

REVISTA DE
PATOLOGIA
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**EPIDEMIOLOGICAL PROFILE OF PREGNANT WOMEN AFFECTED BY
TUBERCULOSIS IN THE STATE OF PARAÍBA, BRAZIL, BETWEEN 2018 AND 2023**
PERFIL EPIDEMIOLÓGICO DE GESTANTES AFETADAS POR TUBERCULOSE NO
ESTADO DA PARAÍBA, BRASIL, ENTRE OS ANOS DE 2018 A 2023

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ABSTRACT

Introduction: Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*, primarily affecting the lungs but capable of affecting other structures and organs such as the kidneys, meninges, bones, among others. This infection typically has a greater impact on immunocompromised individuals and those with congenital infection. Despite the importance of epidemiological surveillance of TB, there is a need for research on this topic in pregnant women. **Objective:** Therefore, this study aimed to outline the epidemiological profile of pregnant women affected by tuberculosis in the state of Paraíba, Brazil, between 2018 and 2023. **Methodology:** This was a quantitative, descriptive epidemiological study that utilized secondary data from the SINAN and DATASUS databases. The variables analyzed included age group, year, ethnicity, education level, and clinical forms of TB. Data were presented using simple descriptive statistics. **Results and discussion** It was observed that from 2018 to 2023, there were 48 confirmed cases of TB in pregnant women, with the year 2023 showing the highest prevalence of cases (23%). The epidemiological profile predominantly consisted of women aged 18 to 39 years (69.0%) and of mixed race (73.0%). The most common clinical form was pulmonary TB, accounting for 83% of cases. **Conclusions:** Based on the findings, there is a highlighted importance for the development of local public policies for the prevention and screening of TB in pregnant women.

KEYWORDS: Tuberculosis; Pregnant women; *Mycobacterium tuberculosis*.

RESUMO

Introdução: A tuberculose (TB) é uma doença infectocontagiosa causada pelo *Mycobacterium tuberculosis*, afetando principalmente os pulmões, porém, pode acometer outras estruturas e órgãos, a exemplo de rins, meninge, ossos, entre outros. Geralmente, essa infecção apresenta maior impacto em indivíduos imunocomprometidos e naqueles com infecção congênita. Apesar da importância do rastreamento epidemiológico de TB, surge a necessidade de pesquisas acerca dessa temática em gestantes. **Objetivo:** Nesse sentido, o estudo teve como finalidade delinear o perfil epidemiológico de gestantes acometidas por tuberculose no estado da Paraíba, entre os anos de 2018 à 2023. **Metodologia:** Estudo epidemiológico, quantitativo e descritivo que usou dados secundários do “SINAN” e “DATASUS”. As variáveis analisadas foram: faixa etária, ano, etnia, escolaridade e formas clínicas. Os dados foram representados através de estatística descritiva simples. **Resultados e conclusão:** Observou-se que durante o período de 2018 à 2023 houve 48 casos confirmados de gestantes com TB, sendo o ano de 2023 aquele com maior prevalência de casos (23%). O perfil epidemiológico foi formado, majoritariamente por mulheres de a 39 anos (69,0%) e etnia parda com (73,0%). A forma clínica mais comum foi a pulmonar correspondendo a (83%). **Conclusões:** Diante dos dados encontrados, destaca-se a relevância para o desenvolvimento de políticas públicas locais para a prevenção e rastreio da TB em gestantes.

PALAVRAS-CHAVE: Tuberculose; Gestantes; *Mycobacterium tuberculosis*.

INTRODUCTION

Tuberculosis (TB) is a contagious disease caused by the bacterium *Mycobacterium tuberculosis*, and it is one of the leading causes of death globally. This microorganism can affect various organs, with the pulmonary form being the most common. Transmission occurs mainly through inhalation of droplets and aerosols expelled during speaking, coughing, or sneezing by an infected individual^{1,2,3}.

According to the World Health Organization (WHO), approximately 10.8 million cases of tuberculosis were reported in 2023, resulting in about 1.6 million deaths related to the disease. Tuberculosis is classified as a leading cause of death from an infectious disease in the world⁴.

Furthermore, women of reproductive age constitute one-third of those affected by tuberculosis. In this context, concurrent infection with Human Immunodeficiency Virus (HIV) and the bacterium *M. tuberculosis* affects maternal and child health, with the risk of vertical transmission of HIV/TB. This increases the risk of premature birth, fetal growth restriction, low birth weight, and neonatal mortality^{5,6}.

Unfortunately, the impact of COVID-19 led to an 18% decline in tuberculosis notifications in 2020. However, disruptions in TB and HIV services resulted in an increased risk of transmission and resurgence of TB-related mortality, affecting particularly vulnerable social groups such as pregnant women^{5,6}.

Thus, it is important to emphasize that congenital tuberculosis can be transmitted from the pregnant woman to the embryo through the placenta, via hematogenous dissemination through the umbilical vein, or through aspiration of amniotic fluid infected with *M. tuberculosis* during birth⁵.

Diagnosing congenital TB can be challenging because its clinical manifestations resemble some symptoms of pregnancy, thus complicating TB screening in pregnant women. However, clinical manifestations of active pulmonary tuberculosis may include pleuritic chest pain, fever, prolonged productive cough, fatigue, loss of appetite, and weight loss⁷.

No context of laboratorial diagnosis, several techniques are employed, including immunological methods, chest radiography, microscopic examinations, interferon-gamma release assay, acid-fast bacilli smear microscopy, bacterial culture, and clinical symptom evaluation^{1,7}.

Despite the high number of cases, TB is curable, and early diagnosis with effective treatment increases the chances of recovery without the presence of comorbidities. Health

services should offer active case finding for TB and screening for various infectious diseases, such as Human Immunodeficiency Virus (HIV/AIDS) and even COVID-19 during prenatal care. Therefore, updating knowledge on tuberculosis during pregnancy and postpartum is crucial for the eradication of this bacterial infection^{8,9}

Therefore, TB is considered a social disease due to its association with socioeconomic determinants, such as poor ventilation, poverty, and malnutrition, which are differentially linked to increased risk of exposure to *M. tuberculosis* or even progression to active disease when pathogens are in latent phase^{10,11}. Additionally, factors such as HIV co-infection, advancing age, atypical radiographic characteristics, advanced immunosuppression, drug resistance, and comorbidities like diabetes have been identified as risk factors for mortality in individuals undergoing TB treatment¹².

There is evidence documenting the negative impact of TB on the overall health of pregnant women and newborns, underscoring the importance of preventing this condition in this population. However, both TB prevention in pregnant women and epidemiological screening in each region are priorities for maternal and child health¹². In this regard, the study aimed to describe and analyze the epidemiological profile of pregnant women affected by tuberculosis between 2018 and 2023 in the state of Paraíba.

METHODOLOGY

Study Design

It is an epidemiological study, quantitative and descriptive, that utilized secondary data from the Sistema Nacional de Agravos e Notificação (SINAN) and the database of the Departamento de Informática do Sistema Único de Saúde (DATASUS), accessible at the website <http://www.datasus.gov.br>.¹³

Data Source

DATASUS is the Department of Informatics of the Brazilian Unified Health System (SUS), responsible for collecting, processing, and disseminating health information nationwide. Secondary data were collected from DATASUS for the purposes of this research.

Study Location

The state of Paraíba is located in the Northeast region of Brazil and comprises 223 municipalities, with João Pessoa as its capital. Paraíba has a territorial area of 56,468.435 km², a population of 3,974,495 people, and a population density of 70.39 inhabitants/km². As of 2021, its Municipal Human Development Index (HDI) was 0.698, and it has a per capita income of R\$ 1,096¹⁴.

Variables Analyzed

The study population consisted of all notified cases of pregnant women with tuberculosis in the state of Paraíba, Brazil, from 2018 to 2023. The following sociodemographic variables were analyzed: age group, year, ethnicity, education level, and clinical forms. Data obtained were compiled in a spreadsheet using Microsoft Office Excel and analyzed using simple descriptive statistics, based on the calculation of absolute and relative frequencies.

Ethical Considerations

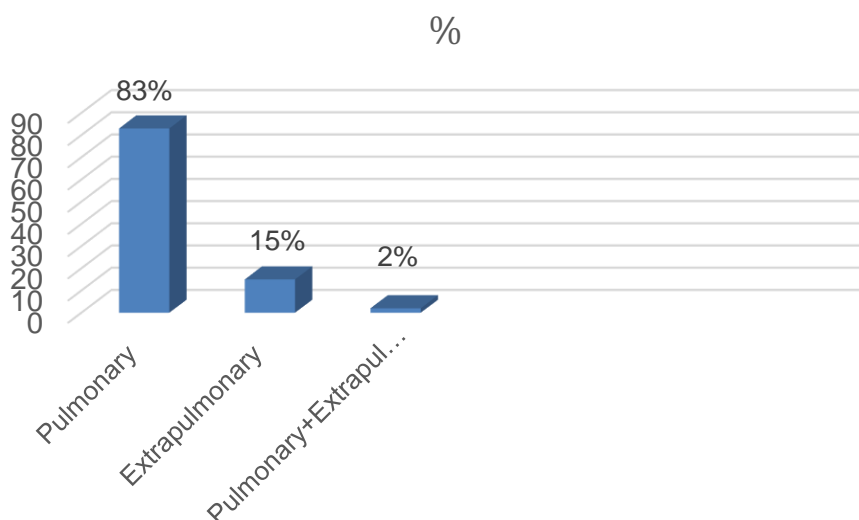
Since this study utilized secondary data from publicly available computerized databases, it was not required to submit this work for review by the Research Ethics Committee, in accordance with Resolution CNS 466/2012, which regulates research and testing involving human subjects.

RESULTS AND DISCUSSION

This study is of great importance to the scientific community as it contributes to expanding knowledge about tuberculosis in pregnant women, a group that faces specific challenges in the diagnosis and treatment of the disease. The findings thus reinforce the need for policies focused on early screening, proper follow-up, and expanding access to treatment, which can directly contribute to the prevention of vertical transmission and the reduction of maternal and neonatal morbidity and mortality.

Out of 9,135 reported cases in the state of Paraíba between 2018 and 2023, only 48 confirmed cases of pregnant women with TB. As depicted in Figure 1, the years are associated with the number of notifications.

Figure 1 - Percentage of pregnant women with tuberculosis from 2018 to 2023 in the state of Paraíba.



Source: Author (2024).

It is noted that the years 2022 and 2023 had the highest notification rates, corresponding to 19.0% and 23%, respectively. There was a decline in 2019 (13.0%), followed by 2020 and 2021 with 19%, where there may have been few notifications of TB in pregnant women, possibly due to the epidemiological situation of SARS-CoV-2 and underreporting and diagnosis of TB cases as a consequence of limited or no healthcare-seeking behavior to treat this infection¹⁵.

Regarding ethnicity, Table 1 shows that there is a predominance of cases among individuals of mixed race (pardo) in all years, accounting for 73%, with the second highest prevalence among white individuals (17%). As for age groups, the highest incidence of TB infections in pregnant women occurred in the adult age groups of 20 to 39 years, comprising 69%, followed by the 40-59 age group with 21%.

Table 1 - Sociodemographic profile of pregnant women with tuberculosis from 2018 to 2023 in the state of Paraíba.

Variables	Number of Cases (n)	%
Race		
White	8	17%
Black	5	10%
Mixed race	35	73%
Age group		
15 to 19 years	3	6%
20 to 39 years	33	69%
40 to 59 years	10	21%
Above 60 years	2	4%

Source: Author (2024).

In this study, it was found that there was a greater predominance of mixed-race (pardo) ethnicity/race. This finding can be justified by the fact that the majority of the population in the state of Paraíba identifies themselves as mixed-race, indicating the predominance of TB cases among pregnant women of this ethnicity ¹⁶. A similar trend was observed in a study at the University Hospital of Piau  with 118 TB patients, where there

was a predominance of mixed-race patients ¹⁷. Another study conducted in Maranhão from 2012 to 2016 indicated a prevalence among mixed-race individuals, possibly due to the historical miscegenation of the Brazilian population ¹⁸.

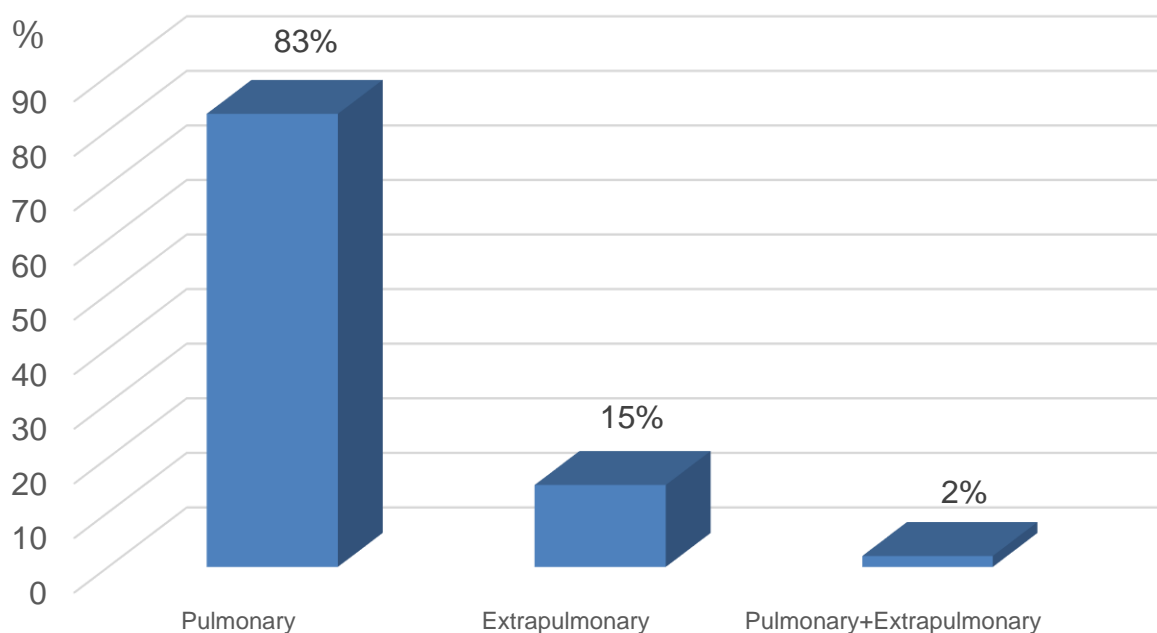
The predominance of mixed-race individuals affected by this disease may be associated with barriers faced by this population in accessing healthcare services. These barriers include low family income, poorer living conditions, housing, and work, leading to greater difficulties in continuing pharmacological therapy compared to infected white individuals, among other factors that contribute to exacerbating this scenario ^{19,20}.

Analyzing the results obtained throughout the study, it was observed that tuberculosis affects pregnant women between the ages of 20 and 39 years. This finding is expected, as this age range corresponds to the peak reproductive years for women ²¹. A study conducted in the state of Paraíba by Feitosa et al. ²² demonstrated that the distribution of tuberculosis cases by age group and sex in the years 2010 and 2019 showed a majority of cases among individuals aged 20 to 39 years, representing 43.30%, followed by the age group of 40 to 59 years with 28.61%, in both sexes. It is noted that individuals aged 20 to 39 years are generally active and more likely to engage in recreational activities, which increases their exposure to crowded environments, facilitating bacillus infection.

In general, regardless of gender, several studies have shown that adults are more susceptible to airborne diseases such as tuberculosis¹⁴. According to the WHO¹³, data indicates that individuals of all age groups can be affected by TB; however, in 2019, adult men accounted for 56% of all cases, adult women 32%, and children 11%.

It is worth noting that when analyzing the socioeconomic variables, residential zone, and education level of pregnant women with TB in the DATASUS platform, it became evident that the absence of this information hindered a deeper and less biased analysis, emphasizing the platform's limitations which, as noted, lead to underutilization of results in epidemiological studies. This highlights the need for adjustments in the system to improve data collection. Furthermore, according to the literature, education level is an important socioeconomic indicator because illiteracy and low education are risk factors that increase vulnerability to TB due to limited access to information and healthcare services, compounded by overcrowding within households where multiple individuals share the same space ^{18,23}. Below, in Figure 2, it is possible to observe the frequency of pregnant women affected by TB according to clinical forms in the state of Paraíba, between the years 2018 to 2023.

Figure 2 - Percentage of pregnant women with tuberculosis according to clinical forms from 2018 to 2023 in the state of Paraíba.



Source: Author (2024).

Compared to the clinical forms, it is possible to observe a predominance of pulmonary TB, accounting for 83%, while extrapulmonary TB represented 15% (Figure 2). When compared to research conducted in Paraíba from 2010 to 2019, pulmonary TB showed a higher prevalence at 84.13%²². This finding is consistent with other studies conducted in Piauí, Pará, and Bahia, which also reported a higher prevalence of pulmonary TB^{17,23,24}.

In a study by Brandão, Vasconcelos, and Barros from 2006 to 2016 in Sobral, CE, 2,068 new cases of TB were reported, with pulmonary TB being the most frequent at 86%. Similarly, another study in the same municipality from 2015 to 2019 found that the majority of notified cases were pulmonary TB, totaling 861 cases with an annual average of 172.2 ± 15 cases, accounting for 84.41%²⁶.

The predominance of pulmonary TB is significant for public health as it is the most common clinical form of TB and the main driver of disease transmission chains²⁷. According to Rios et al.²⁸, these findings can be attributed to the fact that the bacillus is spread through aerosol droplets released into the air by coughing or sneezing of an infected individual, facilitating transmission. On the other hand, the lower percentage of extrapulmonary cases may be due to the need for a more complex diagnosis, as it involves systemic manifestations that can affect various organs, often leading to underreporting due to the lack of specific tests for each subtype.

CONCLUSION

Between 2018 and 2023, 48 cases of tuberculosis in pregnant women were confirmed, with 2023 being the most prevalent year. The epidemiological profile predominantly consisted of mixed-race (pardas) women aged 20 to 39 years, presenting with the pulmonary clinical form.

Given the findings of this study, it becomes evident that strengthening the response to tuberculosis in pregnant women through targeted strategies and effective public policies is crucial. To mitigate transmission and ensure adequate care, expanding access to early diagnosis through systematic testing in primary care and prenatal services is recommended, along with the continuous training of healthcare professionals for proper recognition. Additionally, implementing treatment adherence strategies, such as multidisciplinary follow-up, social support, and the use of digital technologies for remote monitoring, can significantly contribute to the effectiveness of interventions.

Finally, it is important to emphasize that the continuation of epidemiological research is essential for assessing trends and evaluating the impact of containment measures adopted against tuberculosis in the pregnant population. Thus, coordinated actions among health managers, professionals, and communities are essential to reduce the burden of tuberculosis in pregnant women, minimize maternal and infant risks, and consequently decrease disease transmission.

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