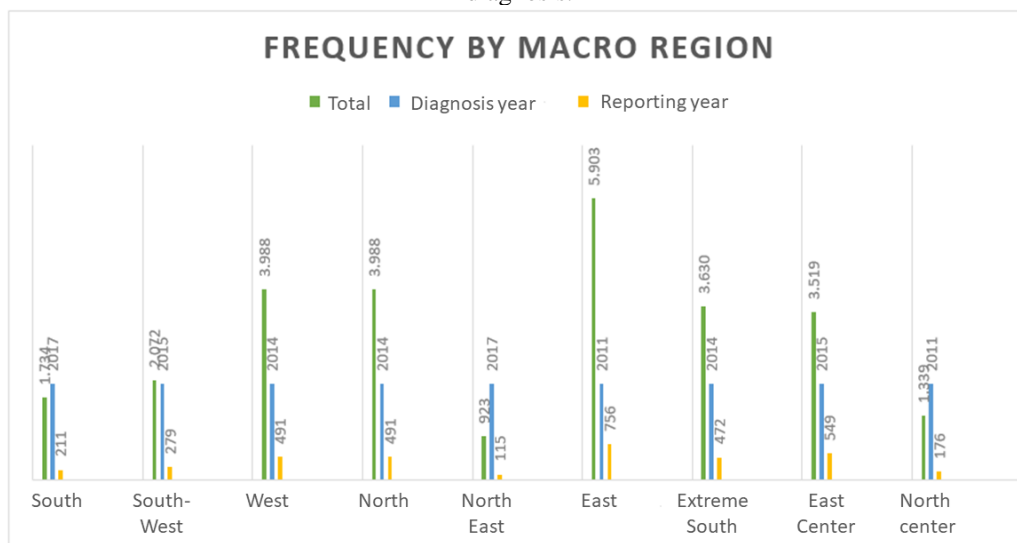
	elementary school, incomplete 5th to 8th grade of middle school, complete primary education, incomplete secondary education, complete secondary education, incomplete higher education, complete higher education
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Source: Author.

3 RESULTS

The results were categorized in terms of macro-region. Followed by the year of diagnosis and year of notification of the disease. Between 2011 and 2020, a total of 26,977 cases were observed. 2011, 3,191 cases were reported, followed by 2014, when 3,189 cases were reported, highlighting a decrease in the number of diagnoses between the years. It was found that the year 2020 had the lowest rate of diagnosed cases. The macro-regions south, southeast, west, north, northeast, east, extreme south, central west, and central north were analyzed (graph 1). The eastern region (NRS/Salvador) had a total of 5,903 cases between the years of data analysis, followed by the western region with 3,988.

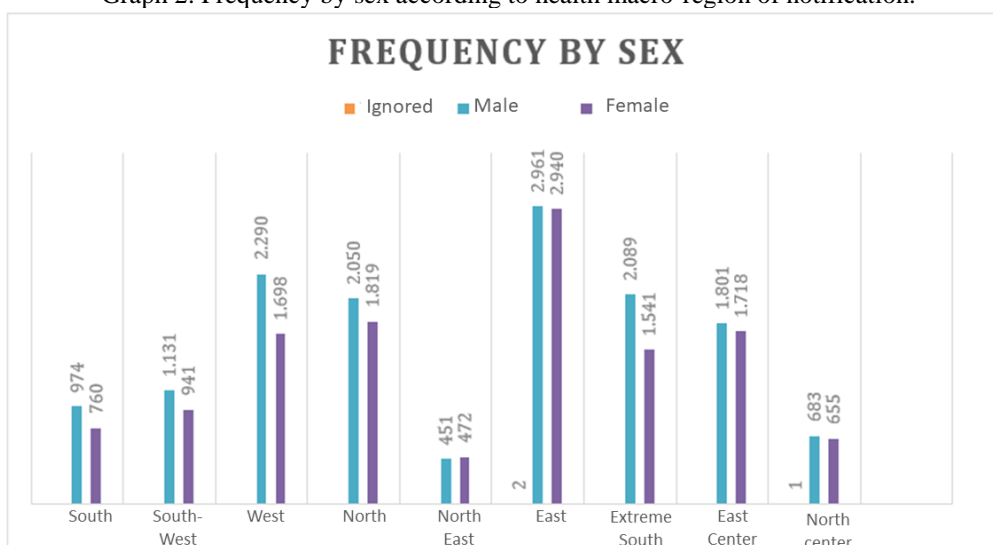
Graph 1. Frequency of Hansen's disease by health macro-region of notification according to a year of diagnosis.



Source: ministério da saúde/SVS- Sistema de informações de agravos e notificações- Sinan net

As for the incidence of infected people (graph 2) by gender and macro-region between the years 2011 to 2020. Both sexes had a significant incidence, but the male population was the most affected. It is observed that in the east region, it was possible to observe a total of 5,903 new cases, and in the west region, a total of 3,869, prevailing a high rate of infectivity during the period of analysis.

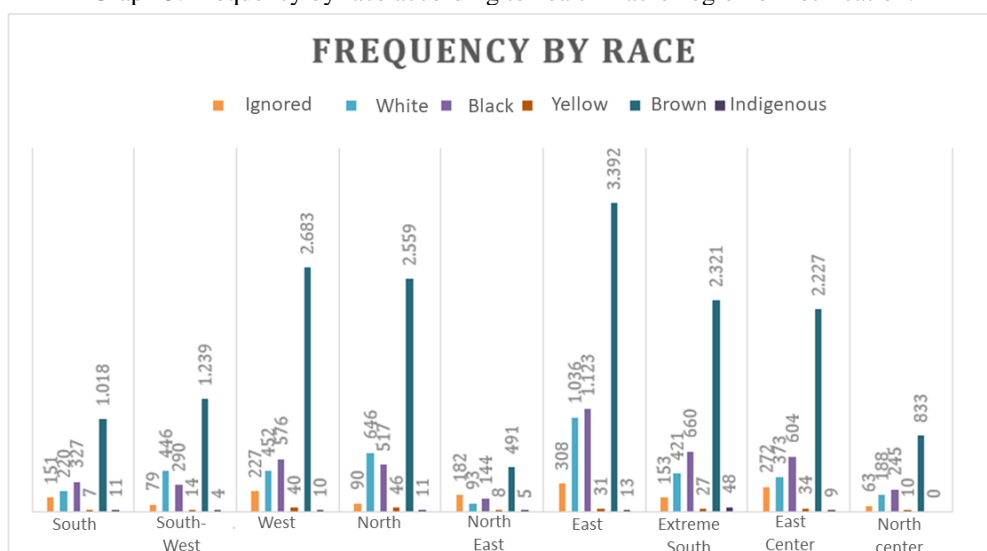
Graph 2. Frequency by sex according to health macro-region of notification.



Source: ministério da saúde/SVS- Sistema de informações de agravos e notificações- Sinan net

The result shown in Graph 3 shows the frequency of race by macro-region. Among the races are white, black, yellow, brown, indigenous, and ignored/white. The brown population was the most affected in the analysis carried out for ten years, with a total of 16,763 cases, demonstrating a higher incidence in the east, west, and north macro-regions.

Graph 3. Frequency by race according to health macro-region of notification.

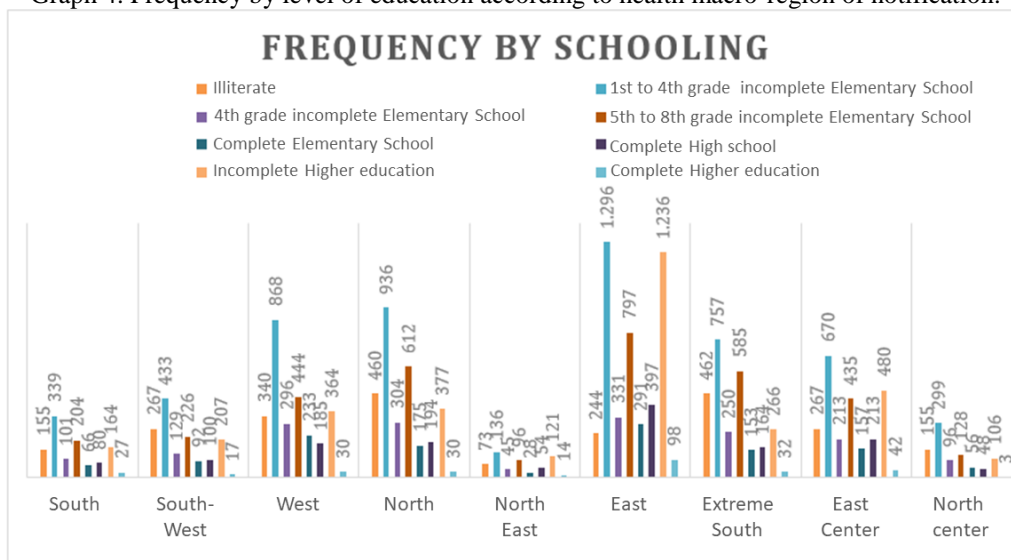


Source: ministério da saúde/SVS- Sistema de informações de agravos e notificações- Sinan net

The results shown in Graph 4 refer to the level of education of people infected with Hansen's disease. The classification ranges from illiteracy rates to complete higher education. There is a tendency for those most affected to have completed the 1st to 4th grade of elementary school, totaling 5,734 cases. The eastern regions with 4,929 cases.

The north, with 3,169 cases, and the western region, with 2,817 cases, had a higher incidence and were more affected by Hansen's disease.

Graph 4. Frequency by level of education according to health macro-region of notification.



Source: ministério da saúde/SVS- Sistema de informações de agravos e notificações- Sinan net

4 DISCUSSION

Mycobacterium leprae is an obligate intracellular bacillus that has a propensity to infect peripheral nerves and the epidermis¹⁵. The mycobacterium infects macrophages, cells that act in the immune system performing phagocytic action against invading microorganisms, which destroy pathogens¹⁶. The bacillus also infects Schwann cells, responsible for providing support and nutrition to the axons of neurons, causing damage to the peripheral system of the human body¹⁷. *Mycobacterium leprae* infection promotes nerve cell demyelination and axonal damage to peripheral nerves through immune reactions^{17, 18}. After the injury, the bacillus will colonize the Schwann cells, significantly corroborating the increase in resistance and its lifespan^{17,19}. The microorganism also reprograms these cells, turning them into stem cells and allowing for high control over their dissemination and reinfection¹⁷⁻¹⁹.

Hansen's disease is caused by *Mycobacterium leprae* in the form of gram-positive bacilli and acid-resistant alcohol in staining, and acid-alcohol resistance is due to the high concentration of lipids in its composition²⁰. Because it is an obligate intracellular mycobacterium, it has an affinity for the human system¹⁵. Manifestations such as neuro dermatological problems, involvement of peripheral nerves, tingling, loss of sensitivity, whitish or reddish spots, decrease or loss of hair, presence of nodules, and physical

deformities - in a high degree of pathology as a result of long-term involvement without treatment, are the main signs and symptoms for the clinical diagnosis of the disease²¹.

The results of the present study make it possible to outline a clinical and epidemiological profile of Hansen's disease in the state of Bahia. Located in the northeast region of Brazil, Bahia has a poor performance in coping actions and health surveillance due to factors related to high vulnerability and social inequality^{22, 23}. In ten years, 26,977 cases of Hansen's were detected in the state of Bahia, according to the information system on notifiable diseases (SINAN) of the Ministry of Health (MS). In the meantime, the East region (NRS/Salvador) had a total of 5,903 cases, followed by the West region with 3,988, with the highest prevalence of year of diagnosis and notification. It is suggested that the spread of the disease is due to demographic expansion in these macro-regions.

Consistent factors are linked to the social, cultural, and environmental spheres. These conditions in the city of Salvador may favor the increase in cases of Hansen's disease when considering the quantification of inhabitants of the capital²⁴.

The significant increase in newly infected cases in the analysis of detection rates by gender, shown in Graph 2, shows a higher rate of Hansen's infections in males. Accordingly, other studies have shown a higher incidence of infected people in males, which can be explained by a higher occurrence of bacciferous infections, indicating negligence in the care and in carrying out prophylaxis among people of this gender²⁵. This fact is associated with vulnerability factors, presenting significant aspects in the male body concerning the lack of care by men, associating this factor with late diagnosis^{22, 26}.

Still regarding the epidemiological profile shown in Graph 4, the race variable was observed in the macro-regions to analyze the population most affected by Hansen's, with greater infectivity being found among the brown race - with a total of 16,763 cases, with a higher incidence in East/Salvador macro-region followed by the North/Juazeiro region. Compared to other races, it was observed that in the literature, the brown color is susceptible to different situations, and the increase in infection rates among people of the brown race may be intertwined with the country's miscegenation process and situations of socioeconomic precariousness in terms of refers to living conditions, health, and education^{12, 25, 27}.

Dealing with the analysis of infected people with schooling, we can infer a considerable number of infected individuals with limited access to education. It is valid to consider the lacking educational scenario, which, in turn, is linked to the

socioeconomic vulnerability to which the affected person is exposed, demonstrating that carriers of the bacillus have limited access to treatment and information regarding the care and prevention of Hansen's disease²⁸.

Similar results are detailed in Graph 5, which shows a high level of infection in the population with low schooling, revealing a predominance among those affected who have attended the 1st to 4th incomplete grade (5,734 cases), followed by the 5th to 8th incomplete grade of middle school (3,527 cases), as well as patients who have completed high school (3,321 cases). In the data analysis, the cases of patients notified in the state of Bahia, framed in the schooling index, showed that the East region/Salvador, North region/Juazeiro, and West region/Barreiras are the macro-regions most affected by illiteracy. This suggests that public policies of investment in education, from basic education to higher education, can considerably reduce diseases that plague developing countries.

The level of education, taking into account the harvest of the most vulnerable individuals, the lack of knowledge, and discrimination contribute to the fact that the correct treatment of the disease does not occur^{29, 30}. It is well known that people with low education are included in the group at high risk of contagion, which is worldwide more susceptible to treatment abandonment³¹⁻³⁴.

Thus, it is noticeable that precarious living conditions favor the longevity of the epidemiological chain of bacillus transmission³⁵. It is necessary to develop prevention strategies for the population with low education, focusing on access to knowledge of the entire infectious process of the pathogen through socio-educational activities, public policies, and lectures, among others³⁶.

5 CONCLUSION

In brief, the *mycobacterium leprae*/Hansen's disease infectivity rate is still high in Bahia, and the present study can demonstrate the increasing prevalence among males. The new cases in the analyzed period were concentrated among individuals with a low level of education, suggesting operational flaws in access to health and education, in addition to calling into question the quality of these services when available. The data indicate a scenario of inequality regarding the incidence and control of Hansen's disease, reinforcing that it is a neglected disease due to the involvement profile.

It is necessary to advance and reform public health, improve health surveillance sectors and strengthen intersectoral health and education actions aimed at economic, social, and cultural changes to reduce the rate of people infected by the disease. Because of the above, it is concluded and emphasized the importance of state and municipal support for the control and monitoring of disease, focused on health education to minimize the impacts of the disease in the state of Bahia.

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GRAPH ABSTRACT

EPIDEMIOLOGICAL FACTORS AND INCIDENCE OF
HANSEN'S DISEASE IN THE STATE OF BAHIA

