

Leprosy in the context of the Family Health Strategy in an endemic scenario in Maranhão: prevalence and associated factors

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Abstract *This study aimed to describe the prevalence of leprosy and verify the factors associated with multibacillary clinical types in a Family Health Strategy priority setting to control and monitor the disease in northeastern Brazil. This cross-sectional study used data from the Notifiable Diseases Information System related to leprosy cases notified in Imperatriz, Maranhão, between 2008 and 2017. The prevalence was determined yearly and for the period. Poisson regression models with a significance level of 5% were employed to associate the variables and the multibacillary clinical types. Most of the 2,476 leprosy cases analyzed referred to multibacillary clinical types. The prevalence ranged from 7.8 and 15.6/10,000 inhabitants, with high and very high endemicity levels. The variables male, age groups between 30 and 59 years and ≥ 60 years, schooling < 8 years, level 2 physical disability, types 1 and 2 reactive episodes, and urban residence area showed significant associations ($p \leq 0.05$) with multibacillary clinical types. Such findings can serve as a basis for elaborating and implementing leprosy control and surveillance measures, gearing actions to the most vulnerable groups, and becoming more effective.*

Keywords *Leprosy, Epidemiology, Family Health Strategy*

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Introduction

One of the oldest diseases affecting men, leprosy is associated with social inequality and unfavorable socioeconomic conditions, such as illiteracy, poor housing conditions, lack of basic sanitation, disorderly urban growth, and ineffective health services¹⁻³. Despite having been eliminated as a public health problem in many countries (prevalence <1 case per 10,000 inhabitants) since 2000, leprosy persists as a neglected disease⁴⁻⁶ in developing countries, causing physical and social limitations to their carriers, growing costs to health services, and stagnating outlook of social inequalities in these locations^{5,6}.

In 2018, data from the World Health Organization (WHO) revealed that 208,619 new cases of the disease were detected globally, distributed in 161 countries, with a detection rate of 2,74 cases per 100 thousand inhabitants and a prevalence of 0,29 cases per 10 thousand inhabitants⁷. Compared to the previous year, the overall prevalence rate decreased by 4%, but countries in the Americas, the Mediterranean, and the Western Pacific showed growing rates, reaching 0,58 cases per 10 thousand inhabitants⁷.

Brazil remains on the list of 23 priority countries for controlling the disease and, together with India and Indonesia, was responsible for about 80% of new cases registered in 2018^{7,8}. Furthermore, it still ranks first in the Americas, contributing to 93% of newly registered cases in 2018, with a prevalence of 1,48 cases per 10,000 inhabitants^{7,8}. In the last five years, the highest concentration of cases occurred in the North, Northeast, and Midwest regions of the country⁸.

In the case of endemic federative units, Maranhão stands out in the Northeast Region of Brazil, with a mean detection rate of new cases of 79,7 per 100 thousand inhabitants and a mean prevalence of 4,33 cases per 10,000 inhabitants⁸ between 2014 and 2018. Among Maranhão municipalities, Imperatriz had an incidence rate of 73,87 per 100 thousand inhabitants⁹ at the end of 2017, a priority for controlling and surveillance of the disease.

Due to the magnitude of leprosy as a Brazilian public health problem, the National Leprosy Control Program of the Brazilian Ministry of Health recommended that the disease control actions be decentralized to Primary Health Care (PHC) and coordinated by the Family Health Strategy (ESF) to facilitate people's access to services, ensure care quality, and reduce the disease's endemic levels¹⁰. Despite this regulation, clinical

practice and scientific investigations continue to cause difficulties for the early diagnosis and timely treatment of the disease, prevention, and monitoring of physical disabilities, besides contact surveillance, which has resulted in motor and neurological sequelae in the affected population¹¹.

According to the WHO, for operational treatment purposes, Paucibacillary (PB) patients are those with up to five skin lesions and negative intradermal skin smear microscopy, when available. Multibacillary (MB) patients are those with six or more skin lesions or positive intradermal skin smear microscopy^{1,4}. The MB classification stands out because it is the most severe forms of the disease, directly related to the greater transmissibility of *Mycobacterium leprae*, until treatment with polychemotherapy (PCT) is started¹².

Noteworthy is that Brazil recorded an increased proportion of MB among the number of new cases. In 2009, the rate was 57,2%, hiking to 77,2% in 2018. This increase was notable in all regions of the country and in the state of Maranhão, which showed a proportion of 80,8%⁸.

Thus, it is imperative to know and analyze epidemiological aspects of the reported leprosy cases, concerning total cases under treatment in priority locations for monitoring the disease, in order to understand the factors associated with the clinical types with a greater possibility of spreading the disease, providing subsidies for more effective health planning and interventions. Thus, we aimed to determine the prevalence of leprosy and verify the factors associated with MB clinical types.

Methods

This is a cross-sectional study¹³ conducted in Imperatriz (MA), a territorial area of 1,368.988 km² and an estimated population of 258,016 inhabitants in 2018, with over 94% of these residing in the urban area¹⁴. The municipality is located 626 km from the state capital, São Luís, and is the second-largest population, commercial, and service center in Maranhão^{14,15}.

All leprosy cases notified to the Notifiable Diseases Information System (SINAN) from January 2008 to December 2017, collected in February 2019 at the Health Surveillance Service (SVS) of the Regional Health Management Unit of Imperatriz were included. After data collection, duplicate records were excluded (74; 2,90%) and with a "diagnostic error" closure status (8; 0,31%).

Sociodemographic variables were selected for investigation, such as age, gender, ethnicity/skin color, and education, besides clinical-epidemiological variables, such as entry type, operational classification, clinical form, number of affected nerves, physical disability at diagnosis, number of registered contacts, number of contacts examined, residence area, and closure status.

A descriptive analysis of the data was performed, by determining the absolute and relative frequencies of the sociodemographic and clinical-epidemiological variables, according to the operational classification (MB/PB). The mean, median, mode, and standard deviation were calculated for the age variable. The age variable was also categorized into four intervals (<15 years, 15-29 years, 30-59 years, and ≥ 60 years).

The prevalence rate for every 10,000 inhabitants was determined for each year under investigation, considering all cases under treatment on December 31 of the assessment year, divided by the total population of the same place and period¹⁶, according to population estimates by the Brazilian Institute of Geography and Statistics (IBGE)¹⁴.

The endemicity parameters were used to classify the prevalence findings, as expressed in the Indicators for Monitoring the Progress of Leprosy Elimination as a Public Health Problem in the Guidelines for the Surveillance, Care, and Elimination of Leprosy as a Public Health Problem¹⁶, and low endemicity was considered in the locations with less than 1,0 cases per 10,000 inhabitants; medium endemicity 1,0-4,9 cases per 10,000 inhabitants; high endemicity 5,0-9,9 cases per 10,000 inhabitants; very high endemicity 10,0-19,9 cases per 10,000 inhabitants; and hyperendemic locations $\geq 20,0$ cases per 10,000 inhabitants.

Poisson regression models with robust adjustment of variance were used to verify the factors associated with the MB clinical types. Sociodemographic and clinical-epidemiological with a p-value $\leq 0,20$ were included in the adjusted model. The prevalence ratios (PR) and the respective 95% confidence intervals were estimated directly by the model's regression coefficients¹⁷. On that occasion, "unknown" data was deleted. Data were tabulated in Microsoft Office Excel® 2019 spreadsheets and tests performed using the *IBM Statistical Package for Social Science*® (SPSS®), version 24,0, at a 5% significance level.

The Research Ethics Committee of the Federal University of Maranhão (UFMA) approved the research according to the human research guide-

lines and regulatory standards of Resolutions 466/2012 and 510/2016.

Results

A total of 2,550 leprosy cases were reported to SINAN in Imperatriz during the investigation, and 2,468 cases were considered for the investigation after applying the exclusion criteria (duplication and diagnostic error). Of these, 1,662 (67,34%) were classified as MB and 806 (32,66%) as PB. The prevalence ranged from 7,8 to 15,6 per 10,000 inhabitants over the study period. Prevalence declined over the years until 2014 and remained stable until the end of the analyzed period after that (Figure 1).

The minimum age of the cases was 3 years and the maximum age 97 years, with a mean of 41,3 years, a standard deviation of 19,2, a median of 41, and a mode of 28 years. Comparing sociodemographic characteristics by operational classification, we observed a predominance of MB cases in males (76,43%), age group ≥ 60 years (77,52%), brown (69,54%), schooling <8 years (72,58%), and significant percentages of ignored information on variables such as ethnicity/skin color (68,42%) and education (68,82%) (Table 1).

As for the clinical-epidemiological characteristics of MB cases compared to PB, there was a predominance of other re-entries (90,90%) as entry type, dimorphic clinical type (70,70%), from two to five affected nerves (67,96%), level 2 physical disability (91,36%), type 2 reactional episode (93,33%), more than five registered and examined contacts (67,36% and 72,28%, respectively), urban residents (67,59%) and closure due to cure (68,07%). Significant percentage values of "unknown" data were also observed in the records of MB cases, specifically in variables such as entry type (82,35%), affected nerves (67,30%), physical disability (74,07%), reactional episode (64,34%), number of registered contacts (75,00%), number of contacts examined (71,09%), and exit type (67,74%) (Table 2).

In the crude analysis, the significant associations ($p \leq 0,20$) for the MB operational classification were age groups 30-59 years and ≥ 60 years, male, brown, schooling < 8 years, levels 1 and 2 physical disability, types 1 and 2 reactional episodes and, urban residence area. In the adjusted analysis, the significant associations ($p \leq 0,05$) for the MB type were male, age groups from 30 to 59 years and ≥ 60 years, schooling < 8 years, level

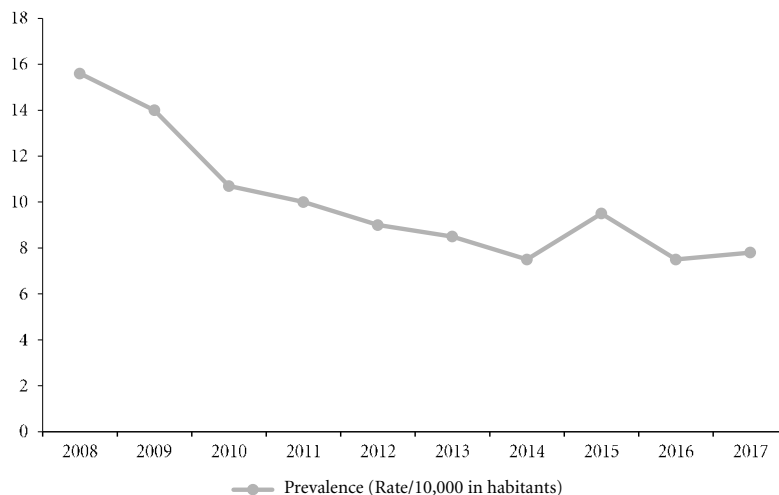


Figure 1. Leprosy prevalence in the city of Imperatriz (MA), Brazil, from 2008 to 2017.

Fonte: SINAN Hanseníase, SVS-UGRSI, Imperatriz-Maranhão, 2019.

Table 1. Sociodemographic characteristics of notified leprosy cases, according to operational classification. Imperatriz (MA). Brazil, 2008 to 2017.

Variables	Operational classification (n=2.468)	
	Paucibacillary (n=806) n (%)	Multi-bacillary (n=1.662) n (%)
Gender		
Female	463 (45,70)	550 (54,30)
Male	343 (23,57)	1.112 (76,43)
Age, years		
<15	98 (47,53)	108 (52,47)
15-29	194 (35,02)	360 (64,98)
30-59	409 (32,90)	834 (67,10)
≥60	105 (22,48)	362 (77,52)
Ethnicity/Skin color		
White	228 (38,00)	372 (62,00)
Black	114 (30,48)	260 (69,52)
Yellow	20 (39,22)	31 (60,78)
Brown	427 (30,46)	975 (69,54)
Indigenous	8 (42,11)	11 (57,89)
Unknown	6 (31,58)	13 (68,42)
Schooling, years		
≥8	335 (41,67)	469 (58,33)
<8	403 (27,41)	1.067 (72,58)
Not applicable	17 (68,00)	8 (32,00)
Unknown	51 (30,18)	118 (68,82)

Source: SINAN Hanseníase, SVS-UGRSI, Imperatriz-Maranhão, 2019.

2 physical disability, type 1 and 2 reactional episodes, and urban residence area (Table 3).

Discussion

A progressive decline was observed in the prevalence of leprosy over the analyzed period, with a maximum value of 15.6 per 10,000 inhabitants in 2008 and a minimum of 7.8 per 10,000 inhabitants in 2016, and the municipality was classified as having high and very high endemicity levels¹⁶, with rates above the elimination target established by the WHO¹⁸. Such findings raise the need for regular analysis of epidemiological and operational indicators to assess the effectiveness of control measures and disease progression¹⁹. The leprosy prevalence rate is an essential indicator to support the formulation of disease control strategies and actions to provide patients with timely treatment, discontinue the transmission chain, and prevent physical disabilities²⁰.

A study conducted by Ribeiro et al.²⁰ revealed a similar national trend of decreasing prevalence from 2005 to 2015, with a heterogeneous distribution among the Brazilian regions, with the North, Northeast, and Midwest regions responsible for the endemic burden the national territory and the managing Maranhão state for the high prevalence rates of the Northeast Region.

Table 2. Clinical and epidemiological characteristics of notified leprosy cases according to operational classification, Imperatriz (MA), Brazil, 2008 to 2017.

Variables	Operational classification (n=2,468)	
	Paucibacillary (n=806)	Multibacillary (n=1.662)
	n (%)	n (%)
Entry type		
New case	755 (37,17)	1.276 (62,83)
Transfers	13 (11,40)	101 (88,60)
Relapse	17 (20,73)	65 (79,27)
Other re-entries	22 (9,10)	220 (90,90)
Unknown	6 (17,65)	28 (82,35)
Clinical form		
Undetermined	337 (41,81)	-
Tuberculoid	469 (58,19)	-
Dimorphous	-	1.175 (70,70)
Virchowian	-	487 (29,30)
Number of affected nerves		
0	312 (34,21)	600 (65,79)
1	75 (32,47)	156 (67,53)
02-05	116 (32,04)	246 (67,96)
>5	38 (32,76)	78 (67,24)
Unknown	277 (32,70)	570 (67,30)
Physical disability		
Zero degree	654 (40,55)	959 (59,45)
Degree 1	57 (13,77)	357 (86,23)
Degree 2	14 (8,64)	148 (91,36)
Not evaluated	74 (29,36)	178 (70,63)
Unknown	7 (25,93)	20 (74,07)

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Table 2. Clinical and epidemiological characteristics of notified leprosy cases according to operational classification, Imperatriz (MA), Brazil, 2008 to 2017.

Variables	Operational classification (n=2,468)	
	Paucibacillary (n=806)	Multibacillary (n=1.662)
	n (%)	n (%)
Reactive episode		
No reaction	178 (29,32)	429 (70,68)
Type 1 reaction	11 (10,28)	96 (89,72)
Type 2 reaction	1 (6,67)	14 (93,33)
Type 1 and 2	3 (15,00)	17 (85,00)
reactions		
Unknown	613 (35,66)	1.106 (64,34)
Number of registered contacts		
≤5	692 (32,72)	1.423 (67,28)
>5	110 (32,64)	227 (67,36)
Unknown	4 (25,00)	12 (75,00)
Number of examined contacts		
≤5	678 (33,61)	1.339 (66,39)
>5	56 (27,72)	146 (72,28)
Unknown	72 (28,91)	177 (71,09)
Residence area		
Rural	30 (40,54)	44 (59,46)
Urban	776 (32,41)	1.618 (67,59)
Exit type		
Cure	636 (31,93)	1.356 (68,07)
Transfers	74 (37,00)	126 (63,00)
Death	5 (38,46)	8 (61,53)
bandonment	51 (36,70)	88 (63,30)
Unknown	40 (32,26)	84 (67,74)

Source: SINAN Hanseníase, SVS-UGRSI, Imperatriz-Maranhão, 2019.

The country's substantial territorial extension and the socioeconomic inequalities between regions explaining such heterogeneity and the most socioeconomically disadvantaged locations were considered of greater endemicity. Implementing PCT and other preventive measures, such as examining contacts and early detection, were listed as positive factors for the reduction²⁰.

The expanded diagnostic network and access to treatment facilitated by the decentralization of leprosy control activities with actions integrated with PHC through the ESF in Brazil is essential for the control of the disease and has been relevant in southern and southeastern settings of the country, which have reached the goal advocated

by the WHO regarding the disease's prevalence indicator¹⁹.

In the Northeast Region, a study investigating the relationship between leprosy and ESF coverage in Paraíba's municipalities indicated that increased ESF coverage contributed significantly to the disease's higher rate of detection, reinforcing that PHC-based services are crucial for the early diagnosis and timely treatment²¹.

In 2008, ESF estimated population coverage was 61,59% in Imperatriz. In 2017, it declined to 58,43%²², below the Brazilian average, 63,91% that year, and with a team composed of a doctor, nurse, nursing technician or assistant and community health workers (ACS), possibly with a

Table 3. Crude and adjusted analysis of sociodemographic and clinical-epidemiological variables associated with clinical types Multibacillary, Imperatriz (MA), Brazil, 2008 to 2017.

Variables	Operational classification – Multibacillary			
	Crude PR (95% CI)	p-value	Adjusted PR (95% CI)	p-value
Age, years				
<15	1		1	
15-29	1,24 (1,08-1,43)	0,083	1,17 (1,00-1,51)	0,091
30-59	1,28 (1,21-1,46)	<0,001	1,60 (1,48-1,81)	<0,001
≥60	1,48 (1,29-1,70)	<0,001	1,72 (1,51-1,99)	<0,001
Gender				
Female	1		1	
Male	1,82 (1,73-1,91)	<0,001	1,97 (1,89-2,07)	<0,001
Ethnicity/Skin color				
White	1		-	-
Black	1,12 (1,02-1,23)	0,110	-	-
Yellow	0,90 (0,78-1,24)	0,899	-	-
Brown	2,12 (2,04-2,26)	0,001	-	-
Indigenous	0,94 (0,63-1,38)	0,749	-	-
Schooling, years				
≥8	1		1	
<8	2,24 (2,12-2,36)	<0,001	2,50 (2,37-2,71)	<0,001
Not applicable	1,05 (0,63-1,75)	0,101	1,15 (0,75-1,88)	0,151
Entry type				
Other re-entries	1		-	-
New case	0,95 (0,88-1,03)	0,100	-	-
Transfers	0,87 (0,77-0,98)	0,228	-	-
Relapse	0,69 (0,64-0,76)	0,257	-	-
Number of affected nerves				
Zero	1		-	-
1	1,02 (0,92-1,13)	0,612	-	-
2-5	1,03 (0,95-1,15)	0,454	-	-
> 5	1,01 (0,89-1,16)	0,752	-	-
Physical disability				
Zero degree	1		1	
Degree 1	1,19 (1,02-1,68)	0,040	1,16 (0,95-1,78)	0,082
Degree 2	1,95 (1,77-2,14)	0,020	2,10 (1,90-2,44)	<0,001
Not evaluated	1,12 (0,93-1,67)	0,070	1,22 (0,98-1,64)	0,090

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linked Oral Health team. Besides this setting, the professional team turnover, the incipient active search actions in children under 15 years of age, and the early detection of cases have favored the maintenance of the epidemiological chain of the disease²³, hindering its elimination and, consequently, favoring underreporting.

Thus, the need to expand the disease diagnostic and monitoring actions emerges in all

ESF teams linked to the municipality's reference center, besides considering improvements in elements, such as the availability of human resources, technical capacity, and sensitivity of the teams and definition of workflows and processes, essential for the control and surveillance of the disease and timely for the qualification of professional practices given the specificities of the territory. ESF professionals also need to improve the

Table 3. Crude and adjusted analysis of sociodemographic and clinical-epidemiological variables associated with clinical types Multibacillary, Imperatriz (MA), Brazil, 2008 to 2017.

Variables	Operational classification – Multibacillary			
	Crude PR (95% CI)	p-value	Adjusted PR (95% CI)	p-value
Reactive episode				
No reaction	1		1	
Type 1	1,32 (1,14-1,53)	<0,001	1,50 (1,19-1,81)	<0,001
Type 2	1,85 (1,70-2,01)	<0,001	2,00 (1,77-2,31)	<0,001
Types 1 and 2	1,17 (0,97-1,45)	0,260	1,28 (0,98-1,42)	0,563
Number of registered contacts				
≤5	1		-	-
>5	0,99 (0,92-1,08)	0,990	-	-
Number of examined contacts				
≤5	1		-	-
>5	1,09 (0,99-1,19)	0,077	-	-
Residence area				
Rural	1		-	-
Urban	1,85 (1,74-1,99)	0,012	2,00 (1,75-2,36)	0,041
Exit type				
Cure	1			
Transfers	1,15 (0,98-1,39)	0,922		
Death	1,01 (0,91-1,22)	0,824	-	-
Abandonment	1,20 (0,99-1,49)	0,221	-	-

PR: Prevalence Ratio; 95% CI: 95% confidence interval.

Source: SINAN Hanseníase, SVS-UGRSI, Imperatriz-Maranhão, 2019.

quality of care offered to users and facilitate the guidance of patients and relatives in treatment, recovery, and self-care.

The ACS are professionals included in the ESF who can actively contribute to leprosy control actions due to their proximity to the population. They are the main executors of the active search for suspected dermatological cases in the population since the home visit is a working tool that builds bonds of trust with families, observes their habits, detects problems, exchanges information, and transmits health guidelines^{24,25}.

Thus, the guidelines provided by ACS during home visits can be the primary strategy to promote and maintain community awareness regarding leprosy²⁵. While not assessing the ACS role in the context of Imperatriz, this investigation raises reflections on the importance of professional training and performance in the fight against leprosy. From this perspective, the active search assumes a hegemonic role because it is a device that allows the early identification of cases

and their increase in the community and identifies patients' abandonment of treatment^{10,11}.

In this study, most reported cases were MB, with a predominance of dimorphs, similar to other studies^{26,27}. This shows a persistent high circulation of the bacillus, which challenges leprosy control, especially for operational reasons, such as early detection, long-term treatment, contact examination, and the disease's social stigma.

A statistically significant association was observed for the gender variable, with a higher occurrence of MB types among men, with almost twice as much occurrence than women. Some authors have pointed out that both leprosy and MB types of the disease are more frequent in men than in women^{28,29}. This predominance is probably linked to greater exposure to work-related activities, low demand for health services, low self-care level, and reduced access to information²⁸.

The low adherence of the male public to health services may be related to the opening hours of the units, which can coincide with the

exercise of work activities⁹, which hinders men's access and permanence at this care level³⁰.

Studies have shown that women tend to attend health services more regularly and are more concerned with healthy habits^{31,32}, which should also be considered regarding gender difference. In this sense, gender must be recognized as a determining factor for the occurrence and greater severity of the disease²⁸, which points to the inevitability of differentiated strategies aimed at the male public, considering the diversity of leprosy's outlook in the country. ESF professionals expanding service opening hours in the setting under investigation could be a strategic alternative for servicing this target audience.

A greater involvement was observed in the age groups 30-59 years (PR=1,60) and ≥ 60 years (PR=1,72), statistically associating with the MB clinical type. Greater possibility of contracting the most bacilliferous types with age is observed, similar to results in other studies^{33,34}. These findings also showed the predominance of leprosy in the economically active age group²⁹ and are very relevant, since the production phase can be drastically interrupted due to the disease's high disabling power.

Low schooling was significantly associated with MB types, and individuals with schooling < 8 years were more susceptible (PR=2,5), agreeing with the result found by Sousa et al.³⁵. Other studies showed a predominance of low schooling level with leprosy cases^{36,37}. An aspect of concern of low schooling is that it is a risk for physical disabilities, since the increased schooling level of individuals tends to decrease the frequency of diagnoses with installed physical disabilities, and illiterate people and people with primary school level are more likely to be diagnosed with disabilities than those with high school education or higher³⁸. In this line of reasoning, the relationship between schooling and leprosy can be explained by a lower level of understanding of the disease's signs and symptoms, hindering treatment and self-care measures, besides this population's difficult access to health services^{39,40}.

Thus, the ESF's health education is an essential factor in determining health^{25,39}, making explicit the paramount importance of expanding public education investments and mitigating socioeconomic inequalities, increasing leprosy control, and improving the living conditions of the population.

In this study, level 2 physical disability was significantly associated with MB clinical types, suggesting a late diagnosis of leprosy, similar to

data from other studies^{26,41-43}. Deficiency, disability, and deformity are the leading causes of the stigma associated with the disease and significantly interfere with the quality of life of leprosy patients⁴⁴. Also, Leano et al.⁴⁰ emphasize that the severity of leprosy is shown in physical disabilities arising from untreated cases, which reduces or eliminates work and subsistence opportunities.

The evidence pointed out in Imperatriz leads to the discussion on achieving the 2016-2020 Global Strategy for Leprosy goals agreed by the WHO, whose fundamental principle was the early detection of all patients before the onset of disabilities⁴⁵. Considering that early detection and reduction of disabilities seem to be related to efficient PHC services^{19,20}, the importance of improving the provision of health services is emphasized concerning access, application of resources, and professional training. Thus, regular training directed to the needs of professionals working in the ESF in Imperatriz is required to offer more qualified care regarding the early detection of leprosy signs and symptoms.

A statistically significant association was identified between type 1 and type 2 reactive episodes and the MB types, with respective PRs of 1,50 and 2,00. A similar result was found by Monteiro et al.⁴⁶ in a study carried out in Tocantins, who recognize that MB cases are risk factors for the development of reactive episodes, which are more frequent in MB cases.

Correlating clinical types and reactive states is extremely important, as these episodes are complications during the disease and the leading causes of disability in these patients^{4,47}. The clinical complications resulting from these interurrences should be avoided by reinforcing the importance of prevention and a specific PCT, which provides new leprosy curative perspectives⁴⁷ without the need to restart it, and they do not contraindicate it⁴.

The urban area showed statistical significance with the MB clinical types. Residents of these spaces were twice as likely to fall ill than rural residents, results that are in line with other studies^{48,49}, in which leprosy cases were identified essentially in urban settings.

The leprosy urbanization process in Brazil has escalated in the last decades, mainly due to the population's unsafe living conditions and the restricted access to collective goods and services. These characteristics are related in the urban space weakened by the high population density and socioeconomic vulnerability, which together determine a general outlook of illness and

death⁵⁰. However, it is essential to highlight that the small number of cases reported in the rural area of the setting under investigation may be related to inequalities in access to health, the lower supply of health services in these areas, and the lower demand for these services by the rural population, when compared to the urban dwellers⁵¹. These factors may result in some notifications below the actual existing value.

A finding that should be highlighted in this study is a large number of “unknown” responses in important information obtained from completing essential and mandatory fields, which means flaws in the notification of the disease or improper feeding, hindering screening and directing appropriate care to the disease carrier. The feeding of the information systems depends directly on the efforts of the municipalities and regions to provide the data³⁴ and the proper completion of the notification form by the ESF professionals involved in patient care.

One of the main limitations of this study is the use of secondary data that often lack information and show inconsistent data. Therefore,

it is necessary to correctly complete the compulsory notification forms with consistent information so that these data provide subsidies for assessing the population's health status and decision-making.

Conclusion

Most patients had the multibacillary clinical type, with greater involvement of the economically active population and a low schooling level. High and very high levels of endemicity were evidenced, which shows that health management and services still fail to control this disease through prevention, management, and curative actions.

Such findings raise the need to strengthen health surveillance actions, especially by the Family Health Strategy professionals linked to the reference center in Imperatriz, focusing on active search and early treatment to reduce physical disabilities and consequent harm to the quality of life of those with this condition.

Collaborators

FC Lopes and M Santos Neto participated in the study design, data analysis and interpretation, writing, paper review, and approval of the final version; ACV Ramos, LM Pascoal, FS Santos, ILTP Rolim, MAAO Serra and LH Santos collaborated in the analysis and interpretation of data, paper review, and approval of the final version.

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