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: Analyze, 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 (MCTB), 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]. MCTB 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
TB can be of two forms: pulmonary and extrapulmonary, in which the pulmonary presents in the primary, post-primary (secondary) or miliary 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 miliary 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 (Fluge’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 in the sputum (sample), using microscopy to identify TB, performed by direct bacilloscopy, to search for Koch’s symptomatology [12].

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 2,428 cases, with 683 cases between 60 and 79 years.

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

| Cities              | < 1 year | 1-14 years | 15-59 years | 60-79 years | > 80 years |
|---------------------|----------|------------|-------------|-------------|-----------|
| Açaílândia          | 1        | 3,1        | 227         | 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      | -         | -         |
| Quaries             | -        | -          | -           | -           | 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 Palhos | 1        | 3,1        | -           | 14          | 0,57      | 4         | 0,91      | 1         | 0,91      |
| 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.
Epidemiological Prevalence of Tuberculosis in the State of Maranhão between 2014 and 2016

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 \( \times \) 100,000 inhabitants and 24.6 \( \times \) 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 60 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].

**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].

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

| Cities            | < 1 year | 1-14 years | 15-59 years | 60-79 years | > 80 years |
|-------------------|----------|------------|-------------|-------------|------------|
| Açailândia        | -        | -          | 17 2,48     | 3 0,48      | -          |
| Bacabal           | 1 8,33   | -          | 26 3,80     | 7 0,92      | 2 0,26     |
| Voices            | 1 8,33   | 1 4,34     | 8 1,17      | 2 0,14      | -          |
| Rope bar          | 1 8,33   | 1 4,34     | 15 2,19     | 8 0,76      | 2 0,14     |
| Caxias            | -        | -          | 31 4,53     | 9 0,63      | 1 0,08     |
| Chapadinha        | -        | -          | 1 1,17      | 1 0,10      | -          |
| Codó              | -        | -          | 19 2,78     | 10 0,70     | 3 0,13     |
| Empress           | -        | -          | 4 0,56      | 6 0,85      | 15 1,96    |
| Itapepecuçu       | -        | -          | 1 4,34     | 26 3,80     | 7 0,92     |
| Quaries           | -        | -          | 1 4,34     | 16 2,34     | 4 0,54     |
| Pine              | -        | -          | 1 4,34     | 26 3,80     | 6 0,76     |
| P. Dutra          | -        | -          | -          | 14 2,04     | 2 0,14     |
| Rosary            | 2 16,66  | -          | 20 2,92     | 3 1,11      |
| Santa Inês        | -        | -          | 55 8,05     | 14 2,11     |
| São João dos Patos| -        | -          | 1 4,34     | 0,14        | 1 0,08     |
| São Luís          | 7 58,33  | 12 52,17   | 283 41,43   | 40 28,16    |
| Timon             | -        | -          | 1 4,34     | 22 3,22     |
| Viana             | 1 8,33   | 1 4,34     | 23 3,36     | 2 0,14      |
| Zé Dock           | -        | -          | 1 4,34     | 29 4,24     |
| Total             | 12 100   | 23 100     | 683 100     | 142 100     |

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

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.

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