CHAPTER 50

Profile of tuberculosis cases in pernambuco: analysis of cases, 2011 to 2020

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ABSTRACT
Tuberculosis is an infectious disease caused by the *Mycobacterium tuberculosis hominis*. In developing countries, such as Brazil, it remains a prevalent infectious disease. Tuberculosis is transmitted through the elimination of bacilli by the respiratory route and its infectivity is directly related to the immune status of the individual. The article aims to identify the profile of confirmed cases of tuberculosis in the period from 2011 to 2020 in Pernambuco. This is an observational, descriptive, quantitative and longitudinal field study, in a time frame from 2011 to 2020. Secondary data were collected from the website of the Department of Informatics of the Brazilian Unified Health System (Datasus), specifically from the Information System of Information on Diseases and Notification (SINAN). The variables were standardized through rates per 100 thousand, with the following variables: sex, race/color, age group, education, form, and closure, analyzed descriptively by means of absolute and relative values. According to the results observed in this research, the cases of tuberculosis mostly occur in mixed-race men, aged between 20 and 39 years, with a blank field of education (and followed by 1st to 4th grade of elementary school), presenting the pulmonary clinical form and with closure situation with cure achieved.

Keywords: Tuberculosis, Mycobacterium tuberculosis, Health Indicators, Epidemiological profile.

1 INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by the *Mycobacterium tuberculosis hominis*. In developing countries, such as Brazil, it remains a prevalent infectious disease. Tuberculosis is transmitted through the elimination of bacilli by the respiratory route and its infectivity is directly related to the immune status of the individual.

According to data from the Computer Department of the Brazilian National Health System (DATASUS), registered in the System of Information on Diseases and Notification (SINAN), Brazil had 83,678 confirmed cases of TB in 2020, of which 6,068 were from the state of Pernambuco.

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In this context, the present research seeks to analyze the profile of tuberculosis cases in Pernambuco, in the period from 2011 to 2020. Thus, in light of the above, the following questions are posed: What is the profile of TB cases in the state of Pernambuco?

Our hypothesis is that the profile of TB cases in Pernambuco follows the same pattern as in Brazil.

The research has as a general objective: To identify the profile of confirmed cases of tuberculosis, in the period from 2011 to 2020 in Pernambuco. The specific objectives are: To perform the temporal analysis of tuberculosis cases in Pernambuco, in the years 2011 to 2020; to trace the profile of tuberculosis cases in the state; to compare the profile of cases in Pernambuco with that presented in Brazil.

As tuberculosis is a treatable disease of priority control in the country, the analysis of its occurrence in Pernambuco becomes indispensable, thus enabling the tracing of new paths for the planning of prevention and combat actions.

This is an observational, descriptive, quantitative and longitudinal field study, in a time frame from 2011 to 2020. The interval analyzed corresponds to the last ten years available in the system. Secondary data were collected from the website of the Informatics Department of the Brazilian Unified Health System (Datasus), specifically from the System of Information on Diseases and Notification (SINAN). The variables were standardized through rates per 100 thousand, with the following variables: sex, race/color, age group, education, form, and closure, analyzed descriptively by means of absolute and relative values.

2 DEVELOPMENT

Tuberculosis (TB) represents one of the major infectious diseases responsible for mortality in adults (GOLDMANN, 2011; WHO, 2014). Its etiological agent is the *bacillus Mycobacterium tuberculosis*, also known as Koch's bacillus. The dissemination of this bacterium occurs mainly through the air (aerosolization of contaminated secretions), and also through direct contact with an open wound. Individuals with cavitated pulmonary tuberculosis (tuberculous cave) are the main source of infection, due to their frequent coughing and sputum with high concentrations of the bacteria (GOLDMANN, 2011, WHO, 2014).

 The bacillus can compromise different organs of the body, which determines the classification of its form. If it affects the lungs, it is classified as pulmonary tuberculosis - the most commonly found form - while its manifestation in other organs is called extrapulmonary tuberculosis (GOLDMANN, 2011; WHO, 2014).

Tuberculosis is considered a serious public health problem worldwide and has been perpetuated throughout human history. In 2018, it was considered the infectious disease that killed the most in the world (WHO, 2018). Characteristics such as the current scenario of the migratory process, added to the financial crisis and political instability have contributed to the maintenance of the TB transmission chain in developed and developing countries, as is the case of Brazil (ANDRADE et al., 2017).

Brazil ranks 18th in TB burden, representing 0.9% of the estimated cases worldwide and 33% of those estimated for the Americas. Even in the face of the advances that have occurred in the country in

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terms of improved access to health services, these have not yet reached an ideal level of equity, which has resulted in health outcomes that are not always fair or acceptable (PAHO, 2012).

Although tuberculosis is preventable, curable, easily diagnosed and whose universal coverage treatment is offered by the Unified Health System, which in a way would favor access to health services, thousands of people still die in the country due to the disease (SANTOS-NETO et al., 2014).

Population agglomerations, coupled with accelerated urbanization, favor high rates of unemployment, underemployment, decreasing wage levels and poverty, to which are added poor housing and nutrition conditions. In this environment and context, tuberculosis finds favorable conditions for its dispersion. Poverty, in itself, contributes decisively to the maintenance of a general framework favorable to the spread of the disease. Pockets of poverty located in the most populous cities are fertile ground for the spread and advance of tuberculosis (PILLER, 2012).

For Barbosa et al. (2013), from the perspective of tuberculosis control, one has sought to understand the occurrence of the disease at a broad level, in which individuals and social space interact in the production of places that provide differentiated risks of getting sick, substantially changing the programming of health actions as well as their operationalization.

In this scenario, Brazil has been developing several actions aimed at reducing TB morbidity and mortality. Among them, with the objective of intensifying prevention actions and reducing TB-related illness, the maintenance of high BCG vaccination coverage and the expansion of surveillance and recommendations for investigation and treatment of latent infection by *Mycobacterium tuberculosis* stand out. Investments in the incorporation of new technologies to fight TB in the Brazilian Unified Health System (SUS) have favored the quality and effectiveness of diagnosis and treatment of the disease (BRASIL, 2020).

However, in studies such as that of Barbosa et al. (2013), the problem of tuberculosis in Brazil reflects the stage of social development of the country, in which the determinants of poverty status, poor sanitary conditions, the advent of acquired immunodeficiency syndrome (AIDS), the aging population and large migratory movements, in addition to weaknesses in the organization of the health system and management deficiencies, limit the action of prevention technology, diagnosis and treatment and, consequently, inhibit the fall of diseases marked by the social context.

When discussing TB, the orientation is to have a vision that goes beyond the characteristics of the clinic: people's living conditions must be involved, since the discussion that poverty favors TB transmission and the relationship of these people with PHC units is not recent. While TB control is considered only from the viewpoint of biomedical intervention, focused on achieving a cure, the prevalence and incidence rates will remain high in our midst (BRAGA, HERRERO, CUELLAR, 2011).

For Rocha et al. (2020), although Brazil has a comprehensive and recognized TB control program, the data obtained indicate the importance of sociodemographic characteristics in the evolution of the disease. There are several risk factors that increase the possibility of infection, passing through HIV,

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smoking, malnutrition, diabetes, or other immunosuppressive diseases. The incidence of infection is also dependent on social conditions, such as quality of life, nutritional status, or hygiene (AZIMKA, 2017). Thus, it is necessary to strengthen control strategies directed at certain population groups.

It is important to emphasize that the patient's geographical proximity to health services does not mean guaranteed access to diagnosis and effective treatment. Access to health services often becomes difficult, either because of the professionals' work process, the stigma of the disease, as well as the user's resistance to seek the service (NARD et al., 2013). This can be exemplified when studying the neighborhoods in which residents move to other places to be attended and, consequently, notified (LEAL et al., 2019).

The actions that have a great impact on TB control were established by the National Tuberculosis Control Program (PNCT) and aims to decentralize these actions to the various PHC units, monitoring indicators, health education in PHC units and early diagnosis, preventing the spread of the disease (LEAL et al., 2019).

Success in the treatment of tuberculosis depends, among other factors, on the achievement of optimal therapy: appropriately chosen drugs, in correct doses and for a sufficient time (BRASIL, 2011). Based on this, it is expected that there will be neither bacterial persistence nor development of strains resistant to the drugs used. This favorable outcome of cure contributes directly to the control of tuberculosis, since the treatment of smearpositive patients is one of the main strategies to contain the infection by interrupting the transmission cycle of the disease (BRASIL, 2011).

Information about contacts and the type of contact established should be listed and, whenever possible, home visits should be conducted to better understand the circumstances and invite them to the Health Unit to be evaluated and, if necessary, request tests (PROCÓPIO, HIJJAR, PORTO. 2008).

Based on the above, it is necessary to explain the vulnerability that individuals who are in contact with a case with an index of bacillus have. The chances of exposure of people to illness, resulting from aspects that are not only individual, but also collective and contextual, make them vulnerable, more susceptible to infection and illness (QUEIROZ et al., 2016). In this social layer, the proximity of coexistence due to the precarious structure of the house, lack of proper ventilation, humidity and large families propitiates contagion (PROCÓPIO, HIJJAR, PORTO. 2008).

According to Teixeira et al. (2020), advances in interrupting the chain of transmission of tuberculosis go beyond curative actions. A broader approach is essential, analyzing the sociodemographic context to the incorporation of preventive actions employed in Primary Health Care (PHC).

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2.1 RESULTS AND DISCUSSION

In the gender variable, Pernambuco has 39,724 (70%) male cases and 17,018 (30%) female cases. Brazil has the same pattern, but with lower rates. Respectively, PE has 410.59 per 100,000 inhabitants and Brazil, 286.33 for males. For females, this number is 175.90 (PE) and 128.70 (BR).

Figure 1 – Tuberculosis rate according to sex, Pernambuco and Brazil
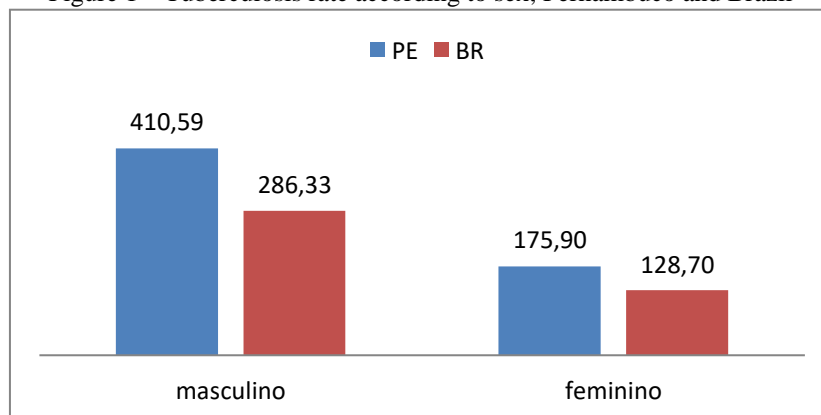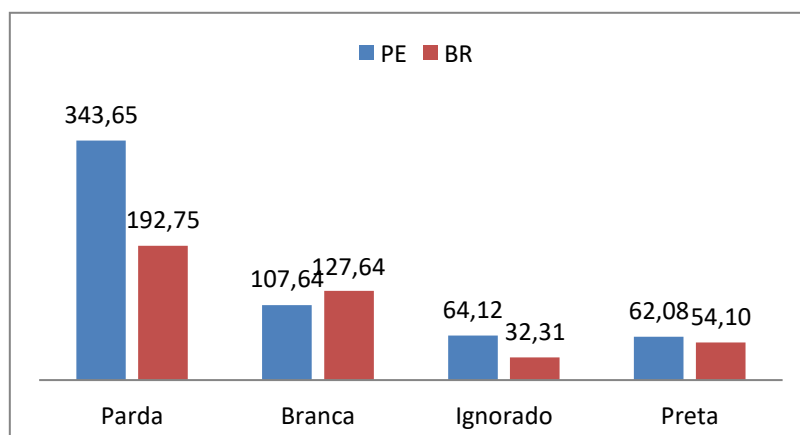

Source: Sinan - DATASUS (elaborated by the author)

It is a disease with deep social roots (FERNANDES et al., 2020), historically maintaining a close relationship with social issues of inequity, poverty and underdevelopment (Barbosa et al., 2013). For the World Health Organization - WHO (2019), tuberculosis disproportionately affects males, young adults and low-income countries, pointing to the association between the occurrence of the disease and socioeconomic factors. The manifestation of tuberculosis is associated with poverty and its consequences, such as malnutrition and inadequate housing, and the existence of comorbidities (TAVARES et al., 2020).

In terms of race/color, Pernambuco shows that 33,247 (67%) of the cases are brown, 10,414 (21%) are white, and 6,203 (12%) had this field blank or ignored. This data differs from Brazil, where black is in 3rd place. The rates found in PE and BR were: brown 343.65 and 192.75, white 107.65 and 127.65, ignored 64.12 and 32.31. Only in the race/color white Pernambuco shows a lower rate compared to Brazil.

FigurE 2 – Tuberculosis rate according to race/color, Pernambuco and Brazil

TRADUÇÃO:
Parda: Brown
Branca: White
Ignorado: Ignored
Preta: Black

Source: Sinan - DATASUS (elaborated by the author)

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The search for care in the referral service and the sociodemographic profile also resemble other scenarios, in which the Primary Health Care is not the first level of care sought by the user for elucidation of the diagnosis of TB that affects them, mainly men, of brown race/color, low education and economically active age (TEIXEIRA et al., 2019).

When it comes to cases by age group, Pernambuco showed 26,364 (56%) aged 20 to 39 years, 18,023 (38%) between 40 and 59 and 2,737 (06%) aged 15 to 19 years. There is a coherence with the classification of Brazil, presenting the same placements. The rates for PE and BR were 272.50 and 188.94 for ages 20 to 30, 186.29 and 131.64 for ages 40 to 59, and 28.29 and 22.92 for ages 15 to 19. The state of Pernambuco has higher rates than Brazil in all categories.
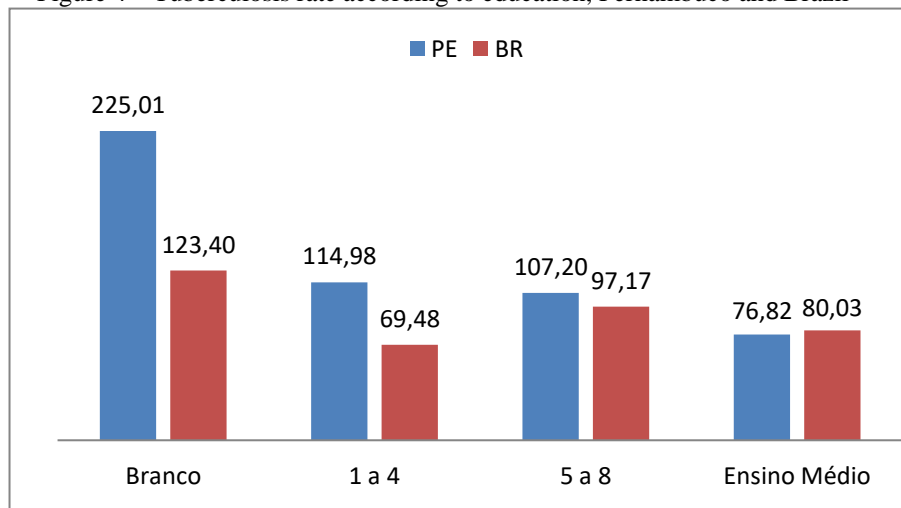
Figure 3 – Tuberculosis rate by age group, Pernambuco and Brazil
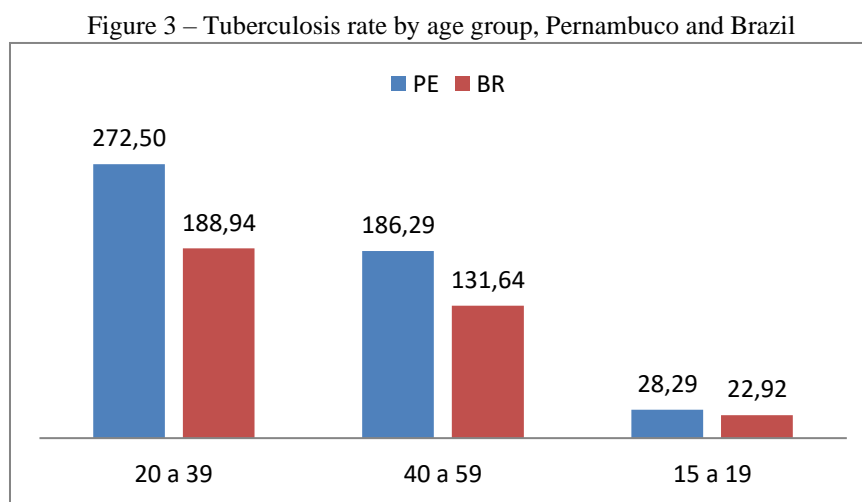
Source: Sinan - DATASUS (elaborated by the author)

The disease disproportionately affects males, young adults, and low-income countries, pointing to the association between TB occurrence and socioeconomic factors (WHO, 2019). The disease is closely linked to the socioeconomic issues of the population. The disease affects all age groups, predominantly in economically active individuals (15 to 54 years old) and males (BRASIL, 2010).

The results regarding the level of education showed that Pernambuco presents the blank category in first place with 21,769 (50%), followed by 1st to 4th grade with 11,124 (26%) and third from 5th to 8th cm 10,371 (24%) of the recorded cases. When compared, Brazil diverges in the third position, where High School is present. In relation to the rates, PE shows higher rates in all categories, with the exception of High School.

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Figure 4 – Tuberculosis rate according to education, Pernambuco and Brazil

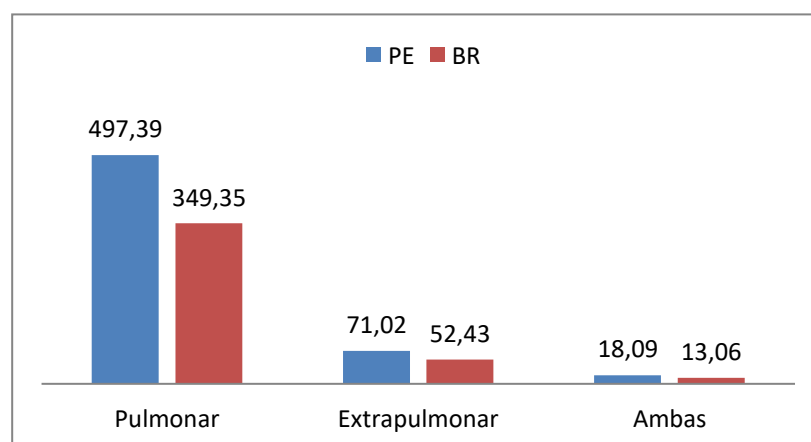Source: Sinan - DATASUS (elaborated by the author)

Most cases are present in males and this aspect when associated with low education level contributes to increased exposure and greater vulnerability, as it compromises access to health services, makes it difficult to face the diagnosis and adherence to treatment, either by lack of information, self-care and co-responsibility of their health condition (SAN, OLIVEIRA, 2013).

As for the clinical form of tuberculosis, Pernambuco registered 48,121 (85%) cases of the pulmonary form, 6,871 (12%) extrapulmonary and 1,750 (03%) of both forms. When compared to the national level, PE follows the same pattern of occurrence.

The rates of PE and BR are respectively: 497.39 and 349.35 for the pulmonary form, 71.02 and 52.43 for extrapulmonary, 18.09 and 13.06 for both clinical forms of the disease.

Figure 5 – Tuberculosis rate according to clinical form, Pernambuco and Brazil

Source: Sinan - DATASUS (elaborated by the author)

According to Threron et al. (2013), the pulmonary clinical form is the way in which TB is transmitted, as well as being the preferred location for the bacilli, since it facilitates their development due to the higher concentration of oxygen. It is the most frequent form, given its transmissibility, and is of great

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importance for the early diagnosis and control of TB through adherence to treatment and assessment of contacts.

When the situation of TB case closure is analyzed, Pernambuco showed 34,072 (72%) with cure achieved, 7,078 (15%) transferred from one municipality to another, and 6,445 (13%) with treatment abandonment. Brazil differentiates its second place in relation to PE, presenting the ignored or blank field when filling out the data. The rates are all higher in Pernambuco. The values of the rates in PE and Brazil, in this order, are: cure status, 352.17 and 270.69, transfer 73.16 and 25.78, and abandonment 66.62 and 50.79.

Figure 6 – Tuberculosis rate according to closing situation, Pernambuco and Brazil
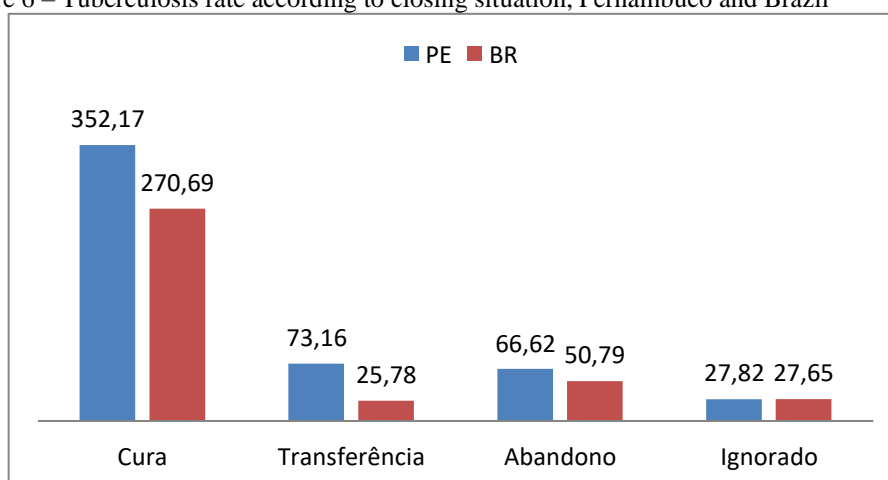
TRADUÇÃO:
Cura: Cure
Transferência: transfer
Abandono: Abandonment
Ignorado: Ignored

Source: Sinan - DATASUS (elaborated by the author)

3 CONCLUSION

This study provided the analysis of the profile of patients diagnosed with TB and notified in the SINAN system, which are similar to those found in the literature, reinforcing the importance of developing actions aimed at controlling the disease, early detection and monitoring of cases in Primary Health Care.

According to the results observed in this research, the cases of tuberculosis mostly occur in brown men, aged between 20 and 39 years, with a blank field of education (and followed by 1st to 4th grade of elementary school), presenting the pulmonary clinical form and with closure status with cure achieved. Pernambuco presents classification of variables differently from Brazil only in relation to race/color, education, and closure status.

There is an evident deficiency in the more complete filling out of the fields of some variables, as well as an increase in the number of cases in the ten years analyzed.

As a limitation of this study, we highlight the quality of the data in the information system, in which inconsistencies were identified, as well as exams "in progress", interfering with the knowledge of the profile and magnitude of the disease in the analyzed scenario. However, in order to produce data that is reliable to reality, it is necessary to train professionals to make them aware of the importance of correct registration, from data collection to data evaluation.

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It is important to emphasize that in order to achieve favorable outcomes, there are recommendations for the implementation of care strategies that favor the establishment of a link and adherence in order to achieve early diagnosis and timely treatment, and consequently, prevention of drug-resistant TB..

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