

Research Article

Epidemiological Prevalence of Tuberculosis in the State of Maranhão between 2014 and 2016

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Abstract

Introduction: Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis* (Bacillus of Koch), and presents chronic evolution affecting the lungs frequently.

Objectives: Analyse, in the state of Maranhão, the epidemiological prevalence of tuberculosis between 2014 and 2016.

Materials and Methods: Documentary and descriptive study of secondary data collected in the database of the dates, epidemiological information and morbidities, between 2014 and 2016.

Results: 3,897 cases of tuberculosis in the state of Maranhão were recorded. The most affected age range was 15 to 59 years, totaling 3,111 cases, for both gender; of 60 to 79 years, 577 cases were totaled.

Conclusion: Tuberculosis affects more adolescent males from adolescence to old age, and it is necessary to promote knowledge of the disease for the population in order to advance in the control of the same and obtain satisfactory clinical results.

Introduction

Tuberculosis (TB) is an infectious-contagious disease and is considered the second leading cause of death in the world, second only to HIV [1]. Approximately 2 billion people were infected with *Mycobacterium tuberculosis*, and in 2012, almost 8.6 million people developed TB, causing the death of 1.3 million, posing a challenge for health authorities to eliminate TB by 2050 [2]. In Maranhão, for example, of its 217 municipalities, eight were prioritized: Caxias, Codó, Imperatriz, Açailândia, Paço do Lumiar, São Luís, São José de Ribamar and Timon because they had a population of more than 100,000 inhabitants and a high bacillary load, State of Maranhão, by the Ministry of Health, for the control of TB [3]. São Luís, the state capital, accounts for 40% of total notifications among priority municipalities, with 585 cases annually in the last ten years, in which the most prevalent clinical form is lung disease [4]. Human tuberculosis (TB) is caused by some *Mycobacterium tuberculosis* Complex Microbacteria (CMTB), and the causative agent needs molecular oxygen to grow and multiply.

The etiologic agent is *Mycobacterium tuberculosis*, known as *Bacillus de Koch* (BK), and presents a chronic evolution affecting the lungs frequently. The spread of infection occurs through contaminated biological material, mainly aerosols from coughing or sneezing [5-7]. *Mycobacterium tuberculosis* is a mycobacterium belonging to the genus *Mycobacterium*, from the *Mycobacteriaceae* family [8]. CMTB species are responsible for TB in humans and animals, with seven species of this complex: *M.*

tuberculosis, *M. bovis*, *M. africanum*, *M. microti*, *M. bovis* - BCG, *M. caprae* and *M. pinnipedii* [9]. *M. tuberculosis* is characterized by forming straight or slightly curved rods, 0.2 to 0.7 µm wide by 1 to 10 µm in length, are immobile, do not form spores or capsules, do not produce toxins, have no flagella, and are composed of a protective coating against chemical agents, reproduces and grows slowly; has a doubling of its population between 18 and 48 hours, depending on the availability of oxygen, nutrients and medium pH, however, physical agents such as heat, ultraviolet rays of sunlight and

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ionizing radiation destroy it easily and its capsule gives high resistance due to the high content of lipids, making the bacillus resistant to discoloration by alcohol-acid solution [10,11].

TB can be of two forms: pulmonary and extrapulmonary, in which the pulmonary presents in the primary, post-primary (secondary) or miliar form (BRASIL, 2010). Primary infection may evolve from a pulmonary or lymph node focus or from hematogenous dissemination in 5% of those infected within the first two years post-infection [8].

The post-primary, because it is common at any age, affects young adults and adolescents more, whereas miliar TB, a name given due to the appearance of the radiological image, is a serious form that is present in 1% of cases of HIV patients seronegative and 10% seropositive HIV seropositives with high immunosuppression, therefore the pulmonary form is the most common and of greater relevance for public health, because it is highly transmissible, with emphasis on bacilliferous individuals [9].

Transmission of TB occurs via the airway in almost all cases by inhalation of particles (Flugge's droplets), with bacilli spreading in the air as they are cleared by coughing, sneezing or speaking of a patient with pulmonary tuberculosis, in which these droplets, when coming into contact with healthy people, will result in tuberculosis infection and the risk of aggravation of the disease [8].

When these droplets, containing bacilli, are retained in the upper respiratory tract, there is less chance of the tuberculous infection occurring, when swallowed they are inactivated by the juice and eliminated by the feces, and only when the bacilli reach the pulmonary alveoli does the infection begin of some factors, such as: type of environment of exposure, time of exposure, contagiousness of the index case, among others [10,11].

In this context, the main symptoms of active pulmonary TB are: cough, mucus or blood, chest pain, weakness or tiredness; weight loss, fever and night sweats, and bloody cough is closely associated with the late or late stages. However, there are situations in which TB may develop, at the outset, with specific or no symptoms. And in the latent form there is no symptomatology [12].

Therefore, it is important the diagnostic process to prove TB, performed by direct bacilloscopy, to search for Koch's bacillus in the sputum (sample), using microscopy to identify if the patient is bacilliferous [13]. The culture of Koch bacillus is indicated for extrapulmonary forms and for cases of suspected bacterial resistance to drugs, and it is accompanied by a sensitivity test. Tuberculin test (PPD) is also performed as an auxiliary test, such as chest x-ray [14].

Therefore, the objective of this research was to analyze, in the state of Maranhão, the epidemiological prevalence of tuberculosis between 2014 and 2016.

Methods

A retrospective study was conducted through a documentary and descriptive study of secondary data collected in the DataSUS database of epidemiological information and morbidities in the year 2014 to 2016. Data on gender, age, region and year of diagnosis. The data were exposed in absolute and percentage values, and were tabulated using the program Microsoft Excel and Word.

Results

Epidemiological data obtained in DATASUS in the period between 2014 and 2016, reveal that in the state of Maranhão were reported 3,987 cases of Tuberculosis. Regarding males, a total of 3,015 cases were reported. The most affected health regions in this period were São Luís (1,451 cases), Imperatriz (124 cases) and Santa Inês (154 cases), and the age group with the highest prevalence of *M. tuberculosis* infection was between 15 and 59 years old and 60 and 79 years, with 2,428 and 435 cases, respectively, as represented in table 1.

On the other hand, 882 cases of tuberculosis were reported in females. The health regions with the highest number of infections were São Luís (344 cases), Santa Inês (154 cases) and Imperatriz (62 cases). The age group with the highest number of reported cases was between 15 and 59 years, with 683 cases, and 60 and 79 years, with 142 cases, according to table 2.

Therefore, these data show that between 2014 and 2016, 3,897 cases of Tuberculosis in the state of Maranhão. The most affected age group was between 15 and 59 years, totaling

Table 1: Prevalence of Tuberculosis in males in the State of Maranhão between 2014 and 2016.

Cities	Age Group									
	< 1 year		1-14 years		15-59 years		60-79 years		> 80 years	
	N	%	N	%	N	%	N	%	N	%
Açailândia	1	3,1	1	2,27	56	2,30	12	2,75	-	-
Bacabal	-	-	2	4,54	68	2,80	15	3,44	5	6,57
Voices	1	3,1	-	-	43	1,77	7	1,60	-	-
Rope bar	-	-	4	9,09	56	2,30	13	2,98	4	5,26
Caxias	-	-	2	4,54	90	3,70	25	5,74	7	9,21
Chapadinha	2	6,25	4	9,09	50	2,05	17	3,90	2	2,63
Codó	2	6,25	3	6,81	85	3,50	26	5,97	8	10,52
Empress	4	12,5	1	2,27	141	5,80	21	4,82	7	9,21
Itapecuru	-	-	-	-	55	2,26	15	3,44	-	-
Quarries	-	-	-	-	56	2,30	11	2,52	3	3,94
Pine	1	3,1	1	2,27	91	3,74	22	5,05	1	1,31
P. Dutra	1	3,1	3	6,81	38	1,56	16	3,67	5	6,57
Rosary	-	-	2	4,54	47	1,93	9	2,06	1	1,31
Santa Inês	-	-	2	4,54	121	4,98	29	6,66	2	2,63
São João dos Patos	1	3,1	-	-	14	0,57	4	0,91	1	1,31
São Luís	17	53,1	17	38,63	1241	51,11	156	35,86	20	26,31
Timon	-	-	-	-	47	1,93	19	4,36	4	5,26
Viana	-	-	2	4,54	49	2,01	7	1,60	3	3,94
Zé Dock	2	6,25	-	-	80	3,29	11	2,52	3	3,94
Total	32	100	44	100	2428	100	435	100	76	100

N = Absolute number of cases, %: percentage of cases.

Table 2: Prevalence of Tuberculosis in the Female gender in the State of Maranhão between 2014 and 2016.

Cities	Age Group									
	< 1 year		1-14 years		15-59 years		60-79 years		> 80 years	
	N	%	N	%	N	%	N	%	N	%
Açailândia	-	-	-	-	17	2,48	3	2,11	-	-
Bacabal	1	8,33	-	-	26	3,80	7	4,92	2	9,09
Voices	1	8,33	1	4,34	8	1,17	2	1,40	-	-
Rope bar	1	8,33	1	4,34	15	2,19	8	5,63	2	9,09
Caxias	-	-	-	-	31	4,53	9	6,33	1	4,54
Chapadinha	-	-	1	4,34	11	1,61	1	0,70	-	-
Codó	-	-	-	-	19	2,78	10	7,04	3	13,63
Empress	-	-	4	17,39	41	6	15	10,56	2	9,09
Itapecuru	-	-	1	4,34	26	3,80	7	4,92	2	9,09
Quarries	-	-	1	4,34	16	2,34	4	2,81	1	4,54
Pine	-	-	1	4,34	26	3,80	6	4,22	1	4,54
P. Dutra	-	-	-	-	14	2,04	2	1,40	-	-
Rosary	2	16,6	-	-	20	2,92	3	2,11	-	-
Santa Inês	-	-	-	-	55	8,05	14	9,85	4	18,1
São João dos Patos	-	-	1	4,34	1	0,14	1	0,70	-	-
São Luís	7	58,33	12	52,17	283	41,43	40	28,16	2	9,09
Timon	-	-	1	4,34	22	3,22	3	2,11	1	4,54
Viana	1	8,33	1	4,34	23	3,36	2	1,40	1	4,54
Zé Dock	-	-	1	4,34	29	4,24	4	2,81	-	-
Total	12	100	23	100	683	100	142	100	22	100

N = Absolute number of cases, %: percentage of cases.

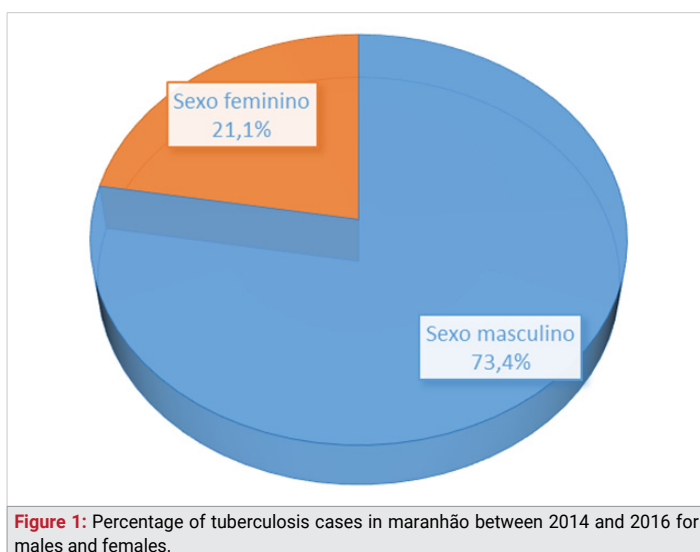


Figure 1: Percentage of tuberculosis cases in Maranhão between 2014 and 2016 for males and females.

3,111 cases for both sexes, followed by 577 cases reported in the age group between 60 and 79 years, and of the total number affected by tuberculosis, about 73.4% of notifications were for males, while 21.1% for females, as shown in figure 1.

Discussion

In Brazil, tuberculosis is considered a serious health problem, and has been combated by the Ministry of Health since 2003. Most of the social programs include the disease as a focus, among them, the More Health program, Pact for Life, besides being in the agenda of actions of the Sanitary Surveillance [15].

It is estimated that in Brazil alone there are at least 57 million people infected with the tuberculosis bacillus, and

85,000 cases are reported each year, of which 71,000 are new cases. Regarding incidence, males presented higher rates than females, with 49.6 \ 100,000 inhabitants and 24.6 \ 100,000 inhabitants, respectively (MINISTÉRIO DA SAÚDE, 2010).

The results obtained in this research revealed that the largest number of cases occurred in São Luís, the state capital. This result is similar to that found by several studies of the spatial distribution of Tuberculosis in the Brazilian Northeast, where the highest prevalence of cases occurs in coastal regions [16]. Corroborating other studies as found in a study to analyze the distribution of the disease in the Brazilian Northeast, and in another research of the same author in 2014 to analyze the prevalence of HIV / TB co-infection in this same region [17].

DataSUS data revealed that in the year 2014 to 2016 there were 3,897 cases of TB in the state of Maranhão, with the most affected age group being 15 to 59 years for males and females, followed by the age group of 60 79 years, for both sexes. These data are compatible with federal government estimates, stating that, in Brazil, the age range with the highest prevalence of infections ranges from 20 to 49 years of age. In addition, data from the World Health Organization suggest that the disease mainly affects individuals in a productive economic phase, comprising between 20 and 60 years of age, coinciding with the data obtained in this research [2].

Of the total number of people affected by tuberculosis, 73.4% of the cases reported were male, while 21.1% were female, confirming other findings reported by Serra and Ross in the city of Caxias, Maranhão, and by Montechi in a research carried out in Piauí [18,19].

Common data observed in the world and national scenario, in which on average 60% of the cases are male and 40% female, and this prevalence is explained by the fact that male individuals are more exposed to bacilli, besides being more associated with risk factors, such as the use of beverages and cigarettes [2,20].

It is also necessary to increase new medical technologies with greater sensitivity in the diagnosis reducing the time of treatment. However, it is the knowledge of the population about TB that is essential for the progress in disease control and the quality of clinical and epidemiological results, since it is this knowledge that defines the acceptance and use of these technologies [21].

Conclusion

In Maranhão, tuberculosis has affected men more from adolescence to old age. In view of this, it is necessary to promote the knowledge of the disease to the population, in order to advance its control in order to obtain quality in clinical and epidemiological results, as well as to increase new technologies with greater diagnostic sensitivity.



References

1. Guimarães RM. Tuberculosis, HIV and poverty: time trend in Brazil, Americas and the world. *Jornal Brasileiro de Pneumologia*. 2012; 38: 511-517.
2. World Health Organization. Global tuberculosis report. 2013.
3. Maranhao. Secretariat of State for Health. State Program for Tuberculosis Control: information for the world day of tuberculosis control. São Luís. 2017; 2014.
4. Luis S. Municipal Health Department. Municipal Tuberculosis Control Program. SINAN. São Luís. 2017.
5. Silva DB, Costa GS, Rosa LFB, Guilherme MS, Oliveira SA, et al. Pharmaceutical assistance to patients with pulmonary tuberculosis: an integrative review. 2017; 2: 7.
6. Ramirez ARM. Educational intervention in health with patients with pulmonary tuberculosis, in the city of cariré-ce. *Collection of Educational Resources in Health*. 2015; 1-30.
7. Andrews JR, Morrow C, Walensky RP, Wood R. Integrating Social Contact and Environmental Data in Evaluating Tuberculosis Transmission in a South African Township. *Journal of Infectious Diseases*. 2014; 210: 597-603.
8. Fields HS. Etiopathogenesis of tuberculosis and clinical forms. *Lung*. 2006; 15: 29-35.
9. Brazil. Ministry of Health. Secretariat of Health Surveillance. National Program for Tuberculosis Control. Manual of Recommendations for the Control of Tuberculosis in Brazil. Brasília. 2010.
10. Kritsky AL. Tuberculosis: from outpatient to infirmary. 2. ed. São Paulo: Atheneu, 2000.
11. Melo FAF. Tuberculosis. In: VERONESI, RF. Treatise on infectology. São Paulo: Atheneu. 2009; 68: 1263-1333.
12. Ferri AO, Aguiar B, Wilhelm CM, Schmidt D, Fussieger F, et al. Diagnosis of tuberculosis: a review. *Revista Liberato, Novo Hamburgo*. 2014; 15: 105-212.
13. Silva JN, Santos MC. Epidemiological survey of tuberculosis cases in the municipality of Mogi das Cruzes (SP). *Mogi das Cruzes*. 2017; 2.
14. CVE. Division of Tuberculosis Control. 2014.
15. Pillar RVB. Epidemiology of Tuberculosis. *Lung Magazine*. 2012; 21: 4-9.
16. Brazil. Ministry of health. Secretariat of Health Surveillance. National Tuberculosis Control Program. Manual of recommendations for the control of Tuberculosis in Brazil. 2010.
17. Barbosa IR, Pereira LMS, Medeiros PFM, Valentim RS, Brito JM, et al. Analysis of the spatial distribution of tuberculosis in the northeastern region of Brazil, 2005-2010. *Journal of Epidemiology and Health Services*. 2013; 22: 687-695.
18. Serra LC, Ross JR. Clinical-epidemiological study of tuberculosis / HIV co-infection in a city in the interior of Maranhão. *Journal of Management and Primary Health Care*. 2012; 3: 122-125.
19. Montechi LN, Coêlho DMM, Oliveira CAR, Campelo V. Special distribution of tuberculosis in Teresina, Piauí, from 2005 to 2007. *Journal of Epidemiology and Health Services*. 2013; 22: 475-482.
20. Marques MV. Clinical-epidemiological characteristics of drug-resistant tuberculosis in the State of Maranhão. *Monografia (Bachelor in Nursing) - Federal University of Maranhão, São Luís*. 2017.
21. Freitas IM, Popolin MP, Touse MM, Yamamura M, Rodrigues LBB, et al. Factors associated with knowledge about tuberculosis and attitudes of the families of patients with the disease in Ribeirão Preto, São Paulo. *Brazilian Journal of Epidemiology*. 2015; 18: 326-340.