

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

Leila Dias da Costa

Centro universitário Fibra – Pará

<http://lattes.cnpq.br/3530242045103767>

Tainá Negreiros de Souza

Centro universitário Fibra – Pará

<http://lattes.cnpq.br/0661890928897463>

Eduarda Cristina Carnaúba de Andrade

Centro universitário Fibra – Pará

<http://lattes.cnpq.br/5797505381108320>

Michele Amaral da Silveira

Centro universitário Fibra – Pará

<http://lattes.cnpq.br/9945012753547968>

All content in this magazine is licensed under a Creative Commons Attribution License. Attribution-Non-Commercial-Non-Derivatives 4.0 International (CC BY-NC-ND 4.0).



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.

State/year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Acre	221	229	234	208	184	249	181	204	209	215	263
Amazonas	1.340	1.246	1.255	1.261	1.294	1.266	1.460	1.506	1.564	1.629	1.580
Amapá	150	191	164	184	188	164	185	173	193	166	175
Pará	2.415	2.616	2.623	2.705	2.642	2.543	2.584	2.499	2.610	2.685	2.871
Roraima	92	107	111	123	89	89	90	97	91	96	102
Rondônia	340	350	311	305	363	293	302	323	380	321	398
Tocantins	186	176	153	166	150	143	123	104	108	126	122
Total Cases in The North Region	4.744	4.915	4.617	4.952	4.910	4.747	4.925	4.906	5.155	5.238	5.511

Table 1 - Number of new cases of pulmonary tuberculosis in the northern region of Brazil between 2001 and 2011 with data from SINAN

Source: Own authorship based on data from SINAN

State/year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Acre	280	267	313	228	344	Sem dados	374	458	488	486	215
Amazonas	1.683	1.761	1.692	1.977	1.853	Sem dados	2.350	2.507	2.437	2.864	1.719
Amapá	169	168	155	152	194	Sem dados	179	225	193	298	194
Pará	2.834	2.851	2.727	2.766	2.820	Sem dados	3.038	3.632	3.278	3.446	1.773
Roraima	80	100	82	123	108	Sem dados	214	257	270	296	177
Rondônia	380	410	406	410	497	Sem dados	448	523	432	468	244
Tocantins	116	108	115	130	140	Sem dados	152	153	140	172	89
Total Cases in The North Region	5.542	5.665	5.490	5.786	5.956	Sem dados	6.755	7.755	7.238	8.030	4.411

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

Source: Own authorship based on data from SINAN

State/year	2012
Acre	5.850
Amazonas	36.244
Amapá	3.860
Pará	57.958
Roraima	2.794
Rondônia	7.904
Tocantins	2.872
Total Cases in The North Region	11.7248

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

State/year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Acre	2	0	0	0	0	0	0	0	1	0	0
Amazonas	0	0	8	4	15	6	11	9	12	14	22
Amapá	0	1	2	2	3	0	0	2	0	0	1
Pará	1	1	8	10	13	6	12	15	18	18	19
Roraima	0	0	0	0	1	2	0	1	0	0	1
Rondônia	1	2	1	0	3	4	3	1	2	1	4
Tocantins	0	0	1	0	0	0	2	2	2	1	2
Total Cases in the North Region	4	4	20	16	35	18	28	30	35	34	49

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

State/year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Acre	2	2	2	1	1	No data	5	8	6	3	2
Amazonas	13	16	17	30	14	No data	37	50	40	85	59
Amapá	1	2	1	3	2	No data	2	1	4	4	3
Pará	15	21	21	27	23	No data	26	25	27	30	11
Roraima	0	3	0	2	3	No data	5	11	5	9	2
Rondônia	6	3	2	3	6	No data	1	6	6	12	4
Tocantins	2	2	2	2	5	No data	4	2	3	9	1
Total Cases in The North Region	39	49	45	68	54	No data	80	103	91	152	82

Table 5 - Number of new cases of extrapulmonary tuberculosis in the northern region of Brazil between 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

State/year	2012
Acre	35
Amazonas	462
Amapá	34
Pará	347
Roraima	45
Rondônia	71
Tocantins	42
Total Cases in The North Region	1.036

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

State/year	2000	2010	2021
Acre	0,517	0,663	0,71
Amazonas	0,515	0,674	0,7
Amapá	0,577	0,708	0,688
Pará	0,518	0,646	0,69
Roraima	0,598	0,707	0,699
Rondônia	0,537	0,69	0,7
Tocantins	0,525	0,699	0,731

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

- BRASIL. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância das Doenças Transmissíveis. Manual de Recomendações para o Controle da Tuberculose no Brasil. Brasília: Ministério da Saúde, 2019
- BUSATTO, Caroline et al. Tuberculose ativa versus Tuberculose Latente: uma revisão de literatura. *Journal Infection Control*, Rio Grande do Sul, v. 4, n. 3, p. 60-4, 2015.
- CONDE, M. B. et al. III diretrizes para tuberculose da Sociedade Brasileira de Pneumologia e Tisiologia. *Jornal Brasileiro de Pneumologia*, São Paulo, v. 35, n. 10, p. 1018-1048, out. 2009.
- IBGE: Índice de Desenvolvimento Humano. [S. l.], 2023. Disponível em: <https://www.ibge.gov.br/cidades-e-estados>. Acesso em: 25 ago. 2023.
- NATARAJAN, Arvind; BEENA, Paravangada Madappa; DEVNIKAR, Anushka V; MALI, Sagar. A systemic review on tuberculosis. *Indian Journal of Tuberculosis*, India, v. 67, n. 3, p. 295-311, 28 nov. 2020. DOI <https://doi.org/10.1016/j.ijtb.2020.02.005>. Disponível em: <https://www.sciencedirect.com/science/article/abs/pii/S0019570720300305>. Acesso em: 10 ago. 2023.
- PILLER, Raquel VB et al. Epidemiologia da tuberculose. *Pulmão Rj*, v. 21, n. 1, p. 4-9, 2012.
- QUADROS, J. D. de; ROSA, R. dos S.; ROCHA, C. M. F.; MENESES, M. N. TUBERCULOSE NA ATENÇÃO PRIMÁRIA: DESAFIOS E POTENCIALIDADES IDENTIFICADOS PELAS COORDENAÇÕES REGIONAIS DE ATENÇÃO BÁSICA DO RIO GRANDE DO SUL. *Saberes Plurais Educação na Saúde*, [S. l.], v. 6, n. 2, 2023. DOI: 10.54909/sp.v6i2.128237. Disponível em: <https://seer.ufrgs.br/index.php/saberesplurais/article/view/128237>. Acesso em: 5 nov. 2023.
- SOUZA AGUIAR, F. H. .; DE SALES CALHAU, G. .; FERREIRA LACHTIM, S. A. .; DA COSTA PINHEIRO, P. N.; ARCÊNCIO, R. A.; LIMA DE FREITAS, G. . Perfil da tuberculose em populações vulneráveis: pessoas privadas de liberdade e em situação de rua. *Revista de Ciências Médicas e Biológicas*, [S. l.], v. 20, n. 2, p. 253–258, 2021. DOI: 10.9771/cmbio.v20i2.43513. Disponível em: <https://periodicos.ufba.br/index.php/cmbio/article/view/43513>. Acesso em: 4 ago. 2023.
- TELES, A. V. de O. M.; KARVAT, D. de C.; PEDRASSANI, D. Saúde única e tuberculose: comunicação entre os entes da administração. *DRd - Desenvolvimento Regional em debate*, [S. l.], v. 12, p. 202–224, 2022. DOI: 10.24302/drd.v12.4076. Disponível em: <https://www.periodicos.unc.br/index.php/drd/article/view/4076>. Acesso em: 5 ago. 2023.