EPIDEMIOLOGICAL ANALYSIS OF PULMONARY AND EXTRAPULMONARY TUBERCULOSIS IN THE NORTHERN REGION OF BRAZIL FROM 2001 TO 2022

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Abstract: Introduction: Tuberculosis (TB) is a bacterial infection caused by Mycobacterium tuberculosis, with airborne transmission through inhalation of bacilli expelled by a person with active pulmonary/laryngeal TB. Although only individuals with pulmonary/laryngeal TB (the most common form) can transmit it, it is possible to affect other organs. In 1996, Brazil launched the “Emergency Plan for Tuberculosis Control” and despite the reduction in incidence, it is still considered a public health challenge, particularly in the North Region. Objective: To evaluate records of individuals diagnosed by the pulmonary and extrapulmonary phase of tuberculosis in the Northern Region of Brazil, comparing them to the human development index (HDI). Material and Methods: Cross-sectional, retrospective, descriptive, quantitative study, with data from SINAN of individuals with tuberculosis, in the pulmonary and extrapulmonary form, reported in the Northern Region of Brazil between 2001 and 2022. Results: 117,248 people with pulmonary TB were found and 1,036 with extrapulmonary TB, highlighting the states of Amazonas and Pará — with the highest number of cases in both forms. The year with the highest number of pulmonary and extrapulmonary cases was in 2021, with 8,030 (6.8%) and 152 (14.8%) respectively. The lowest for the pulmonary form was 2022, with 4,411 (3.8%) and extrapulmonary in 2001 and 2002 with 4 (0.4%) in both years. 2017 does not have data, however it does not mean an absence of cases. The northern region has an HDI lower than 0.7 (average index), with Pará having the second lowest in the region. Conclusions: Despite the increase in the HDI in several states, the cases in question show patterns of decline and constancy over the years, with an increase during the COVID-19 pandemic. TB in the Northern Region has a social nature, remaining an alarming reality in all states and a public health challenge.

Keywords: Pulmonary Tuberculosis; Extrapulmonary Tuberculosis; Epidemiology; Mycobacterium tuberculosis

INTRODUCTION

Tuberculosis (TB) is a bacterial infection caused by the bacillus Mycobacterium tuberculosis, also known as Koch's bacillus (BK). It is transmitted airborne when a healthy person inhales bacillus expelled by a person with active pulmonary/laryngeal TB (bacillus). Even though only individuals with active pulmonary/laryngeal TB (the most common form) can transmit it, it is possible for the bacillus to affect other organs, causing the extrapulmonary form. For the pathogen to progress, the immune system must be compromised.

After infection, the risk of illness is associated with endogenous factors that negatively interfere with the individual's immune system. Therefore, vulnerable populations are more susceptible to becoming ill. In Brazil, a country endemic for TB, we can highlight: people living with HIV (PLHIV), indigenous peoples, people living on the streets and people deprived of liberty (PPL). Among the factors that make these groups vulnerable, we can mention the fragility of the PLHIV immune system, low infrastructure and availability of health services (whether in urban outskirts, interiors or indigenous territories), the social disintegration that exists in Brazil, prison overcrowding and constant transfer between prison units (Factor associated with PPL) and low adherence to treatment. Although it is one of the oldest diseases known to humanity, it is still a severe public health problem.

The main symptoms are: cough for 3 weeks or more; afternoon fever; night sweats and weight loss. The cough may be a productive cough due to sputum or a dry cough. The diagnosis can be confirmed or ruled out by
bacteriological criteria, where the sample is positive in sputum smear microscopy, mycobacterial culture and molecular biology, and/or by clinical criteria, where confirmation is made based on imaging or histological exams suggestive of tuberculosis.

Because M. tuberculosis is highly infectious, rapid diagnosis of this infection is of fundamental importance, both for adequate treatment of the patient and to prevent the spread of the disease (OPLUSTIL, 2010). As soon as a positive TB diagnosis is confirmed, the case must be reported to the Notifiable Diseases Information System (SINAN). According to Ordinance No. 204, of February 17, 2016, tuberculosis is a notifiable disease and can be reported by doctors, other health professionals or those responsible for public and private services that provide care to the patient.

**OBJECTIVE**

The main objective of the present work is to evaluate records of individuals diagnosed by the pulmonary and extrapulmonary phase of tuberculosis in the Northern Region of Brazil with data from SINAN, comparing with the human development index (HDI).

**METHODOLOGY**

The methodology used was a cross-sectional, retrospective, descriptive, quantitative study, with data from SINAN of individuals with tuberculosis, in the pulmonary and extrapulmonary form, reported in the Northern Region of Brazil between the years 2001 to 2022.

**RESULTS**

In total, 117,248 cases of pulmonary TB (Table 3) and 1,036 cases of extrapulmonary TB (Table 6) were reported throughout the northern region between 2001 and 2022, highlighting the states of Amazonas and Pará — with the highest number of cases in both forms. The year with the highest number of pulmonary (Table 2) and extrapulmonary (Table 5) cases was in 2021, with 8,030 (6.8%) and 152 (14.8%) respectively. The lowest for the pulmonary form was 2022 (Table 2), with 4,411 (3.8%) and extrapulmonary (Table 4) in 2001 and 2002 with 4 (0.4%) in both years. The present study does not have data from 2017 due to the absence of data in SINAN for that year, which does not mean an absence of cases.

<table>
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<td>168</td>
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<td>143</td>
<td>123</td>
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</tbody>
</table>

Total Cases in The North Region: 4,744, 4,915, 4,617, 4,952, 4,910, 4,747, 4,925, 4,906, 5,155, 5,236, 5,511

Source: Own authorship based on data from SINAN

Table 1 - Number of new cases of pulmonary tuberculosis in the northern region of Brazil between 2001 and 2011 with data from SINAN, comparing with the human development index (HDI).

<table>
<thead>
<tr>
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<td>153</td>
<td>140</td>
<td>172</td>
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<td></td>
</tr>
</tbody>
</table>

Total Cases in The North Region: 5,542, 5,665, 5,490, 5,786, 5,956

Source: Own authorship based on data from SINAN

Table 2 - Number of new cases of pulmonary tuberculosis by state of the northern region of Brazil between the years 2012 and 2022 with data from SINAN
Table 3 - Number of new cases of pulmonary tuberculosis by state of the northern region of Brazil between the years 2001 and 2022 with data from SINAN

Source: Own authorship based on data from SINAN

Table 4 - Number of new cases of extrapulmonary tuberculosis in the northern region of Brazil between 2001 and 2011 with data from SINAN

Source: Own authorship based on data from SINAN

Table 5 - Number of new cases of extrapulmonary tuberculosis in the northern region of Brazil between the years 2012 and 2022 with data from SINAN

Source: Own authorship based on data from SINAN

According to the Brazilian Institute of Geography and Statistics (IBGE), the northern region has an HDI lower than 0.7 (average index). Between 2000 and 2021, all states had an average HDI (between 0.50 and 0.799), however there was an increase in the index when comparing 2021 with 2000. The three worst

Table 6 - Number of new cases of extrapulmonary tuberculosis by state of the northern region of Brazil between the years 2001 and 2022

Source: Own authorship based on data from SINAN

Table 7 - Human development index in two states of the northern region of Brazil from 2000 to 2022

Source: Own authorship based on data from SINAN

CONCLUSION

Despite the increase in the HDI in several states, the cases in question show patterns of decline and constancy over the years, with an increase during the COVID-19 pandemic. TB in the North Region has a social nature, remaining an alarming reality in all states and a public health challenge.
REFERENCES


