10.18605/2175-7275/cereus.v16n2p212-220

ARTIGO ORIGINAL

<< Recebido em: 06/02/2024 Aceito em: 25/05/2024. >>

REVISTA CEREUS ISSN: 2175-7275

Epidemiological Profile of Tuberculosis Cases in Belém-Pará, between the years 2018-2022

Perfil Epidemiológico dos Casos de Tuberculose em Belém-Pará, entre os anos de 2018-2022

Neemias Costa Duarte Neto[1], Denise Alves Santos[2], Sabrina de Cristo Ramos[3], Paula Gracianny Cavalcante Ebert[4], Aline Sharlon Maciel Batista Ramos[5], Alinne dos Santos Pereira[6], Sabrina Louhanne Corrêa Melo[7], Francisca Maria Ferreira Noronha[8]

[1] Enfermeiro, Universidade Federal do Maranhão – UFMA.
E-mail: neemias.duarte@hotmail.com.
Orcid: https://orcid.org/0000-0003-2513-0947.

[2] Enfermeira, Mestranda em Entomologia em Saúde Pública- Universidade de São Paulo- USP.
E-mail: denisealvesantos@usp.br
Orcid: https://orcid.org/0000-0003-2959-0246.

[3] Enfermeira, Universidade de São Paulo- USP.
E-mail: Sabrina.ramos@usp.br.
Orcid: https://orcid.org/0009-0005-8885-3255.

[4] Graduanda de Medicina, UNDB.
E-mail: paullagra0@gmail.com
Orcid: https://orcid.org/0009-0007-1303-6933.

[5] Enfermeira e Doutora em ciências médicas, UERJ.
E-mail: aline.shalon@ceuma.br
Orcid: https://orcid.org/0000-0002-7648-2857

[6] Enfermeira, Universidade Ceuma, UniCeuma
E-mail: alinnepsantos@gmail.com
Orcid: https://orcid.org/0009-0009-1397-8458.

[7] Farmacêutica, Universidade Ceuma, UniCeuma
E-mail: sabrina75601@ceuma.com.br
Orcid: https://orcid.org/0000-0002-3663-3649

[8] Enfermeira e Mestre em Biologia Parasitária, Universidade Ceuma, UniCeuma
E-mail: franciscamarianoronha@yahoo.com.br
Orcid: https://orcid.org/0000-0003-4460-7325.

RESUMO

A tuberculose (TB) é uma doença infecciosa e contagiosa causada pelo agente etiológico Mycobacterium tuberculosis ou Bacilo de Koch, representando um desafio significativo para a saúde pública em escala global. Assim, objetivou-se descrever o perfil epidemiológico dos casos de tuberculose em Belém-PA, entre os anos de 2018 a 2022. Trata-se de um estudo retrospectivo, descritivo e quantitativo. Os dados secundários foram obtidos por meio do Sistema de Informação de Agravos de Notificação (SINAN), as variáveis consideradas na análise incluem aspectos sociodemográficos, formas clínicas da doença, tipos de entrada no sistema de saúde e a situação de diagnóstico encerrado. Os resultados apontam cerca de 7.481 casos novos, maior prevalência entre o público masculino (63,13%), com idade entre 20 a 39 anos (42,32%), pardo (71,73%) e ensino médio completo (19,95%). Acerca da forma clínica, a pulmonar (83,24%) obteve maior prevalência, e percentual de cura em torno de 59,41%. Portanto, há a necessidade de estratégias voltadas para o controle e interrupção da cadeia de transmissão da doença, através da capacitação de profissionais da atenção primaria e o acompanhamento de perto por meio de busca ativa.

Descritores: Tuberculose Pulmonar; Epidemiology; Belém- Pará.

ABSTRACT

Tuberculosis is an infectious and contagious disease caused by the etiological agent Mycobacterium tuberculosis or Koch's bacillus, representing a significant challenge to the public health service on a global scale. Thus, the objective of the present work was to describe the epidemiological profile of the cases of Tuberculosis in Belém-PA between the years of 2018 and 2022. This is a retrospective, descriptive and quantitative study. The secondary data was obtained through SINAN (System of Information on Notification Grievance, in English). The variables considered in the analysis include sociodemographic aspects, clinical forms of the disease, types of entry into the health system and the situation of the closed diagnosis. The results point out about 7,481 new cases, with higher prevalence between men (63.13%), with an age gap between 20 and 39 years old (42.32%), brown-skinned (71.73%) and with complete high school education (19.95%). About the clinical form, the pulmonary (83.24%) obtained with higher prevalence, and its percentual of cure was about 59.41%. Therefore, there is a need for strategies geared to the control and interruption of the disease's transmission chain through the training of primary care professionals and close monitoring through active search.

Descriptors: Pulmonary Tuberculosis, Epidemiology, Belém- Pará.

1. INTRODUCTION

Tuberculosis (TB) is an infectious and contagious disease caused by the etiological agent Mycobacterium tuberculosis or Koch's bacillus, representing a significant challenge to the public health system on a global scale. According to the World Health Organization (WHO), year of 2018 registered approximately 10 million new cases worldwide. Brazil ranked 20th position between the 30 countries responsible for the global tuberculosis burden, totalizing more than 73 thousand new cases (WHO, 2023).

Tuberculosis transmission occurs through aerosols when a bacilyphere individual eliminates the bacillus during speech, cough, or sneeze (SILVA et al., 2021). Given this, these aerosols, when inhaled by healthy persons, can result in latent infection, and these people can remain asymptomatic. The immune response of the body is crucial to determining if the infection remains latent or advances to the active phase of the disease (MOREIRA; KRITSKI; CARVALHO, 2020).

Pulmonary tuberculosis represents 85% of the cases, being the main cause of transmission. Beyond the lungs, the disease can affect other organs, manifesting as extrapulmonary tuberculosis, in which there is no dissemination of the bacillus (MACIEL; GONÇALVES JUNIOR; DALCOMO, 2020).

Early diagnosis plays a crucial role in the prevention of the increase in TB cases (MOREIRA; KRITSKI; CARVALHO, 2020). Symptoms such as nocturnal sweating, fatigue, weight loss, fever, and coughing, especially when it persists for three weeks or more, indicate the necessity of actively researching for respiratory symptomatic cases.

The diagnostic methods for tuberculosis include direct sputum smear microscopy, sputum culture — considered the gold standard —, tuberculin test, radiological examinations, and the rapid molecular test for tuberculosis (TRM-TB), carried out by the GeneXpert® MTB/RIF system, that detects the bacillus and its resistance to rifampicin (ABREU et al., 2020).

The effective treatment and the cure of TB depend on the early diagnosis and the adhesion to the treatment. The therapeutic scheme involves the use of four drugs — rifampicin, isoniazid, pyrazinamide, and ethambutol — to interrupt bacterial colonization (AGUIAR et al., 2021).

By understanding the epidemiological profile, it will be possible to identify the higher risk groups, to determine seasonal patterns and, thus, to provide fundamental subsidies to improve prevention programs and early diagnosis and treatment, contributing to the

reduction of the incidence and, consequently, to the improvement of the population of Belém-PA's life quality.

2. METHODOLOGY

The present research is configured as a retrospective investigation, characterized by a descriptive approach and a quantitative methodology. The study is grounded on the analysis of the secondary data obtained through the System of Information on Notification Grievance (SINAN), more specifically in the tuberculosis' compulsory notification forms, accessed on the Departamento de Informática do Sistema Único de Saúde — DATASUS — (Department of Informatics of the Unified Health System, in English).

The targeted population of this research covers the city of Belém, localized in the state of Pará, in the period comprehended between the years 2018 and 2022. The choice of this period is justified so that there can be future epidemiological comparisons of the clinical profile in relation to the municipality and the period described. The variables considered in the analysis include sociodemographic aspects, clinical forms of the disease, types of entry into the health system and situation of the closed diagnosis.

Belém, as the capital of the state of Pará, occupies a geographical position in the northern region of Brazil, covering an area of approximately 1,059.408 km². According to the Brazilian Institute of Geography and Statistics (IBGE), the populational estimative of Belém in 2020 was about 1,499.641 inhabitants.

After the gathering of information, data was meticulously organized in spreadsheets using the software Microsoft Excel ® 2016 version. The statistical analysis was realized using the software SPSS 22 version, using statistical techniques of absolute and relative frequencies to provide a wide comprehension of the epidemiological profile of tuberculosis in the studied population. This rigorous methodological approach aims to assure the reliability and validity of the results obtained, contributing to a deeper understanding of the dynamics of tuberculosis in Belém.

3. RESULTS

The pertinent variables to the sociodemographic data on tuberculosis are presented in table 1. Thus, there was a significant prevalence of the male gender (63.13%), on the age gap of 20 to 39 years old (42.32%), ethnicity/colour brown (71.73%) and, to education level, ignored/non-filled (23.96%).

Table 1 – Absolute and relative frequencies of notified tuberculosis cases by gender, age range, race, and education level, in the period of 2018 to 2022, Belém – PA.

Variable	N	%
Gender		
Male	5,800	63.13
Female	3,387	44.29
Age Range		
<1	17	0.19
01-04	50	0.54
05-09	65	0.71
10-14	121	1.32
15-19	580	6.31
20-39	3,888	42.32
40-59	2,986	32.50
60-64	520	5.66
65-69	380	4.14
70-79	415	4.52
80+	165	1.80
Race		
White	1,036	11.28
Black	726	7.90
Yellow	44	0.48
Brown	6,590	71.73
Indigenous	25	0.27
Ignored/Non-filled	766	8.34
Education Level		
Ignored/Non-filled	2.201	23,96
Illiterate	211	2,30
1st to 4th incomplete grade of Elementary School	752	8,19
4th complete grade of Elementary School	375	4,08
5th to 8th incomplete grade of Junior High School	1.473	16,03
Complete Elementary and Junior High	681	7.41
Incomplete High School	888	9.67
Complete High School	1,833	19.95
Incomplete Higher Education	221	2.41
Complete Higher Education	467	5.08
It does not apply	85	0.93

Source: Ministério da Saúde/ Sistema de Informação de Agravos de notificação (SINAN), respectively Ministry of Health and System of Information of Notification Grievance, in English.

Table 2 exhibits the relative and absolute frequencies of the reported cases by type of entry. Notably, the New Cases have a significantly higher prevalence, reaching (81.43%) followed by Re-entry after abandonment, which represents (7.95%). These results highlight the importance of the planning and management in health to the prevention of tuberculosis in Belém-PA.

Table 2. Absolute and relative frequencies of reported cases of tuberculosis by type of entry. Belém- PA. 2018-2022.

Type of entry	N	%
New cases	7,481	81.43
Recurrence	633	6.89
Re-entry after abandonment	730	7.95
Do not know	12	0.13
Transference	309	3.36
Postmortem	22	0.24

Source: Ministério da Saúde/ Sistema de Informação de Agravos de notificação (SINAN), respectively Ministry of Health and System of Information of Notification Grievance, in English.

The absolute and relative frequencies unveil the relevance of the pulmonary clinical form, which represents (83.24%) of the sample, as detailed in table 3. On the other hand, the extrapulmonary clinical form presents considerable numbers, with 1,173 cases, representing 12.77% of the total of the sample.

Table 3. Absolute and relative frequencies of notified tuberculosis cases by clinical form. Belém- PA. 2018-2022.

Clinical form	N	%
Pulmonary	7,647	83.24
Extrapulmonary	1,173	12.77
Pulmonary + Extrapulmonary	367	3.99

Source: Ministério da Saúde/ Sistema de Informação de Agravos de notificação (SINAN), respectively Ministry of Health and System of Information of Notification Grievance, in English.

In table 4, to the situation of closed diagnosis of the patient, it was observed that there was an expressive number of recovered, i.e., cured, with a significant prevalence of (59.41%).

Table 4. Absolute and relative frequencies of notified tuberculosis cases by closed diagnosis situation. Belém- PA. 2018-2022.

Situation closed diagnosis	N	%
Ignored/non-filled	1,162	12.65
Abandonment	1,283	13.97
Death from tuberculosis	206	2.24
Death from other causes	405	4.41
Transference	386	4.20
TB-DR	160	1.74
Change of regimen	96	1.04
Failure	6	0.07
Primary abandonment	25	0.27
Cure	5,458	59.41

Source: Ministério da Saúde/ Sistema de Informação de Agravos de notificação (SINAN), respectively Ministry of Health and System of Information of Notification Grievance, in English.

4. DISCUSSION

This study identified 9,187 cases of tuberculosis in Belem-PA. Of this total, the prevalence was identified in the male population, with indexes around 63.13% of the sample, as Table 1 shows. These results corroborate with those identified on the Brazilian territory, in which the demand for health services by this portion of the population is less and less (CORTEZ et al., 2021).

In some cases, men can be more exposed to occupational environments in which tuberculosis transmission is more probable, such as workplaces with inadequate venting conditions (MOON et al., 2023). Furthermore, gender differences on access to health services can result in late diagnosis and treatment, increasing the dissemination of the disease (SILVA et al., 2022).

Tuberculosis exerts considerable implications for the economically active population, specially between 20 and 39 years of age (42.32%) a crucial segment of the socioeconomic development. The incidence of this disease in this age range can result in significant impacts on the workforce (NANQUE et al., 2023). Affected individuals frequently face prolonged treatment periods, time off from work and, in some cases, permanent sequels that can limit their productive capacity, as pointed out by Silva and collaborators (2021).

In this way, tuberculosis implications to the economically active population transcend health questions, achieving social and economic spheres, highlighting the need for wide-ranging prevention strategies, early diagnosis, and treatment to decrease the economic and social impacts of this infirmity (AGUIAR et al., 2021).

The analysis of the relation between the brown-skinned race (71.73%) and tuberculosis prevalence proves to be significant, considering the context of the miscegenation of the Brazilian population. In this sense, epidemiological studies have suggested that brown skin colour can present associations with tuberculosis prevalence, reflecting the social and access to health services disparities (TAVARES et al., 2020; ROCHA et al., 2020).

About the education level, to the ignored/non-filled there were some expressive values, with 23.96%. This very same phenomenon was observed in a study about the syphilis cases in the state of Paraíba over the last ten years (SILVA et al., 2023), pointing to an inadequate filling of the notification form (OLIVEIRA; OLIVEIRA; ALVES, 2021). Then, it is observed that individuals with complete high school education obtained expressive values (19.95%), which differs from various studies — those which points to a higher prevalence for the complete Junior High School (ROCHA et al., 2020; SANTOS et al., 2021).

Data related to the type of entry, as shown in table 2, indicates a significant increase in the recent related cases (81,43%). This data, when contextualized to the sociodemographic variables, signalizes the need for deeper attention given by the health authorities, specifically related to the most vulnerable population. It is recommended, therefore, investments in strategies of active search conducted by primary attention professionals, as preconized by Hino et al. (2021) in his study about the impact of COVID-19 on the control and reorganization of the health services focused on tuberculosis.

In this scenario, it is imperative to analyze the predominant clinical manifestation, which showed significant rates of pulmonary involvement (83.24%), as shown in table 3. This clinical presentation is the most prevalent form of the disease, characterized by symptoms such as a persistent cough, expectoration of sputum - which, in cases of tuberculosis, can contain traces of blood - and a mild, nocturnal fever (SILVA et al., 2024). These results corroborate the conclusions of Naque et al. (2023), strengthening the consistency of the evidence presented.

Even so, the results show a high rate of cure, with values of 59.41%, as shown in Table 4. This scenario points to some therapeutic tools that lead to a cure, such as directly observed treatment (DOT), in addition, there is a need to perform sputum culture as a way of obtaining control over the disease, increasing the chances of cure (ALVES et al., 2020).

5. CONCLUSION

From data analysis, it is highlighted that, in the city of Belém, tuberculosis is yet an endemic pathology. In short, it affects more men, in the age range of 20 to 39 years of age, brown-skinned and with a complete high school education, which differs from the national literature. On the clinical form, the pulmonary presents a higher prevalence. On the other hand, the city presents great results on the cure quantitative, achieving expressive values.

The results found show the need for strategies focused on the control and interruption of the disease's transmission chain, through primary attention professionals' capacitation and their follow-up through active search. Therefore, it is valid to mention the importance of education in health as a form of stimulating the continuity of the treatment by the patient.

REFERENCES

ABREU, Ricardo Gadelha de et al. Tuberculose e diabetes: associação com características sociodemográficas e de diagnóstico e tratamento. Brasil, 2007-2011. **Revista Brasileira de epidemiologia**, v. 23, p. e200009, 2020.

ALVES, Kelle Karolina Ariane Ferreira et al. Fatores associados à cura e ao abandono do tratamento da tuberculose na população privada de liberdade. **Revista Brasileira de Epidemiologia**, v. 23, 2020.

CORTEZ, Andreza Oliveira et al. Tuberculose no Brasil: um país, múltiplas realidades. **Jornal Brasileiro de Pneumologia**, v. 47, 2021.

HINO, Paula et al. Impacto da COVID-19 no controle e reorganização da atenção à tuberculose. **Acta Paulista de Enfermagem**, v. 34, p. eAPE002115, 2021.

IBGE. Cidades e Estados. https://www.ibge.gov.br/cidades-e-estados/pa/belem.html.

MACIEL, Ethel Leonor Noia; GONÇALVES JÚNIOR, Etereldes; DALCOLMO, Margareth Maria Pretti. Tuberculose e coronavírus: o que sabemos?. **Epidemiologia e Serviços de Saúde**, v. 29, n. 2, p. e2020128, 2020

MOON, Daseul et al. Gender differences in tuberculosis patients with comorbidity: A cross-sectional study using national surveillance data and national health insurance claims data in South Korea. **PloS one**, v. 18, n. 1, p. e0280678, 2023.

MOREIRA, Adriana da Silva Rezende; KRITSKI, Afrânio Lineu; CARVALHO, Anna Cristina Calçada. Determinantes sociais da saúde e custos catastróficos associados ao diagnóstico e tratamento da tuberculose. **Jornal Brasileiro de Pneumologia**, v. 46, 2020.

NANQUE, Adelia Roberto et al. Análise espacial e temporal da incidência da tuberculose em Guiné-Bissau, 2018 a 2020. **Revista Brasileira de Enfermagem**, v. 76, p. e20220481, 2023.

NANQUE, Adelia Roberto et al. Análise espacial e temporal da incidência da tuberculose em Guiné-Bissau, 2018 a 2020. **Revista Brasileira de Enfermagem**, v. 76, p. e20220481, 2023.

OLIVEIRA, Iana Mundim de; OLIVEIRA, Rívert Paulo Braga; ALVES, Rosane Ribeiro Figueiredo. Diagnóstico, tratamento e notificação da sífilis durante a gestação em Goiás, de 2007 a 2017. **Revista de Saúde Pública**, v. 55, 2021.

OPAS. **A resposta à tuberculose se recupera da pandemia, mas requer esforços acelerados para alcançar as novas metas.** Genebra, Suíça. 2023. Disponível em: https://www.paho.org/pt/noticias/7-11-2023-resposta-tuberculose-se-recupera-da-pandemia-mas-requer-esforcos-acelerados-para#:~:text=A%20OMS%20informa%20que%20os,infecciosa%20do%20mundo%20em%202022.

ROCHA, Marli Souza et al. Sistema de Informação de Agravos de Notificação (Sinan): principais características da notificação e da análise de dados relacionada à tuberculose. **Epidemiologia e Serviços de Saúde**, v. 29, p. e2019017, 2020

SILVA, Denise Rossato et al. Recomendações da Sociedade Brasileira de Pneumologia e Tisiologia para o manejo da doença pulmonar pós-tuberculose. **Jornal Brasileiro de Pneumologia**, v. 49, p. e20230269, 2024.

SILVA, Denise Rossato et al. Tuberculose e COVID-19, o novo dueto maldito: quais as diferenças entre Brasil e Europa?. **Jornal Brasileiro de Pneumologia**, v. 47, 2021.

SILVA, Maria Cintia Souza da et al. **Prevalência de sífilis adquirida no Estado da Paraíba: 2012 a 2021**. Trabalho de Conclusão de Curso - Universidade Federal de Campina Grande – Campus Cuité. 2023.7

SILVA, Talina Carla da et al. A tuberculose na perspectiva do homem e da mulher. **Revista da Escola de Enfermagem da USP**, v. 56, 2022.

SILVA, Tarcisio Oliveira et al. População em situação de rua no Brasil: estudo descritivo sobre o perfil sociodemográfico e da morbidade por tuberculose, 2014-2019. **Epidemiologia e Serviços de Saúde**, v. 30, 2021.

TAVARES, Clodis Maria et al. Tendência e caracterização epidemiológica da tuberculose em Alagoas, 2007-2016. **Cadernos Saúde Coletiva**, v. 28, p. 107-115, 2020.