Original Research Article

CLINICAL AND EPIDEMIOLOGICAL ASPECTSININDIGENOUS ELDERLY PEOPLE WITH TUBERCULOSIS IN A STATE IN THE BRAZILIAN AMAZON

ABSTRACT

Objective: To analyze the clinical and epidemiological aspects of tuberculosis among indigenous elderly individuals in Pará, from 2010 to 2019.
Methodology: This study employed an epidemiological, quantitative approach using data from the Information System for Notifiable Diseases. The data comprised new cases of tuberculosis reported in elderly individuals in the state of Pará between 2010 and 2019. The data, publicly accessible and stored in epidemiological indicators of tuberculosis in the health macro-regions of Pará, were analyzed using descriptive statistics in Microsoft Excel© software. The results were presented through graphs and tables, displaying the absolute and percentage frequency distribution of the selected variables.
Results and Discussion:A total of 99 cases were identified. The year with the highest occurrence of cases was 2016, with 14 cases (14.14%) reported. The majority of cases were incident in females, with 51 cases (51.52%). The most affected age group was between 70 and 79 years old, accounting for 45 cases (45.45%). Among individuals with no schooling, there was a higher prevalence of illiterate elderly people, with 59 cases (59.60%).
Conclusion: The relationship between TB cases in indigenous elderly individuals and social determinants such as health conditions, housing, and education is highlighted to demonstrate that social inequality among different socioeconomic classes affects the health-disease process.

Keywords: Tuberculosis; Health of Indigenous Populations; Elderly.

1. INTRODUCTION

Tuberculosis (TB) is an alarming disease that mainly affects the most vulnerable populations, one of which is the indigenous population, where it affects up to 8 times more than the Brazilian population. Particularly, TB has a high incidence in the group of elderly people aged 60 years or older, with a higher incidence rate in females, characterized by records of many new cases [1].

Tuberculosis is an infectious disease caused by *Mycobacteriumtuberculosis,*also called Koch's bacillus (BAAR) and is considered a serious public health problem on a global scale, due to its high incidence and prevalence, especially in less developed countries [2]. TB is classified as a neglected disease because it is related to conditions of poverty, poor sanitation, urban agglomerations, inappropriate housing situations, health inequalities, exclusion and social stigma [3].

In 2020, in Brazil, 31.6 new cases were registered per 100,000 inhabitants, making it one of the 30 countries with the highest incidence of TB [4]. In this context, Brazil remains among the 30 countries with the highest TB burden worldwide. For the year 2017, approximately 70,000 new cases were diagnosed in the country, with the highest incidence in the Brazilian population in the North, Northeast and Southeast regions [5].

The infection caused by the bacillus affects certain groups with a greater tendency to illness, among which the elderly and the indigenous population stand out [6]. The elderly are more vulnerable to the development of TB due to the decrease in the efficiency of the immune system, the functional deficit related to age, mucociliary dysfunction and pulmonary function resulting from the senescence process [7].

In contrast, indigenous populations in countries with high, medium or low income have a high and disproportionate incidence of TB [8]. In this population, the incidence rates of TB are higher than in the non-indigenous population, a fact that can be explained by extreme poverty, malnutrition, precarious housing, intestinal parasitism, transmission pattern in villages, resistance to drugs and high prevalence of infection. and social vulnerability that these people are exposed to [9].

According to Ferreira et al (2020) [8], in South American countries there are approximately 34 million indigenous people, organized into 450 population groups. With regard to Brazil, the indigenous population comprises approximately 817,963 thousand indigenous people, representing 0.4% of the country's total population, and the incidence of TB in this population is often greater than 1,000/100,000 inhabitants, or at least 20 times greater than the incidence in the general Brazilian population.

Given this context, there is a need for studies on the clinical-epidemiological profile of indigenous elderly people living in the Amazon living with TB, with a view to characterizing this population. Thus, this study aims to analyze the clinical and epidemiological aspects of indigenous elderly people with tuberculosis in a state in the Brazilian Amazon in the historical series 2010-2019.

2. MATERIAL AND METHODS

This is an epidemiological descriptive study carried out using data from the Information System on Notifiable Diseases (SINAN) regarding new cases of TB reported among elderly indigenous individuals in the state of Pará during the period from 2010 to 2019. The data is available at https://datasus.saude.gov.br. The state of Pará is divided into 13 Health Regions: Araguaia, Baixo Amazonas, Carajás, Lago de Tucuruí, Marajó I, Marajó II, Metropolitana I, Metropolitana II, Metropolitana III, Rio Caetés, Tapajós, Tocantins, and Xingu. Data access was obtained in August 2021.

The independent variables were: sex; schooling (no schooling, incomplete primary education, complete primary education, complete secondary education, complete higher education, ignored); municipality of residence. To characterize the clinical and epidemiological aspects of this population, clinical and epidemiological variables were used (type of entry, clinical form, and diseases associated with AIDS and HIV, smoking, alcoholism, illicit drugs, diabetes, and other diseases).

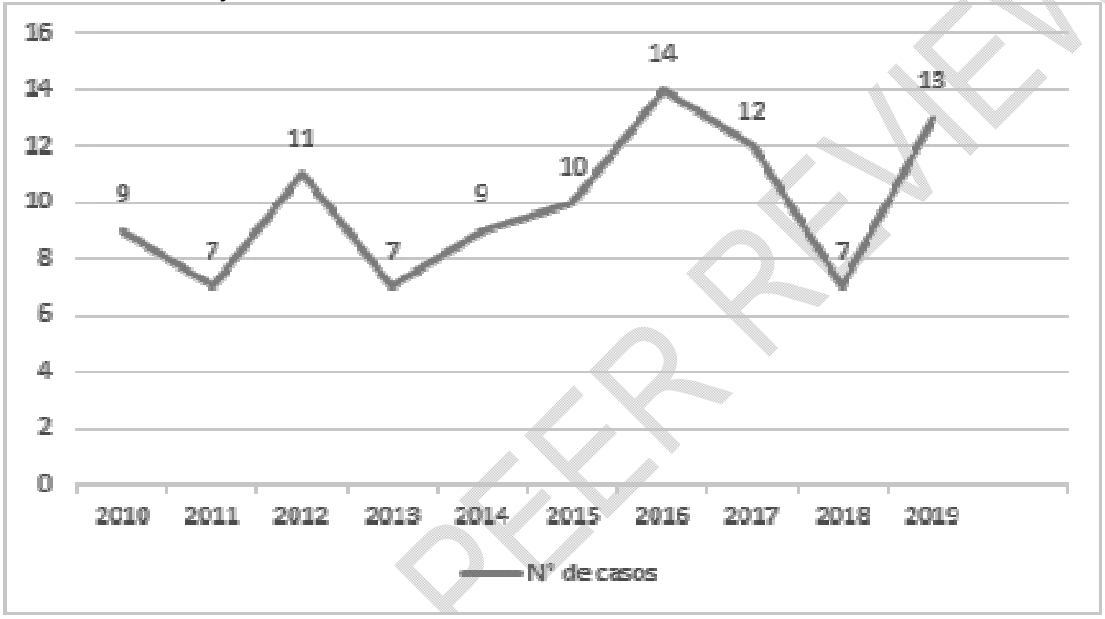
For this study, the following inclusion criteria were defined: being a case of tuberculosis in indigenous individuals aged ≥ 60 years. And as exclusion criteria, incomplete or inconsistent notifications were discarded. For analysis, a spreadsheet was created using Microsoft Excel© software, where the data were entered and analyzed using descriptive statistics. There was no

need for submission to the Research Ethics Committee (CEP) as it is a study with publicly available domain data.

3. RESULTS

99 cases of TB in the elderly were included in the study of indigenous populations, with the highest occurrence in the year 2016, corresponding to 14 (14.14%) cases, followed by the year 2019 with 13 (13.13%) cases. Oscillation is identified in the registration of cases, with the lowest values observed in the years 2011, 2013, and 2018, which recorded 7 (MALTA%) cases each (Graph 1).

Graph 1: Distribution of the number of cases of indigenous elderly with Tuberculosis in the state of Pará between the years 2010-2019. Belem, PA, Brazil, 2021.



Source: Ministry of Health/SVS - Information System for Notifiable Diseases - SINAN-Net , 2021.

Regarding the sociodemographic profile, a higher occurrence of cases was observed in females with 51 cases (51.52%). The most prevalent age group was 70-79 years, with 45 cases (45.45%). In terms of education, it was observed that the majority of the elderly were illiterate, totaling 59 cases (59.60%). Regarding the geographical distribution of cases, there was a predominance in the municipality of Jacareacanga with 29 cases (29.29%), followed by Belém with 9 cases (9.09%) (Table 1).

Table 1: Sociodemographic profile of the indigenous elderly with Tuberculosis in the State of Pará between the years 2010 to 2019. Belém, PA, Brazil, 2021.

	Indigenous old people infected with Tuberculosisn= 99	
Variables	***f***	**%**
Sex		
Masculine	48	48.48%
Feminine	51	51.52%
Age group		
60 – 64	17	17.17%

65 – 69	23	23.23%
70 – 79	45	45.45%
≥ 80	14	14.14%
Education		
1st - 4th incomplete grade of Elementary School	13	13.13%
4th complete grade of Elementary School	1	1.01%
5th - 8th grade incomplete of Elementary School	1	1.01%
Complete primary education	1	1.01%
Illiterate	59	59.60%
Ignored / blank	24	24.24%
Cities		
Jacareacanga	29	29.29%
Belém	9	9.09%
Altamira	8	8.08%
Novo Progresso	6	6.06%
Redenção	6	6.06%
Itaituba	5	5.05%
Parauapebas	4	4.04%
São Félix do Xingu	4	4.04%
Ignorado	4	4.04%
Ourilândia do Norte	3	3.03%
Cumaru do Norte	2	2.02%
Pau D'Arco	2	2.02%
Paragominas	1	1.01%
Breves	1	1.01%
Santa Bárbara do Pará	1	1.01%
Santa Luzia do Pará	1	1.01%
Santarém	1	1.01%
MagalhãesBarata	1	1.01%
Tomé-Açu	1	1.01%
Paragominas	1	1.01%
Oriximiná	1	1.01%
Marabá	1	1.01%
Juruti	1	1.01%
Tucuruí	1	1.01%
Capanema	1	1.01%

f= frequency
Source: Ministry of Health/SVS - Notifiable Diseases Information System – SINAN-Net , 2021.

Regarding the clinical-epidemiological aspects, according to Table 2, there were 82 new cases (82.83%) in terms of the type of entry. The most frequent clinical form was pulmonary, with 90 cases (90.91%). Of the total studied, 81 (81.82%) did not have AIDS/HIV co-infection, and there was no data record for 18 cases (18.18%). Regarding life habits, 47 cases (47.47%) declared themselves as non-smokers, 89 (89.90%) were not alcoholics, and 52 (52.53%) stated that they did not use illicit drugs. As for the presence of comorbidities, 89 (89.90%) reported not having diabetes, and 75 (75.76%) did not have any other associated diseases.

Table 2: Clinical-epidemiological profile of the indigenous elderly with Tuberculosis in the State of Pará between the years 2010 to 2019. Belém, PA, Brazil, 2021.

	Seniors with Tuberculosisn= 99

Variables	*f*	%
Entry Type		
New case	82	82.83%
Relapse	13	13.13%
Transfer	2	2.02%
Ignored / blank	2	2.02%
Clinical Form		
Pulmonary	90	90.91%
Extrapulmonary	7	7.07%
Pulmonary + Extrapulmonary	2	2.02%
Diseases – AIDS		
No	81	81.82%
Ignored / blank	18	18.18%
Diseases – HIV		
Negative	81	81.82%
Not Performed / blank	18	18.18%
Grievance - Smoking		
Yes	6	6.06%
No	47	47.47%
Ignored / blank	46	46.46%
Grievance - Alcoholism		
Yes	3	3.03%
No	89	89.90%
Ignored / blank	7	7.07%
Grievance - Illicit Drugs		
Yes	1	1.01%
No	52	52.53%
Ignored	46	46.46%
Diseases - Diabetes		
Yes	3	3.03%
No	89	89.90%
ignored / blank	7	7.07%
Grievance - Other Diseases		
Yes	5	5.05%
No	75	75.76%
Ignored / blank	19	19.19%

f= frequency
Source: Ministry of Health/SVS - Notifiable Diseases Information System – SINAN-Net , 2021.

According to Table 3, there was no laboratory confirmation for TB in 56 cases (56.57%). Among the cases reported as extrapulmonary TB, the clinical form was not identified in 90 records (90.91%). Sputum culture was not performed in 82 cases (82.83%), the rapid TB test was not conducted in 49 cases (49.49%), and there was no record of the sensitivity test in 94 cases (94.95%).

Regarding the Directly Observed Treatment (DOT) strategy used for supervised medication intake, 68 cases (68.69%) underwent this treatment modality. However, in 97 cases (97.98%), there was no information available, as they either ignored or left the antiretroviral category blank. In terms of the bacilloscopy results, 45 cases (45.45%) had a negative result in the 2nd month, and 50 cases (50.51%) did not undergo the bacilloscopy in the 6th month. As for the treatment termination status, 73 cases (73.74%) were discharged due to being cured.

Table 3: Examinations and treatment performed by the indigenous elderly with Tuberculosis in the State of Pará between the years 2010 to 2019. Belém, PA, Brazil, 2021.

Indigenous elderly people infected with Tuberculosisn= 99		
Variables	***f***	**%**
Laboratory Confirmation		
Yes	43	43.43%
No	56	56.57%
Extrapulmonary form		
Pleural	3	3.03%
Peripheral Ganglionic	3	3.03%
Miliary	2	2.02%
Laryngeal	1	1.01%
Ignored / blank	90	90.91%
Sputum culture		
Positive	7	7.07%
Negative	6	6.06%
In progress	4	4.04%
Unrealized	82	82.83%
Rapid Tuberculosis Test		
Ignored / blank	48	48.48%
Undetectable	2	2.02%
Unrealized	49	49.49%
Sensitivity Test		
Sensitive	1	1.01%
Unrealized	4	4.04%
Ignored / blank	94	94.95%
DOT (Directly Observed Treatment)		
Yes	68	68.69%
No	12	12.12%
Ignored / blank	19	19.19%
Antiretroviral		
Yes	1	1.01%
No	1	1.01%
Ignored / blank	97	97.98%
Bacilloscopy 2nd Month		
Positive	5	5.05%
Negative	45	45.45%
Unrealized	26	26.26%
Not applicable	3	3.03%
ignored / blank	20	20.20%
Bacilloscopy 6th Month		
Negative	50	50.51%
Unrealized	12	12.12%
Not applicable	3	3.03%
Ignored / blank	34	34.34%
Status Closed		
Cure	73	73.74%
Abandonment	1	1.01%
TB death	6	6.06%
Death from other causes	7	7.07%

Transfer	7	7.07%
Ignored / blank	5	5.05%

f=frequency
Source: Ministry of Health/SVS - Notifiable Diseases Information System – SINAN-Net , 2021.

4. DISCUSSION

By analyzing the clinical and epidemiological aspects of indigenous elderly people with tuberculosis in Pará,its relation to inequalities in the elderly indigenous population was observed, in variables such as gender, age group, education, type of tuberculosis and housing. The study by Basta [10]et al (2013), emphasizes the relationship between the older age group and the clinical form as factors associated with greater vulnerability to TB involvement, treatment abandonment and cases of death during treatment in indigenous peoples.

With the aging of the population, people who were infected in childhood/adolescence may become susceptible again when they reach older age due to the process of immunosenescence. It is observed that the diagnosis and initiation of treatment in the elderly are often delayed due to atypical clinical conditions. The presence of other comorbidities is also frequent in those over 60 years of age, with co-infection with HIV and diabetes being the most important predictors of death from TB [8].

Furthermore, the study by Zorzi et al [11], identified that the indigenous population tends to live in precarious health, housing and malnutrition conditions that may be related to the increase in TB, due to the presence of a high density of people in the area. indoors, living in a single room and without adequate ventilation facilitate the illness.

With regard to gender, the results presented demonstrate the prevalence of cases in females. On the other hand, the study by Silva et al [12] (2018) finds that male indigenous people are more vulnerable to TB, as a result of factors such as poor hygiene conditions, the abusive use of alcohol and tobacco, and poor working conditions. Additionally, it is cultural for men to seek fewer health services, a situation that makes early diagnosis of the disease difficult.

The municipality of Jacareacanga, which has experienced a large number of cases, is located in the rural area of Pará and is one of the areas with a significant concentration of indigenous territory. According to Ferreira et al. (2020) [8], indigenous peoples are spread throughout the entire Brazilian territory, with the majority residing in the North (48.6%), Northeast (20.4%), and Midwest (19.1%) regions, followed by the Southeast (8.1%) and South (3.7%) regions.Furthermore, the authors state that this population, in high, middle, or low-income countries, experiences a high and disproportionate incidence of TB, with significant variation between different groups and regions.

The low educational level found, corroborating with these data the study by Paiva et al (2017) [13], points out that this population has difficulties in understanding the issue of information about symptoms, diagnosis, means of transmission, treatment, precarious living conditions, food, among others, which results in interference in adherence to promotion, prevention and TB treatment.The most frequent type of tuberculosis was pulmonary, noting that this pattern has been found in several studied populations, regardless of population or ethnic differences, and this form is responsible for maintaining the disease transmission chain [14]. The fact that the lungs have a high concentration of oxygen attracts bacilli (bacteria) to this organ, resulting in approximately 85% of cases of tuberculosis in the lung parenchyma [15].

In this study, it was observed that the indigenous elderly did not present problems such as smoking, alcoholism, illicit drug use, Diabetes Mellitus (DM) and other diseases. According to Silva et al (2018) [16], there are several predisposing factors to be controlled in order to reduce the burden of TB, including DM, smoking, alcohol use and use of other drugs, which can also contribute to bad results of tuberculosis treatment. In addition, tuberculosis can lead to complications in the course and management of existing diseases.

The non-occurrence of TB/HIV co-infection was observed in this study, which is one of the main problems found in TB patients. In the study carried out by Aguiar et al (2020) [2], who, when investigating the prevalence of co-infection by TB/HIV in the elderly in the metropolitan region of Belém-Pará, found that the elderly are more vulnerable to both pulmonary tuberculosis and HIV infection, with the presence of co-infection in this extremely harmful and even fatal population.

DOT showed high prevalence, as in the study by Basta et al [10](2013), carried out in Mato Grosso, where DOT occurred in 88.1% of cases. DOT represents a strategy to reduce dropout rates, indicated for all people identified with TB, especially for the vulnerable population, including indigenous peoples.

The study carried out by Aguiar et al (2020) [2], showed the need for follow-up measures for TB treatment in the elderly, due to their greater susceptibility to the occurrence of undesirable side effects, identifying the probability of presenting toxicological effects such as hepatotoxicity and appearance of liver damage during treatment, which may lead to possible treatment abandonment.

Based on the closure situation, the percentage of cure is observed as prevalent, as well as in the study by Zorzi et al (2019) [11], which obtained the percentage of 72% of cure in the participating indigenous elderly population. However, it is noteworthy that the outcome presented is lower than the values set (at least 85% of cases) by the World Health Organization (WHO), emphasizing the challenge encountered in the continuity and success of the treatment [17].

Taking into account the tests and treatments performed on the target population, various gaps were observed, and important tests were not conducted, such as sputum culture, rapid TB test, sensitivity test, and antiretroviral treatment. These findings signal the challenges faced in the fight against TB and its accurate diagnosis and treatment. Additionally, the presence of "ignored/blank" responses in different variables highlights the underreporting, incompleteness, and/or duplication of data, which complicates the research process.

Despite these limitations, the data found in this research can serve as a subsidy for the creation of strategies aimed at reducing the incidence rate of TB among indigenous elderly, thus allowing managers in these areas to redefine the focus of their attention, thinking about the lack of assistance.

5. CONCLUSION

In view of the findings of this study, it was possible to emphasize the relationship between TB cases and social determinants such as health conditions, housing and education, since indigenous elderly people have greater difficulty in accessing prevention and health promotion programs, in order to prove that social inequality between classes interferes directly in the health-disease process.

Therefore, there is a need to develop and apply effective public policies, considering the particularities of this population, which aim to minimize inequalities and develop goals for controlling the disease. In addition, further studies on TB in indigenous elderly people are necessary, due to the scarcity of literature aimed at this population.

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