

Cases of leprosy notified in the municipality of Parnaíba, state of Piauí, Brazil, 2007-2016

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ABSTRACT. This study aimed to describe the epidemiological and clinical characteristics of leprosy cases reported in the municipality of Parnaíba, State of Piauí. This was a cross-sectional study of leprosy cases, living in Parnaíba, State of Piauí, reported to the National System of Notifiable Diseases (SINAN), from 2007 to 2016. There were 582 cases of leprosy with hyperendemic detection in the general population in 2008, 2009 and 2016; and under < 15 years of age in 2008, 2014 and 2016, with a predominance of females (53.1%), brown (62.2%), aged 20-64 years (74.7%), complete and incomplete elementary school (56.4%), housewives (20.7%), living in the urban area (87.1%), reported by primary care (69.2%). The most frequent clinical and therapeutic findings were: multibacillary operational classification (53.8%); clinical forms: undetermined (30.6%) and virchowian (24.3%); single lesion (34.8%); no affected nerves (86.7%); degree of disability zero (70.6%); bacilloscopy not performed (26.7%); therapeutic regimen 12 doses (53.7%) and no reaction (70.8%). Regarding the mode of input, predominated new case (88.8%); mode of output, cure (87.9%) and detection mode: spontaneous demand (45.8%). Out of 2,106 registered contacts, 60.6% were examined. Leprosy is endemic to Parnaíba, State of Piauí. It is noteworthy that the hyperendemic detection rates occurred during years when there was intensification of active search for contacts and cases in the population.

Keywords: leprosy; epidemiology; health care; public health surveillance.

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Introduction

Leprosy is caused by the alcohol-resistant bacteria *Mycobacterium leprae* that lodges in the skin, nerves and trunk tissues, preferring to infect the Schwann cells that surround the peripheral nerves, and also affects the vision and other target organs (Ministério da Saúde, 2017, 2020). This disease is transmissible, with slow evolution, presenting clinical complications due to the physical sequelae that the patient may have when not treated, generating physical, psychological, social consequences affecting people of different sexes, age groups, and all stages of the life cycle (Araújo, Andrade, & Madeira, 2011; Silva, Lopes, & Costa, 2019).

Leprosy is present in more than 142 countries, according to the World Health Organization. The latest official data released in 2016 is that the number of new leprosy cases is 214,783, with a detection rate of 2.9 cases per 100,000 inhabitants⁻¹. In the American continent, there was a decrease of 35% new cases, which in 2004 was 52,662 cases, reducing in a decade to 33,789. However, from 2011 to 2015, there were new detections of the disease in 24 countries in the Americas. Of these, 94% were from Brazil (World Health Organization [WHO], 2016).

The World Health Organization has set goals to eradicate leprosy. For the period from 2016 to 2020, the objective is to reduce the incidence and prevalence, break the chain of transmission, favor rapid diagnosis and treatment for the affected people (OMS, 2016).

Leprosy is among the neglected diseases of WHO's priority attention worldwide, its elimination is a public health problem. Brazil is one of the countries with a high load for the disease and the second in the world with the highest records (Ministério da Saúde, 2018).

In Brazil, from 2012 to 2016, 151,764 leprosy cases were reported with an equivalent detection rate of 14.97 new cases per 100,000 inhabitants. Among the new cases mentioned above, 84,447 were male, 55.6% (Ministério da Saúde, 2018).

In the Northeast region, from 2001 to 2016, the average detection rate in people under 15 years was considered very high, being 8.64 cases per 100,000 inhabitants. In 2016, Piauí was classified as endemic with a detection rate of 5.74 per 100,000 inhabitants for people under 15 years old (Schneider & Freitas, 2018).

In the State of Piauí, from 2011 to 2015, 6,378 cases were reported, with an average of 1,275.6 annual cases, with the highest frequencies in 2011 and 2014 being 1,358 and 1,308 cases, respectively. While the lowest occurrence of the period was in 2015, with 1,194 cases (Monteiro et al., 2017).

A historical series of notified leprosy cases from 2001 to 2016 in the municipality of Parnaíba showed that there were 771 cases, with an average detection rate of 33.50 cases 100,000 inhabitants⁻¹. Comparing 2001 with 2016, there was an increase in the detection rate from 54 to 64 new cases per 100,000 inhabitants (Araújo et al., 2016).

Given the above, this study aimed to describe the epidemiological and clinical characteristics of leprosy cases notified in the municipality of Parnaíba, State of Piauí, from 2007 to 2016.

Material and methods

This was a cross-sectional study of leprosy cases, living in Parnaíba, State of Piauí, reported to the National System of Notifiable Diseases (SINAN), in the period from 2007 to 2016.

The municipality of Parnaíba is located on the northern coast of the State of Piauí, in northeastern Brazil. It is the second most populous in the State, with a territorial area of 299,110 km² and an estimated population of 153,078 inhabitants (Instituto Brasileiro de Geografia e Estatística [IBGE], 2019).

In the period from October to November 2018, data from the notification/investigation form of leprosy of SINAN were made available by the Municipal Health Department of Parnaíba, State of Piauí, in an electronic spreadsheet, in the consolidated format per year of the following variables: notification source (primary care, hospitals, clinics), sex (male and female), ethnicity (white, brown, yellow, black, indigenous), age group (0 to 14; 15 to 19; 20 to 34; 35 to 49; 50 to 64; 65 to 80 or more), housing area (urban, peri-urban, rural), education (illiterate, elementary school, high school, higher education), occupation, operational classification (paucibacillary, multibacillary), clinical forms (indeterminate, tuberculoid, dimorphic, virchowian), skin lesions (single; 2 to 5 lesions; +5 lesions), affected nerves (none; 1 to 3 nerves; 4 to 6 nerves), assessment of disability at reporting (grades 0, 1 and 2), mode of entry (new case, relapse, transfer of municipality, transfer of state), detection mode (spontaneous demand, referral, collective examination, contact examination, other modes), bacilloscopy (positive, negative, not performed), therapeutic regimen (6 doses - paucibacillary; 12 doses - multibacillary), number of registered contacts. In addition, the following consolidated data from the leprosy follow-up bulletin were made available: number of contacts examined, reaction episode (reaction type 1, reaction type 2, reaction type 1 and 2, no reaction), type of exit (cure, abandonment, transfer of municipality, transfer of state).

For the calculation of detection rates in the general population and under 15 years old, population and inter-census estimates were used. The inter-census projections for the populations of July 1st in the inter-census years were those estimated by the Brazilian Institute of Geography and Statistics (IBGE)¹. In 2010, census data were considered, and in other years (2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015, 2016) the inter-census projections².

Statistical analyses were run in Microsoft Excel 2016, categorical variables were presented in absolute and relative frequency. For the analysis of the progression of the endemic, in the period studied in the municipality of Parnaíba, the coefficients of detection of grade II disability and annual detection of new cases were calculated for the general population and under 15 years old. To calculate these coefficients, the guidelines recommended by the Ministry of Health in the Guidelines for Surveillance, Attention and Elimination of leprosy as a public health problem were adopted (Diretrizes para Vigilância, Atenção e Eliminação da Hanseníase como Problema de Saúde Pública, 2016). These coefficients are used as indicators and parameters of evaluation for monitoring the progress of leprosy elimination by the Ministry of Health, being classified as: annual detection rate of new leprosy cases: hyperendemic: > 40.0/100 thousand inhabitants; very high: 20.00 to 39.99/100 thousand inhab.; high: 10.00 to 19.99/100 thousand inhab.; average: 2.00 to 9.99/100 thousand inhab.; low: < 2.00/100 thousand inhab., this indicator is useful to measure force of morbidity, magnitude and tendency of the endemic. Annual detection rate of new leprosy

¹ Available at <http://www.ibge.gov.br>.

² Available at <http://tabnet.datasus.gov.br/cgi/tabcgi.exe?ibge/cnv/poptpi.def>.

cases in the population from zero to 14 years old: hyperendemic: $\geq 10.00/100$ thousand inhab.; very high: 5.00 to 9.99/100 thousand inhab.; high: 2.50 to 4.99/100 thousand inhab.; average: 0.50 to 2.49/100 thousand inhab.; low: $< 0.50/100$ thousand inhab. The latter measures recent transmission (force of infection) of the endemic and its tendency, which is evaluated as good if there is a reduction in the magnitude of the endemic (Diretrizes para Vigilância, Atenção e Eliminação da Hanseníase como Problema de Saúde Pública, 2016).

The research was approved by the Research Ethics Committee of the State University of Piauí/UESPI under CAEE 03513318.7.0000.5209, in which it was conducted within the norms of resolution 466/12, strictly following the guided principles, including integrity, privacy and confidentiality of information.

Results and discussion

From 2007 to 2016, 582 cases of leprosy were reported in the population residing in the municipality of Parnaíba, State of Piauí. The detection rate in the general population was highest in the years 2008, 2009 and 2016, when the municipality was classified as hyperendemic; the magnitude of the endemic disease was considered very high in the years 2010 to 2013 and in 2015; while the lowest rates were recorded in the years 2007 and 2014. Even so, in those years, the detection rate in the municipality was classified as high. On the other hand, there was a decline in rates from 2009 to 2014, followed by a significant increase, especially in 2016 (42.6/100,000 inhab.) (Figure 1).

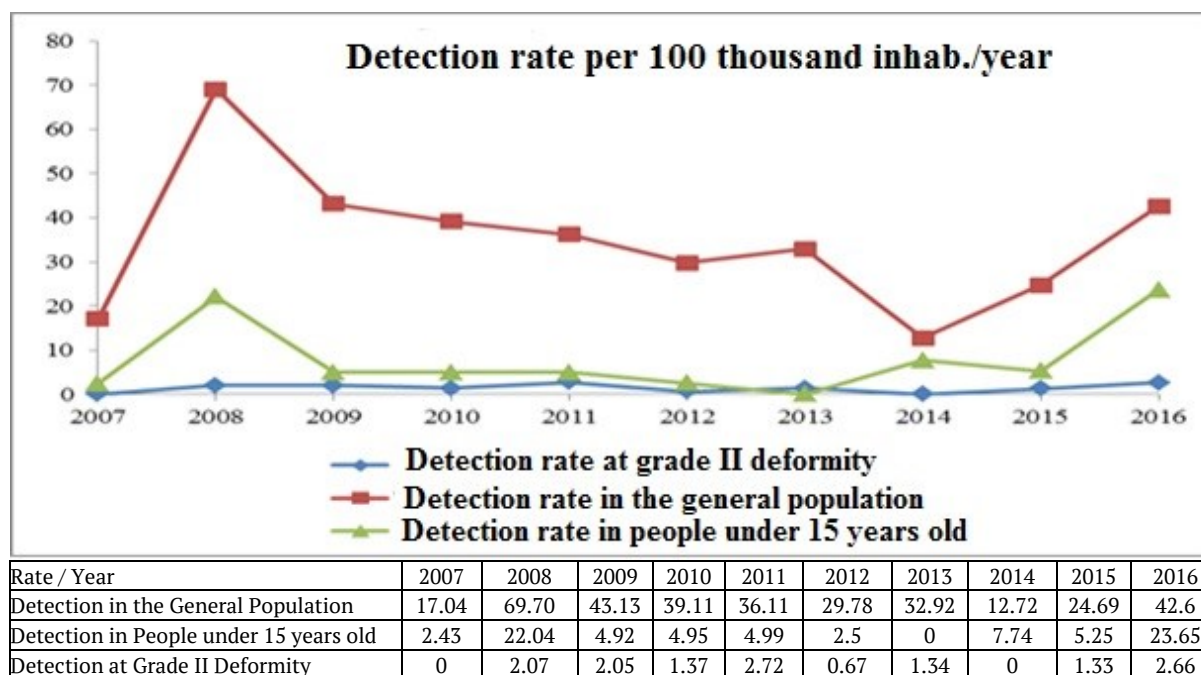


Figure 1. Detection rate of leprosy cases, 2007 to 2016, Parnaíba, State of Piauí, Brazil.

Araújo et al. (2016) observed a decline in new cases of leprosy in Floriano, State of Piauí, from 2007 to 2016. The authors attribute this decline to the likely underreporting in the health information system. According to the Ministry of Health (Ministério da Saúde, 2020), the high detection rates in isolated periods may reflect the intensification of actions such as campaigns aimed at finding cases, reinforcing the need of municipalities in the State of Piauí to carry out preventive actions, detection of new cases and disease control.

With regard to the annual detection rate of new cases of leprosy in the population aged zero to 14 years, the highest rates were recorded in 2008 and 2016, these years are classified as hyperendemic. The lowest rate was recorded in 2013, classified as low, and in the other years, the classification was between high and very high. In the period from 2009 to 2013, there was a decline in relation to 2007, with a significant increase in 2016 (Figure 1). The Ministry of Health points out as one of the epidemiological indicators for assessing leprosy cases the detection rate in the population under 15 years old. This indicator is used to measure the force of new transmissions of the disease and its tendency, since the causative agent of the disease has a long incubation period until the manifestation of signs and symptoms (Ministério da Saúde, 2020).

Detection coefficients are indicators of leprosy transmissibility. In the municipality of Parnaíba, values remained high, considering that in the studied period, the classifications considered high, very high and hyperendemic predominated, both in the general population and in those under 15 years old. On the other hand, the reduction in detection rates is the result of a decrease in the active search for cases.

As for the rate of new leprosy cases with grade II physical disability at the time of diagnosis, fluctuations occurred over the period, with peaks in 2008, 2009, 2011 and 2016 (Figure 1). The increase in this rate may indicate failures in actions aimed at the early diagnosis of this disease. In the other years of the series, a reduction in this rate was found, reaching zero in some years such as 2007 and 2014.

As for the trend towards a reduction in the grade II disability rate, there was a reduction in the magnitude of the endemic disease (Diretrizes para Vigilância, Atenção e Eliminação da Hanseníase como Problema de Saúde Pública, 2016). In addition, the World Health Organization, when launching the global strategy for coping with the disease for the period 2016 to 2020, resumes the new goal of reducing the number of patients with grade II disability, emphasizing that the national control program should firmly commit to early diagnosis so that prevention is the means to avoid disabilities and deformities (World Health Organization [WHO], 2010).

With regard to sociodemographic aspects, there was a predominance of females, 53.1% (Table 1), in line with three studies carried out in northeastern Brazil: Melo, Moraes, Santos and Silva Santos (2017) in Maceió, State of Alagoas, Souza et al. (2013) in Fortaleza, State of Ceará, and Santana, Santos, Lima and Carvalho (2018) in Itabuna, State of Bahia. On the other hand, Silva et al., (2017) in Caxias, State of Maranhão, and Sirtoli, Gama and Marroni (2017) in Gurupi, State of Tocantins, found a male predominance.

Most patients were 62.2% brown (Table 1), a percentage much higher than the proportion of browns in the population of Parnaíba (7.71%) (IBGE, 2010). In Caxias, State of Maranhão, Costa et al. (2017a) found that 67% of the patients were brown, and Buna et al. (2015), in São Luís, State of Maranhão, 78%. It is worth mentioning that Maranhão and Piauí have a large proportion of browns, respectively, 80.4% and 80.0% (IBGE, 2018). In Brazil, brown color is associated with poverty, as well as leprosy.

Most of the cases were in the age group of 20 to 64 years old, 74.7% (Table 1). Vieira et al. (2015) found 40.6% cases in the range of 30 to 70 years. The involvement of young adults who are economically active, can generate a withdrawal from the labor market, even with permanent disability. As in our study, Vieira et al. (2015) reported involvement of people under 15 years old, demonstrating the hyperendemicity of the disease.

Regarding education, there was a predominance of low education: illiterate (7.1%) and Elementary School - 56.4% (Table 1). Costa, Borba-Pinheiro, Reis and Reis Júnior (2017b), in a research carried out in Tucuui, State of Pará, also found a predominance of Elementary School 66.5% and illiterate (14.2%), showing that leprosy is a disease of poverty. Palú and Cetolin (2015) state that the level of education is important in the factor of self-care, in understanding the disease from transmission to treatment.

As for occupation, 20.7% were housewives. Similar findings were reported by Cid, Lima, Souza and Moura (2012) in Fortaleza, State of Ceará, and Reis, Raposo, Alencar, Ramos Júnior and Heukelbach (2018) in Vitoria da Conquista, State of Bahia. Attention is drawn to the fact that the occupation of a housewife is related to low schooling and, consequently, to poverty.

As for the reporting unit (Table 1), 69.2% of notifications were generated by primary care, the preferred gateway to the health network. In Aracajú, State of Sergipe, 58.8% of cases were diagnosed in primary care (Moreira, Costa, Moreira-Junior, & Góes, 2019). Importantly, the diagnosis at this level of health care may be the result of the expansion and coverage of health services (Araújo & Lana, 2020).

Most patients lived in the urban area, 87.1% (Table 1). Santos et al. (2017) in Rondonópolis, State of Mato Grosso, also found the highest frequency of cases in the urban area, 90.2%. In the urban area, there is greater circulation and crowding of people, greater probability of infection by the bacillus, since transmission occurs by air. It should also be noted that the population of the municipality of Parnaíba is concentrated in the urban region as well as in most Brazilian municipalities.

Regarding the operational classification of leprosy cases, the multibacillary form predominated, 53.8% (Table 2), and it can be inferred that the diagnosis in leprosy cases has been made late, indicating the endemicity of the disease, and must be an alert for health professionals and managers about the need to actively search for cases, early diagnosis and the prevention of disability caused by the disease. On the other hand, Gomes, Loiola, Araújo, Nogueira and Araújo (2017) in a study carried out in Floriano, State of Piauí,

found a higher frequency for the paucibacillary form (55.9%) and Monteiro et al. (2018), in Palmas, State of Tocantins, found a higher frequency for the multibacillary form, 93%.

Table 1. Distribution of sociodemographic variables of leprosy cases, 2007 to 2016, Parnaíba, State of Piauí, Brazil.

| Variable | N | % |
|----------------------|-----|------|
| | 582 | 100 |
| Sex | N | % |
| Male | 273 | 46.9 |
| Female | 309 | 53.1 |
| Race/color | N | % |
| White | 136 | 23.0 |
| Black | 53 | 8.8 |
| Yellow | 19 | 3.2 |
| Brown | 364 | 62.2 |
| Indigenous | 11 | 1.3 |
| Ignored/Blank | 9 | 1.5 |
| Age group (in years) | N | % |
| 0 to 14 | 30 | 5.1 |
| 15 to 19 | 25 | 4.3 |
| 20 to 34 | 133 | 22.9 |
| 35 to 49 | 152 | 26.3 |
| 50 to 64 | 148 | 25.5 |
| 65 to 80+ | 92 | 15.9 |
| Education | N | % |
| Illiterate | 41 | 7.1 |
| Elementary School | 328 | 56.4 |
| High school | 103 | 17.7 |
| Higher education | 34 | 5.9 |
| Not applicable | 2 | 0.1 |
| Ignored/blank | 74 | 12.8 |
| Occupation | N | % |
| Housewife | 120 | 20.7 |
| Retired/Pensioner | 69 | 11.8 |
| Student | 61 | 10.4 |
| Others | 170 | 29.3 |
| No information | 162 | 27.8 |
| Reporting unit | N | % |
| Primary care | 403 | 69.2 |
| Specialized services | 179 | 30.8 |
| Housing area | N | % |
| Urban | 507 | 87.1 |
| Rural | 59 | 10.2 |
| Peri-urban | 6 | 1.0 |
| Ignored | 10 | 1.7 |

As for the clinical form, the indeterminate form was found with 30.3% (Table 2). Gomes et al. (2017), in Floriano, State of Piauí, found the indeterminate form in 58.6% of the cases. While in a reference center in Fortaleza, State of Ceará, the predominant form was the dimorphic, 68.9% (Moura et al., 2016), a finding that can be justified by the fact that the study site is a specialized service. Virchowian and dimorphic forms represented 47.5% cases (Table 2). These clinical forms are characterized by higher severity and greater risk of contamination, requiring immediate interventions to break the transmission cycle to contacts and cohabitants (Holanda, Giló, Silva Junior, Soares, & Cerdeira, 2018). When comparing filling in information on operational classification with filling in the clinical form, it is clear that the operational classification was completed in 100% cases - probably because it is a mandatory field of the leprosy notification/investigation form and linked to the type of treatment to be instituted. While the unclassified or ignored/blank clinical form represented 9% cases (Table 2).

As for the number of skin lesions, the single lesion was the most frequent, with 34.8% (Table 2). In the study by Franco et al. (2014) in Igarapé Açu, State of Pará, single lesion was found in 62.1% cases. In turn, Pescador, Sakae and Magajewsky (2018) in a study conducted in Santa Catarina found a single lesion in 17.8% cases.

Inconsistency was found between the information on the operational classification and numbers of skin lesions: 344 multibacillary cases and only 186 cases with more than five lesions; 292 paucibacillary cases

and 400 cases with less than five lesions (Table 2). According to the Ministry of Health (Ministério da Saúde, 2018), cases with up to five lesions should be classified as paucibacillary and those with more than five lesions as multibacillary.

Table 2. Distribution of clinical variables of leprosy cases, 2007 to 2016, Parnaíba, State of Piauí, Brazil.

| Clinical Aspects | N | % |
|----------------------------|-----|------|
| | 582 | 100 |
| Operational Classification | N | % |
| Multibacillary | 313 | 53.8 |
| Paucibacillary | 269 | 46.2 |
| Clinical forms | N | % |
| Indeterminate | 178 | 30.6 |
| Tuberculoid | 75 | 12.9 |
| Dimorphic | 135 | 23.2 |
| Virchowian | 141 | 24.3 |
| Unclassified | 37 | 6.3 |
| Ignored/Blank | 16 | 2.7 |
| Number of skin lesions | N | % |
| Single lesion | 203 | 34.8 |
| 2 to 5 | 162 | 28.5 |
| >5 | 171 | 29.3 |
| None | 46 | 7.4 |
| Number of nerves affected | N | % |
| None | 504 | 86.7 |
| 1 to 3 | 70 | 12.0 |
| 4 to 6 | 8 | 1.3 |
| Degree of disability | N | % |
| Grade 0 | 410 | 70.6 |
| Grade I | 97 | 16.6 |
| Grade II | 27 | 4.7 |
| Not evaluated | 23 | 3.9 |
| Ignored/Blank | 25 | 4.2 |

As for the number of nerves affected, 86.7% cases did not have nerve involvement (Table 2). Serra et al. (2019), in a survey conducted in Imperatriz, State of Maranhão, found no nerves affected in both paucibacillary (77.9%) and multibacillary (51.8%) forms.

Regarding the degree of disability, 70.6% cases were classified as grade zero, 16.9% with grade I disability and 4.5% with grade II disability (Table 2), pointing out that the timely and early detection of cases have been effective, since the Ministry of Health considers low proportions below 5% cases with grade II disability (Diretrizes para Vigilância, Atenção e Eliminação da Hanseníase como Problema de Saúde Pública, 2016). On the other hand, Carvalho, Martins, Nunes and Araújo (2013) in a study carried out in Teresina, State of Piauí, at the rehabilitation center, found 76% patients with no disability, 13.3% with grade I disability and 8.1% with grade II, demonstrating that in rehabilitation centers there is a higher prevalence of grade II disability.

At the beginning of polychemotherapy, the assessment of disabilities is a procedure that focuses on preventing physical sequelae. In case of nerve involvement, the patient has a greater possibility and risk of presenting disabilities. When treated, the purpose of the assessment is to reverse bodily weaknesses. Thus, leprosy control programs have to thoroughly evaluate patients at the beginning and end of polychemotherapy for early identification of the resulting physical complications.

Among 2,106 contacts registered at SINAN, 60.6% were examined, a percentage lower than that found by Souza and Barbosa-Bom (2019), in a study conducted in Alagoas (71.9%). The examination of contacts is one of the pillars of the leprosy control program, because it allows the active search for cases and the breaking of the transmission chain. In addition, the percentage of our study reached the regular parameter of 50 to 74.9% of household contacts examined according to guidelines from the Ministry of Health (Portaria nº 3.125, 2010). The Ministry of Health recommends that non-sick family members and social contacts should be assessed for five years and thus released by surveillance (Diretrizes para Vigilância, Atenção e Eliminação da Hanseníase como Problema de Saúde Pública, 2016).

Skin smear microscopy was performed in 37.3% cases, being positive in 13.7% (Table 3). Lima and Moreira (2015) in a study carried out in Passos, State of Minas Gerais, found positive skin smear microscopy in 60.7% cases. It is worth mentioning that skin smear microscopy is an extremely important complementary exam in the diagnosis of leprosy. However, the Ministry of Health reinforces that skin smear microscopy is not a conclusive test for diagnosis, but rather complementary, considering that the tuberculoid and indeterminate clinical forms may present a negative result and the Virchowian and dimorphic forms, positive (Ministério da Saúde, 2017).

Table 3. Distribution of laboratorial and treatment variables of leprosy cases, 2007 to 2016, Parnaíba, State of Piauí, Brazil.

| Variable | N | % |
|--|-----|------|
| | 582 | 100 |
| Bacilloscopy | N | % |
| Positive | 80 | 13.7 |
| Negative | 137 | 23.6 |
| Not performed | 155 | 26.7 |
| No information | 210 | 36.0 |
| Therapeutic regimen | N | % |
| Polychemotherapy/Paucibacillary/6 doses | 269 | 46.3 |
| Polychemotherapy/Multibacillary/12 doses | 313 | 53.7 |
| Reaction episode | N | % |
| Reaction type 1 | 55 | 9.5 |
| Reaction type 2 | 23 | 3.9 |
| Reaction type 1 and 2 | 3 | 0.5 |
| No reaction | 412 | 70.8 |
| Blank | 89 | 15.3 |

As for the therapeutic regimen, the most used polychemotherapy was for the multibacillary form, 53.8% cases (Table 3). The adopted schemes coincide with the operational classification (Table 2), since this classification has precisely the objective of distinguishing patients affected by leprosy in order to indicate different therapeutic regimens. Drug treatment is an important therapeutic resource to prevent transmission of the bacillus, seeking to prevent possible complications that may be generated by the disease. In addition, the WHO (2016) recommends the treatment of patients affected by leprosy, as one of the measures for control and eradication.

Regarding the occurrence of a reaction episode, 81 patients (13.9%) had some type of reaction during treatment. Of these, 55 (67.9%) had a type I reaction (Table 3). Cunha, Xavier, Pires and Oliveira (2013) in a study in Belém, State of Pará, found a higher frequency of type I reaction among those who did not adhere to the treatment (66.7%) and 57.1% among those who adhered. It is worth mentioning that these reactions can occur before, during and after the completion of polychemotherapy.

Regarding the mode of input, 88.8% were new cases (Table 4). Similar data were reported in Bahia, 86.5% (Costa, Pfrimer, Menezes, Nascimento, & Carmo Filho, 2019); while in São Luís, State of Maranhão, 58.3% were found (Pacheco, Aires, & Seixas, 2014). Therefore, it is deduced that the number of new cases registered is due to the improvement of early detection of cases in health services, which can lead to an increase in notifications and treatment of cases.

When assessing the mode of output of the cases, there was cure in 87.9%, a percentage close to that found in Sobral, State of Ceará, 86.2% (Pereira et al., 2019) and much higher than that described in a study carried out in Castanhal, State of Pará, 74.11% (Cunha et al., 2019). The proportion of leprosy cure is one of the indicators for assessing the quality of care established by the Ministry of Health: proportions greater than or equal to 90% are considered good, from 75 % to 89.9% are regular and less than 75% are classified as precarious (Portaria nº 3.125, 2010).

Regarding the detection mode, spontaneous demand represented 44.4% cases; the high frequencies of spontaneous demand and referral, as well as the low proportions of diagnosis by collective examination and evaluation of contacts (Table 4), suggest the existence of flaws in the prevention and control of the disease. The need to implement surveillance actions, such as active search, is one of the strategies that could be adopted for the early diagnosis of the disease.

Table 4. Mode of input, mode of output, and mode of detection of leprosy cases, 2007 to 2016, Parnaíba, State of Piauí, Brazil.

| Variable | N | % |
|---|----------|----------|
| | 582 | 100 |
| Input Mode | N | % |
| New case | 517 | 88.8 |
| Relapse | 26 | 4.4 |
| Transfer from the same municipality | 8 | 1.3 |
| Transfer from another municipality in Piauí | 15 | 2.5 |
| Transfer from another State | 7 | 1.2 |
| Other entry | 10 | 1.8 |
| Mode of Output | N | % |
| Cure | 512 | 87.9 |
| Abandonment | 23 | 3.9 |
| Transfer to the same municipality | 2 | 0.3 |
| Transfer from another municipality | 11 | 1.9 |
| Transfer from another State | 11 | 1.9 |
| Death | 5 | 0.9 |
| Diagnostic error | 18 | 3.2 |
| Mode of detection | N | % |
| Spontaneous demand | 266 | 45.8 |
| Referral | 175 | 30.0 |
| Collective examination | 45 | 7.9 |
| Examination of contacts | 25 | 4.2 |
| Ignored / Blank | 63 | 10.9 |
| Other modes | 8 | 1.2 |

Pereira et al. (2019) found in Sobral, State of Ceará, the growth in attendance due to spontaneous demand in a historical series. On the other hand, in Juína, State of Mato Grosso, there was a predominance of spontaneous demand, which declined throughout the historical series while the examination of contacts increased (Lopes & Pereira, 2015).

Among the limitations of the study, stand out the variables with ignored, blank and unfilled information. However, considering the number of cases, there was no loss in data analysis. On the other hand, there is a need to intensify leprosy prevention and control actions, in addition to implementing awareness-raising strategies for professionals in filling in the compulsory notification form, which is a challenge to obtain real data, because the failure to fill in the fields compromises the accuracy and completeness of the health information.

The strengths of this research are: the number of cases, the study period (10 years) and the analysis of data generated by health surveillance of a disease that is considered a hidden and neglected endemic disease.

Conclusion

Leprosy is a major public health problem in Parnaíba, State of Piauí, considering that the annual detection rate of new cases in the general population fluctuated according to the parameters of the Ministry of Health between hyperendemic, very high and high. Similar patterns of magnitude of the endemic were found in the population aged 0 to 14 years. Regarding the rate of leprosy cases with grade II physical disability at the time of diagnosis, there are large fluctuations, with peaks and phases of significant reductions in this rate.

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