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# LEPROSY CASES WITH PHYSICAL DISABILITY IN NORTHEASTERN BRAZIL

## *CASOS DE HANSENÍASE COM INCAPACIDADE FÍSICA NO NORDESTE BRASILEIRO*

## *CASOS DE LEPRA CON DISCAPACIDAD FÍSICA EN EL NORESTE DE BRASIL*

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**RESUMO**
Analisar o perfil epidemiológico dos novos casos de hanseníase com incapacidade física na Região Nordeste do Brasil entre os anos de 2018 e 2022. Estudo epidemiológico, ecológico, transversal, de natureza descritiva e retrospectiva, com abordagem quantitativa. A amostra foi formada pelos casos de hanseníase diagnosticados com algum grau de incapacidade fisica na Região Nordeste do Brasil, notificados no Sistema de Informação de Agravos de Notificação Compulsória. Foram notificados 13.928 casos de hanseníase com algum grau de incapacidade. Foi observada uma maior prevalência de incapacidades em homens (62,9%), pardos (64,0%), ensino fundamental incompleto (39,6%), com idade entre 50 a 59 anos (20,4%). As variáveis clínicas evidenciaram uma prevalência de casos multibacilares (90,1%), com mais de cinco lesões (47,1%), sem episódio reacional (54,1%) e uso de 12 doses do PQT (88,6%). Os dados demonstraram que o diagnóstico tardio é o principal fator que leva ao aparecimento das incapacidades.
**Descritores:** *Hanseníase; Pessoas com Incapacidades; Saúde Pública; Epidemiologia*.

**ABSTRACT**
To analyze the epidemiological profile of new cases of leprosy with physical disability in the Northeast region of Brazil between 2018 and 2022. Epidemiological, ecological, cross-sectional study of a descriptive and retrospective nature, with a quantitative approach. The sample was formed by leprosy cases diagnosed with some degree of physical disability in the Northeast region of Brazil, reported in the Compulsory Notification Diseases Information System. 13,928 cases of leprosy with some degree of disability were reported. A higher prevalence of disabilities was seen in men (62.9%), mixed race (64.0%), incomplete primary education (39.6%), aged 50 to 59 years (20.4). Clinical variables showed a prevalence of multibacillary cases (90.1%), with more than five lesions (47.1%), without a reactional episode (54.1%) and use of 12 doses of MDT (88.6%). Data demonstrated that late diagnosis is the main factor that leads to the appearance of disabilities.
**Keywords:** *Leprosy; Persons with Disabilities; Public Health; Epidemiology*.

**RESUMEN**
Analizar el perfil epidemiológico de nuevos casos de lepra con discapacidad física en la región Nordeste de Brasil entre los años 2018 y 2022. Estudio epidemiológico, ecológico, transversal, de carácter descriptivo y retrospectivo, con abordaje cuantitativo. La muestra estuvo formada por casos de lepra diagnosticados con algún grado de discapacidad física en la región Nordeste de Brasil, reportados en el Sistema de Información de Enfermedades de Notificación Obligatoria. Se reportaron 13.928 casos de lepra con algún grado de discapacidad. Se observó mayor prevalencia de discapacidad en hombres (62,9%), mestizos (64,0%), educación primaria incompleta (39,6%), de 50 a 59 años (20,4). Las variables clínicas mostraron prevalencia de casos multibacilares (90,1%), con más de cinco lesiones (47,1%), sin episodio reaccional (54,1%) y uso de 12 dosis de MDT (88,6%). Los datos demostraron que el diagnóstico tardío es el principal factor que conduce a la aparición de discapacidades.
**Descriptores:** *Lepra; Personas con Discapacidad; Salud Pública; Epidemiología*.

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## INTRODUCTION

Leprosy is a chronic infectious disease caused by the gram-negative bacterium *Mycbacterium leprae*, also known as Hansen's bacillus[1]. Transmission occurs through the upper airway, when an individual with the transmissible form of the disease (multibacillary), and who has not started treatment, eliminates the bacillus through droplets[2]. In addition, intimate and prolonged contact between the patient and the person susceptible to leprosy is necessary[3].

The disease progresses slowly and progressively, and the incubation period can take from two to seven years[2-4]. Diagnosis is preferably made through physical examination and epidemiological history of the patient[3]. The treatment is carried out through multidrug therapy (MDT), consisting of the association of three drugs, dapsone, clofazimine and rifampicin, and can last from six to twelve months, depending on the operational class presented[4].

Leprosy is a major public health problem and is constantly associated with taboos and stigmas, mainly related to its history[2,5]. One of the main features of the disease is the tropism of the bacillus by peripheral nerves and skin cells, especially Schwann cells, which is the cell responsible for producing the myelin sheath of the Peripheral Nervous System. Due to neural involvement, leprosy has a high potential to generate physical disability [6,7,] being the main cause of physical disability of infectious origin.

The physical disabilities caused by leprosy mainly affect the eyes, hands and feet[6]. At the time of diagnosis, patients are classified according to the Degree of Physical Disability (GIF). GIF is a measure that looks for the occurrence of loss of sensation and/or visible deformity as a result of neurological damage caused by leprosy in the eyes, mothers, and feet[8].

Patients with leprosy can be classified into three levels, Grade 0: no disability found; Grade 1: in the eyes indicates decreased eyelid muscle strength without visible deficiency and/or decreased and/or loss of corneal sensitivity, in the hands and feet indicates decreased muscle strength without visible deficiency and/or change in plantar and/or palmar sensitivity; and Grade 2: in the eyes it indicates visible deficiency such as lagophthalmos, trichiasis and/or decreased visual acuity, while in the hands and feet it is characterized by visible deficiency caused by leprosy, such as muscle atrophy, claws, bone resorption[8,9].

Due to the nature of the lesions, the disabilities generated by leprosy bring data to the social and psychological aspects, in addition to the physical damage[6,9]. The assessment of the degree of physical disability is an important epidemiological tool for the evaluation of leprosy, being an important tool in the evaluation of the precocity of the diagnosis[10], the higher the prevalence of cases with some degree of disability, indicating a delay in early screening of the disease, which influences the continuity of the transmission of the disease.

According to data from the World Health Organization (WHO), in 2022, 174,087 new cases of leprosy were diagnosed worldwide, of which 9,554 had disease-related disability11. Brazil was responsible for 1,917 new cases with disability, which represented 20.1% of the cases worldwide and 91.8% of the American continent, in addition, Brazil was responsible for 91.8% of the total cases in the Americas, with 19,635

new cases[11]. These statistics led the country to be included in the group of priority countries for the disease[11].

The distribution of cases among the regions of Brazil is heterogeneous, with a predominance in the North, Northeast and Midwest regions[9]. Among these, the Northeast region stands out, in 2021 it had the highest prevalence in the diagnosis of new cases of leprosy and in new cases with physical disabilities[7]. The Northeast region is still the main leprosy cluster in Brazil, with three of the five main states with the highest prevalence of the disease.

In this sense, a study[7] points out that it is important for health professionals to know the factors that lead to the development of physical disability, in order to minimize frailties during detection. Even so, studies that address leprosy cases with physical disability in the Northeast region are still very limited. Due to this bias, the objective of this study is to analyze the epidemiological profile of new cases of leprosy with physical disability in the Northeast region of Brazil between 2018 and 2022.

## METHODS

This is an epidemiological, ecological, cross-sectional study of a descriptive and retrospective nature, with a quantitative approach, the epidemiological variables were analyzed in five stages: 1. Elaboration of the problem (cases of leprosy with physical disabilities); 2. Generating sources (Notifiable Diseases Information Systems); 3. Reasoning (public health problem); 4. Variables and hypotheses (delay in diagnosis); and 5. Research development[12].

The guidelines of the Reporting of Studies Conducted Using Observational Routinely-Collected Health Data (RECORD) were followed[13]. The data came from the Notifiable Diseases Information System (SINAN), a database linked to the Department of Informatics of the Unified Health System (DATASUS), which has the function of grouping cases of diseases and conditions of compulsory notification throughout the national territory.

The study was set in the Northeast region of Brazil, which, according to the Brazilian Institute of Geography and Statistics (IBGE), is composed of nine states (Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe), in an area of approximately 1,558,000 km$^2$, with an estimated population of 54,627,621 million inhabitants[14].

All new cases of leprosy with GIF reported in the Northeast region present in SINAN were selected. GIF1 is characterized by the presence of disability resulting from neural involvement, while GIF2 is characterized by the presence of physical disabilities and deformities. To achieve the proposed objective, the following variables were selected: gender, race, education, age group, operating class, clinical form, sputum smear microscopy, reaction episode (type I and type II), therapeutic regimen (MDT/PB/6 doses and MDT/MB/12 doses) and skin lesions. Data collection was performed manually, by a researcher with previous experience accessing the database, in December 2023.

The collected data were tabulated in spreadsheets of the Mycrosoft Officie Excel Program (2019 version). After tabulation, the data were analyzed descriptively through absolute and relative measures, for a better understanding, the data were distributed

through tables. The bibliographic survey was carried out through the following academic research bases: 1. Google Scholar; 2. Virtual Health Library; and 3. Scientific Electronic Library Online. Studies published from 2015 to 2023 were selected.

Because secondary data were used, with free access, where the individuals were not identified, there was no need for approval from the Research Ethics Committee to perform them, according to resolution No. 466/2012, even so, all ethical standards for this type of study were respected[15].

## RESULTS

During the study period, 48,568 new cases of leprosy were diagnosed in the Northeast region of Brazil, of which 13,928 (28.7%) had some level of GIF. Table 1 shows the distribution of cases among the states that make up the Northeast region, the federative units with the highest prevalence values were Maranhão, Pernambuco and Bahia, in all the years evaluated, with a total of 4,436 (31.8%), 2,556 (18.4%) and 2,102 (15.1%), respectively.

**Table 1. Cases of leprosy with degree of physical disability I and II reported in the Northeast region, between the years 2018 and 2022**

| STATE | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | II | I | II | I | II | I | II | I | II | N (%) |
| Alagoas | 88 | 25 | 64 | 24 | 41 | 19 | 81 | 23 | 74 | 35 | **474 (3,4)** |
| Bahia | 368 | 136 | 345 | 140 | 236 | 97 | 249 | 108 | 313 | 110 | **2.102 (15,1)** |
| Ceara | 328 | 151 | 288 | 142 | 230 | 88 | 234 | 117 | 193 | 99 | **1.870 (13,4)** |
| Maranhao | 760 | 210 | 914 | 222 | 534 | 136 | 543 | 169 | 767 | 181 | **4.436 (31,8)** |
| Paraiba | 108 | 50 | 102 | 47 | 56 | 24 | 89 | 36 | 82 | 26 | **620 (4,5)** |
| Pernambuco | 360 | 128 | 455 | 173 | 322 | 111 | 337 | 118 | 406 | 146 | **2.556 (18,4)** |
| Piaui | 198 | 68 | 191 | 45 | 99 | 40 | 174 | 62 | 218 | 61 | **1.156 (8,3)** |
| Rio Grande do Norte | 64 | 20 | 46 | 17 | 38 | 18 | 43 | 15 | 39 | 14 | **314 (2,3)** |
| Sergipe | 59 | 26 | 63 | 28 | 44 | 20 | 54 | 21 | 71 | 14 | **400 (2,9)** |
| **TOTAL** | **2.333** | **844** | **2.468** | **838** | **1.600** | **553** | **1.804** | **669** | **2.163** | **686** | **13.928 (100)** |

**Source:** Authors, 2023. According to data collected from SINAN/DATASUS // **Legend: I –** Degree of Physical Disability I;**II –** Degree of Physical Disability II

The socioeconomic variables are presented in Table 2, when analyzing the data, a higher prevalence of disabilities is seen in men (62.9%), brown individuals (64.0%), with incomplete primary education (39.6%), aged 50 to 59 years (20.4), followed by individuals aged 40 to 49 (18.6%).

**Table 2. Leprosy cases with degree of physical disability I and II reported in the Northeast region, between 2018 and 2022, according to socioeconomic variables**

| VARIABLES | I | | II | | TOTAL | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| **SEX** | | | | | | |
| Ignored | - | - | 1 | 0,0 | **1** | **0,0** |
| Male | 6.237 | 60,2 | 2.528 | 71,0 | **8.765** | **62,9** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Female | 4.131 | 39,8 | 1.031 | 29,0 | **5.162** | **37,1** |
| **RACE** | | | | | | |
| Ignored/White | 417 | 4,0 | 188 | 5,3 | **605** | **4,3** |
| White | 1.631 | 15,7 | 584 | 16,4 | **2.215** | **15,9** |
| Black | 1.548 | 14,9 | 498 | 14,0 | **2.046** | **14,7** |
| Yellow | 78 | 0,8 | 29 | 0,8 | **107** | **0,8** |
| Curtain | 6.661 | 64,2 | 2.249 | 63,2 | **8.910** | **64,0** |
| Indigenous | 33 | 0,3 | 12 | 0,3 | **45** | **0,3** |
| **SCHOOLING** | | | | | | |
| Ignored/White | 2.296 | 22,1 | 898 | 25,2 | **3.194** | **22,9** |
| Illiterate | 1.363 | 13,1 | 585 | 16,4 | **1.948** | **14,0** |
| EFIC | 4.103 | 39,6 | 1.345 | 37,8 | **5.448** | **39,1** |
| EFC | 526 | 5,1 | 166 | 4,7 | **692** | **5,0** |
| EMIC | 520 | 5,0 | 176 | 4,9 | **696** | **5,0** |
| EMC | 1.156 | 11,1 | 297 | 8,3 | **1.453** | **10,4** |
| ESIC | 106 | 1,0 | 28 | 0,8 | **134** | **1,0** |
| ESC | 284 | 2,7 | 62 | 1,7 | **346** | **2,5** |
| Not applicable | 14 | 0,1 | 3 | 0,1 | **17** | **0,1** |
| **AGE GROUP** | | | | | | |
| 1 to 4 years | 6 | 0,1 | 1 | 0,0 | **7** | **0,1** |
| 5 to 9 years | 57 | 0,5 | 18 | 0,5 | **75** | **0,5** |
| 10 to 14 years | 267 | 2,6 | 74 | 2,1 | **341** | **2,4** |
| 15 to 19 years old | 333 | 3,2 | 134 | 3,8 | **467** | **3,4** |
| 20 to 29 years old | 850 | 8,2 | 289 | 8,1 | **1.139** | **8,2** |
| 30 to 39 years old | 1.317 | 12,7 | 385 | 10,8 | **1.702** | **12,2** |
| 40 to 49 years old | 1.952 | 18,8 | 549 | 15,4 | **2.501** | **18,0** |
| 50 to 59 years old | 2.099 | 20,2 | 743 | 20,9 | **2.842** | **20,4** |
| 60 to 69 years old | 1.906 | 18,4 | 684 | 19,2 | **2.590** | **18,6** |
| 70 to 79 years old | 1.148 | 11,1 | 464 | 13,0 | **1.612** | **11,6** |
| 80< | 433 | 4,2 | 219 | 6,2 | **652** | **4,7** |
| **TOTAL** | **10.368** | **100** | **3.560** | **100** | **13.928** | **100** |

**Source:** Authors, 2023. According to data collected from SINAN/DATASUS // **Legend: I –** Degree of Physical Disability I;**II** – Degree of Physical Disability II; **EFIC** – Incomplete Elementary School; **EFC** – Complete Elementary School; **EMIC** – Incomplete High School; **EMC** – Complete High School; **ESIC** – Incomplete Higher Education; **ESC** – Complete Higher Education

Table 3 shows the clinical variables, showing a higher prevalence of cases of multibacillary operating class (90.1%), of dimorphic clinical form (51.5%), without reaction episode (54.2%), multibacillary therapeutic regimen in 12 doses (88.6%), with more than 5 skin lesions (47.1%), in addition, a deficiency of notification is seen in the variable sputum smear microscopy, where 58.0% of the cases were reported as unknown/blank.

**Table 3.** Leprosy cases with physical disability I and II reported in the Northeast region, between 2018 and 2022, according to clinical variables

| VARIABLES | I | | II | | TOTAL | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| **OPERATIONAL RATING** | | | | | | |
| Paucibacilar | 1.214 | 11,7 | 168 | 4,7 | **1.382** | **9,9** |
| Multibacillary | 9.154 | 88,3 | 3.392 | 95,3 | **12.546** | **90,1** |
| **CLINICAL FORM** | | | | | | |
| Ignored/White | 336 | 3,2 | 139 | 3,9 | **475** | **3,4** |
| Undetermined | 737 | 7,1 | 95 | 2,7 | **832** | **6,0** |
| Tuberculoid | 798 | 7,7 | 140 | 3,9 | **938** | **6,7** |
| Dimorph | 5.464 | 52,7 | 1.703 | 47,8 | **7.167** | **51,5** |
| Virchowiana | 2.310 | 22,3 | 1.121 | 31,5 | **3.431** | **24,6** |
| Not classified | 723 | 7,0 | 362 | 10,2 | **1.085** | **7,8** |
| **BASCOPYING** | | | | | | |
| Ignored/White | 6.006 | 57,9 | 2.077 | 58,3 | **8.083** | **58,0** |
| Positive | 1.398 | 13,5 | 483 | 13,6 | **1.881** | **13,5** |
| Negative | 1.317 | 12,7 | 448 | 12,6 | **1.765** | **12,7** |
| Not carried out | 1.647 | 15,9 | 552 | 15,5 | **2.199** | **15,8** |
| **REACTION EPISODE** | | | | | | |
| Unfilled | 3.033 | 29,3 | 1.111 | 31,2 | **4.144** | **29,8** |
| Type I reaction | 1.167 | 11,3 | 440 | 12,4 | **1.607** | **11,5** |
| Type II reaction | 291 | 2,8 | 155 | 4,4 | **446** | **3,2** |
| Type I and II reaction | 136 | 1,3 | 52 | 1,5 | **188** | **1,3** |
| No reaction | 5.741 | 55,4 | 1.802 | 50,6 | **7.543** | **54,2** |
| **THERAPEUTIC ESQUEMA** | | | | | | |
| Ignored/White | 27 | 0,3 | 3 | 0,1 | **30** | **0,2** |
| PQT/PB/6 doses | 1.196 | 11,5 | 166 | 4,7 | **1.362** | **9,8** |
| PQT/MB/12 doses | 9.009 | 86,9 | 3.330 | 93,5 | **12.339** | **88,6** |
| Other schemes | 136 | 1,3 | 61 | 1,7 | **197** | **1,4** |
| **SKIN LESIONS** | | | | | | |
| 0 or not informed | 1.469 | 14,2 | 775 | 21,8 | **2.244** | **16,1** |
| Single lesion | 1.270 | 12,2 | 236 | 6,6 | **1.506** | **10,8** |
| 2-5 injuries | 2.793 | 26,9 | 830 | 23,3 | **3.623** | **26,0** |
| 5< Injuries | 4.836 | 46,6 | 1.719 | 48,3 | **6.555** | **47,1** |
| **TOTAL** | **10.368** | **100** | **3.560** | **100** | **13.928** | **100** |

**Source:** Authors, 2023. According to data collected from SINAN/DATASUS // **Legend: I –** Degree of Physical Disability I;**II –** Degree of Physical Disability II

## DISCUSSION

Based on the results achieved, it was possible to raise an epidemiological overview of leprosy cases in the Northeast region. Despite leprosy control programs, leprosy is still a major public health problem in Brazil, being the only country in the world that has not yet reached the elimination target, based on less than 1 case per 10,000 inhabitants[5,7].

The present study showed that about one third of the reported cases had some GIF, a characteristic similar to other studies in the literature[3,7,9,16]. This characteristic indicates that the diagnosis is occurring late, demonstrating the existence of a hidden prevalence of the disease and the permanence of undiagnosed, potentially transmissible cases in the social environment[7,16]. The proportion of new cases with GIF 2 has been used as a tool in the evaluation of the early detection of leprosy cases, and the present study presented a parameter considered medium (8.2%), according to the parameters recommended by the Ministry of Health (MH)[17].

Studies[7,18-20] indicate that this characteristic may be associated with the lack of knowledge of primary care professionals about leprosy, especially in aspects related to signs, symptoms and diagnostic methods, leading to delays in diagnosis and in the beginning of treatment, leading to the appearance of disabilities. The drop observed between 2020 and 2021 may not lead to reality, since the pandemic caused by the new coronavirus significantly affected the diagnosis of new cases.

The present study showed a higher proportion of cases in males, a characteristic similar to other studies in the literature[7,20,21]. Leprosy is a condition that becomes more relevant in the male public, according to data from the 2018 epidemiological bulletin, the proportion in men was 15,17 cases per one million inhabitants, while in women it was only 6.0721. From this perspective, because they are more affected, men have a higher risk of disability due to leprosy[9].

There is also the fact that men seek health services only when disability appears[9]. This characteristic may also be a reflection of women's lower resistance to seeking health services, which are often diagnosed at the beginning of the disease[18], in this perspective, another study[16] showed that the presence of more advanced forms in men (potentially more limiting) is associated with the fragility of health services in the face of leprosy and the peculiarities of men's health.

Studies[7,9,22,23] show an association between the development of physical disability and a lower level of education, a thesis confirmed by the present study. The connection between education and the presence of disabilities is perhaps due to the role of education in helping to understand the health-disease process, contributing to the timely search for care in health services and later early diagnosis[22]. Due to this bias, according to data from the IBGE and the 2022 Continuous National Household Sample Survey (PNAD), the Northeast region has the highest illiteracy rate and the lowest in average years of schooling, compared to the other regions[24]. A study[7] indicates that this type of finding suggests the need for continuous health education.

It was possible to verify a higher prevalence of cases in brown individuals, an occurrence confirmed by other studies present in the literature[3,25]. In the scientific literature, there is still a lack of studies that address race in relation to GIF, however, this

characteristic may be a result of racial miscegenation in Brazilian society and the high percentage of people who declare themselves black or brown, who in the Northeast region, according to data from IBGE and PNAD, form about 73.9% of the population[24], In addition, this population group is more vulnerable to social inequalities due to the historical context of the black population in Brazil, and is therefore more vulnerable to contracting leprosy and late diagnosis[18].

Regarding the age group, there was a higher frequency of individuals aged 40 to 59 years, together adding up to about 40% of the cases. Other studies also present characteristics similar to those found in the present study[3,7,9,23,25]. Leprosy can affect all age groups, however, it is more frequent in individuals in the economically active range, mainly due to the long period between infection by the bacillus and the onset of symptoms18. The appearance of leprosy in this age group may still indicate that individuals may have been presenting symptoms for a certain time, however, without a diagnosis[9].

Studies indicate that disabilities resulting from leprosy in economically active individuals can lead to psychosocial problems, especially in issues related to obtaining and/or maintaining employment relationships[16]. The present study showed that cases in adolescents accounted for about 3% of the disabilities, a positive finding, since other studies have shown a higher rate than the one presented[7,9]. The occurrence of leprosy in children under 15 years of age is an important epidemiological marker, since due to the incubation period of the bacillus, it indicates that there was an early intimate contact with the bacillus, thus demonstrating endemic regions for leprosy.

Individuals under 15 years of age are increasingly affected by leprosy due to the increase in cases of the disease in the population[18], however, in a study carried out in the northern region of Brazil, it was seen that in 73.2% of the cases there was a delay of one year in diagnosis, 63.4% received another diagnosis and 46.3% were evaluated by 3 or more physicians to be diagnosed[26]. This fact is due to the difficulty in the application of dermatoneurological tests by health professionals and the lack of knowledge about the signs and symptoms of leprosy in children under 15 years of age, which contributes to the late diagnosis and subsequent appearance of disabilities[27].

It was observed that a significant portion of the cases were of the multibacillary operating class, also having their characteristic clinical forms, dimorphic and virchowian, in higher prevalence, a characteristic similar to other studies[20,23,25]. These are considered more advanced and severe stages of leprosy, as they are more susceptible to causing neural damage, consequently they have a greater potential to lead to disabilities[23], with a risk twice as high as that of a paucibacillary patient[25]. The higher prevalence of multibacillary cases points to areas with high dissemination of leprosy, as well as the occurrence of late diagnosis[21].

Multibacillary individuals are also characterized by having a higher burden of bacilli, in addition to presenting immunological instabilities against them, increasing the possibility of neural damage and, consequently, the appearance of disabilities[28]. A higher prevalence of multibacillary cases requires further investigation in aspects such as detection, follow-up and evaluation of GIF, since multibacillary patients are more prone to the development of leprosy reactions, which contribute to the onset of disabilities[7,8].

Leprosy reactions are characterized by a strong reaction of the immune system against the bacillus, generating an intense acute inflammatory process, which can be classified as type I (reverse) or type II (erythema nodosum leprosum)[8,28]. It was evidenced that only a small portion had reactions at the time of diagnosis, data similar to those of another study[29], confirming the fact that leprosy reactions occur more frequently at the end of or after treatment[8]. The higher proportion of multibacillary cases (dimorphic and virchowian) presented in the present study may predispose to the onset of reactions, since a previous study indicated that 91.80% of the reactions occurred at this stage of leprosy, as well as linking it to the occurrence of disabilities, being present in 52.45% of them[29].

Despite the low association of reactions with disabilities (16.0%), compared to the aforementioned study, 29.8% of the cases were not filled out, which makes it difficult to analyze the real impact of reactions on the generation of disability. However, the fact that GIF II cases present the greatest relationship with reactions (18.3%) compared to patients with GIF I (15.4%) may be a finding that associates the appearance of disabilities with reactions in the Northeast region.

Most individuals had an average of more than five lesions, which is consistent with other studies[7,23]. The number of lesions is an important factor for the direction of treatment, with patients with less than five lesions (paucibacillary) being indicated for the use of 6 doses, and those with more than five (multibacillary) for 12 doses of MDT, one every month[8]. As in other studies[21,23], most patients were referred to the use of MDT/MB in 12 doses. These specificities are not directly related to the onset of disability, but expose the occurrence of delays in diagnosis, leading to the appearance of disabling forms of the diseases[23].

From this point of view, a study[23] pointed out that patients with only a single lesion may contain high bacilli loads, consequently changing the operational classification and/or generating disabilities, even in the paucibacillary form. The diagnosis of leprosy is essentially based on the patient's clinical condition, and when available, it can be associated with ancillary tests, such as sputum smear microscopy[8].

Sputum smear microscopy is a test with high specificity, but it has low sensitivity, and in about 70% of cases they present negative results[23]. As in the results presented, it is similar to other studies that show a slightly higher percentage of positive results in patients with disabilities[7,23]. However, when positive sputum smear microscopy is associated with multibacillary operational classification, more than five lesions and affected nerves effectively contribute to the onset of disabilities[7]. It is also observed that in approximately 73.8% of the sputum smear microscopy was not performed or reported as unknown/blank, which may be the result of the fact that it is not mandatory[23], but it may also be the result of lack of training, little availability of time, low knowledge about leprosy and the high turnover of Primary Health Careprofessionals[30].

Due to the fact that leprosy is a disease whose treatment is mostly carried out in the public sector, with low technology for diagnosis and treatment, and an extremely low number of deaths, it does not receive the necessary priority by the health sector[23], even so, the results provided the understanding that disabilities are one of its challenges.

## CONCLUSION

As this is a study with the use of secondary data, they have certain limitations, the main ones being based on the ecological fallacy, underreporting and deficiency in filling out the notification form and subsequent notification in SINAN. In spite of this, it was possible to efficiently survey the profile of patients with disabilities due to leprosy in the Northeast region of Brazil, and the main aspects that surround them.

It is evident that the group with the highest disability due to leprosy in the Northeast region is composed of males, aged 40 to 59, brown, with low schooling. The clinical variables showed a prevalence of the multibacillary operating class and its clinical forms, with more than five lesions, without reactive episodes, referred for 12 doses of MDT, with sputum smear microscopy presenting a high rate of deficiency in reporting.

The data also showed that late diagnosis is the main factor that leads to the appearance of disabilities, thus, it is important that early diagnosis is made, based mainly on the main aspects that lead to disability. It is hoped that this study will serve as a subsidy instrument for future research, as well as for the adoption of public policies for the reduction of leprosy and its effects on individuals.

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