PUBLICAÇÃO OFICIAL DO NÚCLEO HOSPITALAR DE EPIDEMIOLOGIA DO HOSPITAL SANTA CRUZ E PROGRAMA
DE PÓS GRADUAÇÃO EM PROMOÇÃO DA SAÚDE - DEPARTAMENTO DE BIOLOGIA E FARMÁCIA DA UNISC

Revista de Epidemiologia e Controle de Infecção

Hospital Santa Cruz

ORIGINAL ARTICLE

Analysis of leprosy cases in the state of Pará between 2001 and 2020

Análise dos casos de hanseníase no estado do Pará entre 2001 e 2020

Análisis de los casos de lepra en el estado de Pará entre 2001 y 2020

https://doi.org/10.17058/reci.v14i2.18997

Received: *12/07/2023*
Accepted: *04/12/2024*
Available online: *5/21/2024*

Corresponding Author:
Lyncoln Eduardo Alves Silva
lyncoln.easilva@aluno.uepa.br

Address: Travessa Coronel Manoel Bandeira, Quadra 27, Lote 04, Bairro Liberdade, Marabá, Pará, Brasil, CEP: 68501020.

Lyncoln Eduardo Alves Silva[1];
Ewerton Lima da Silva[1];
Dyana Melkys Borges da Silva[1];
João Claudio Paes Magno[1];
Amanda Araujo Pereira[1];
Athos Costa Pedroza[1];

[1] *Universidade do Estado do Pará. Marabá, PA, Brasil.*

ABSTRACT

Background and Objectives: leprosy is a mycobacteriosis known for centuries and prevalent to this day and, despite the reduction in the number of cases, it still affects many Brazilians. To this end, this study aimed to assess the clinical forms of leprosy in the state of Pará between 2001 and 2020. **Methods:** an ecological study was carried out using data from the Notifiable Diseases Information System (SINAN) of patients with leprosy according to three classifications, such as notified clinical form, notified operational classification and notified degree of disability, collected between 2001 and 2020. **Results:** the milder forms of leprosy showed a greater decrease than the more severe form, combined with a greater drop in cases in the paucibacillary class compared to the multibacillary classification. Furthermore, grade zero disability showed a large reduction in cases, in contrast to grades one and two, which remained stationary. **Conclusion:** despite the evident decrease in leprosy in the state, the most serious forms of the disease, which are related to higher levels of disability and transmission, showed little reduction.

Keywords: *Leprosy. Health Information Systems. Epidemiology. Paucibacillary Leprosy. Multibacillary Leprosy.*

RESUMO

Justificativa e Objetivos: a hanseníase é uma micobacteriose conhecida há séculos e prevalente até os dias atuais e, apesar da diminuição dos números de casos, ainda atinge diversos brasileiros. Para tanto, este estudo tem como objetivo avaliar as formas clínicas da hanseníase no estado do Pará entre 2001 e 2020. **Métodos:** foi realizado estudo ecológico a partir de dados do Sistema de Informação de Agravos de Notificação (SINAN) de pacientes com hanseníase de acordo com três classificações, como forma clínica notificada, classificação operacional notificada, e grau de incapacidade notificado, coletados entre os anos de 2001 e 2020. **Resultados:** as formas mais brandas da hanseníase tiveram um decrescimento maior do que a forma mais grave, aliado a uma maior queda dos casos da classe paucibacilar em comparação com a classificação multibacilar. Além disso, o grau zero de incapacidade apresentou

Please cite this article as: *Silva LEA, da Silva EL, da Silva DMB, Magno JCP, Pedroza AC, Pereira AA. Análise dos casos de hanseníase no estado do Pará entre 2001 e 2020. Rev Epidemiol Control Infect [Internet]. 12º de julho de 2024 [citado 19º de agosto de 2024];14(2). Disponível em: https://online.unisc.br/seer/index.php/epidemiologia/article/view/18997*

grande redução dos casos, em contraste aos graus um e dois, que se mantiveram estacionários. **Conclusão:** apesar do decréscimo evidente da hanseníase no estado, as formas mais graves da doença, que estão relacionadas a maiores níveis de incapacidade e transmissão, apresentaram pouca redução.

Descritores: *Hanseníase. Sistemas de Informação em Saúde. Epidemiologia. Hanseníase Paucibacilar. Hanseníase Multibacilar.*

RESUMEN

Justificación y Objetivos: la lepra es una micobacteriosis conocida desde hace siglos y prevalente hasta el día de hoy y, a pesar de la reducción del número de casos, todavía afecta a muchos brasileños. Para ello, este estudio tiene como objetivo evaluar las formas clínicas de lepra en el estado de Pará entre 2001 y 2020. **Métodos:** se realizó un estudio ecológico utilizando datos del Sistema de Información de Enfermedades de Declaración Obligatoria (SINAN) de pacientes con lepra según tres clasificaciones, tales como forma clínica notificada, clasificación operativa notificada y grado de invalidez notificado, recopiladas entre 2001 y 2020. **Resultados:** las formas más leves de lepra tuvieron una disminución mayor que la forma más grave, combinado con una mayor caída de casos en la clase paucibacilar, en comparación con la clasificación multibacilar. Además, la discapacidad de grado cero mostró una gran reducción de casos, en contraste con los grados uno y dos, que se mantuvieron estacionarios. **Conclusiones:** a pesar de la evidente disminución de la lepra en el estado, las formas más graves de la enfermedad, que se relacionan con mayores niveles de discapacidad y transmisión, mostraron poca reducción.

Palabras Clave: *Lepra. Sistemas de Información en Salud. Epidemiología. Lepra Paucibacilar. Lepra Multibacilar.*

INTRODUCTION

Leprosy is an infectious disease caused by the etiological agent *Mycobacterium leprae*, which mainly affects the skin and peripheral nerves, causing deformities and morphofunctional disabilities with relevant social, emotional and psychological repercussions for individuals affected by the pathology. In Brazil, it presents itself as an endemic, neglected disease, with unequal distribution linked to the condition of poverty, which maintains this ancient disease as a public health concern, especially in the North, Northeast and Midwest regions.[1-4]

Despite these general characteristics, leprosy has different clinical forms that are classified according to paucibacillary (PB) (presence of a low number of bacilli and lesions on the skin) and multibacillary (MB) characters (presence of a high number of bacilli and lesions on the skin), according to the Monitoring and Evaluation Guide, published by the World Health Organization. Within the spectrum of PB clinical forms, the initial type of the disease is indeterminate leprosy, characterized by hypochromic or erythematous-hypochromic macules, without variations in relief, with poorly defined limits and decreased local sensitivity (hypoesthesia). There is also the tuberculoid form at a milder end, characterized by skin lesions in plaques with well-defined, elevated, papular edges and recurrent hypoesthesia. There are MB forms, which can be moderate, such as dimorphic leprosy, which is characterized by a variable clinical presentation, with symptoms ranging from the mildest to the most severe. Finally, at the most serious end, there is Virchowian leprosy, with a high bacterial load, in which individuals present dry, red skin, papules, nodules, madarosis, cramps, tingling and loss of sensitivity.[2,5-6]

A diagnosis of leprosy can be made based mainly on clinical criteria, analyzing the presence of the main signs and symptoms characteristic of the disease, such as loss of local sensitivity, total or partial hair loss, presence of spots, papules and nodules. Furthermore, there may be a need to perform a histopathological and bacilloscopic examination, when clinical examinations alone do not make it possible to determine a final diagnosis. This exam consists of an intradermal scraping, used as a complement, to analyze cases of PB and MB leprosy. In this exam, the presence of bacilli in the tissue sample is verified, provided that *Mycobacterium leprae* is present in the sample, which may result in a positive sputum smear microscopy, common in MB types, whereas the opposite is characteristic of the PB form, with a negative smear microscopy.[2]

After diagnosing leprosy, it is necessary to assess patients' degree of disability, based on some criteria, based on the Eyes, Hands, Feet (EHF) score. In general, this assessment must be carried out at the time of diagnosis and after patients progress to cure. The final score is calculated from the sum of the grades of disability attributed to the right and left segments of EHF, varying on a scale from 0 (no loss of disability) to 12 (the highest grade of impairment of patients). This assessment makes it possible to analyze the loss of protective sensitivity as a consequence of a possible neural injury and serve as an epidemiological indicator used to assess the leprosy surveillance program in the country.[2]

In Brazil, many healthcare professionals have little periodic training for managing and diagnosing the different forms of leprosy. Thus, even with the availability of these complementary tests, the correlation of results

Please cite this article as: *Silva LEA, da Silva EL, da Silva DMB, Magno JCP, Pedroza AC, Pereira AA. Análise dos casos de hanseníase no estado do Pará entre 2001 e 2020. Rev Epidemiol Control Infect [Internet]. 12º de julho de 2024 [citado 19º de agosto de 2024];14(2). Disponível em: https://online.unisc.br/seer/index.php/epidemiologia/article/view/18997*

with observed clinical signs becomes nonspecific and subjective, generalizing the diagnosis and classifying the type of disease only when there are very evident signs. Therefore, there is a need to understand the clinical forms of leprosy, which is an essential factor in the effective intervention of health actions to combat the progression and transmission of the disease in northern Brazil. Therefore, this study aims to assess the evolution of clinical forms of leprosy in the state of Pará between 2001 and 2020, with the purpose of presenting relevant information on the subject to the scientific community and healthcare professionals. Furthermore, the aim is to verify the prevalence of the disease, comparing its temporal progression with that of other locations, in addition to interpreting and indicating the implications that result from the epidemiological overview found in that state.[2,7] Therefore, this work is justified by the need to analyze the persistence of leprosy in its most serious forms in the state of Pará, which are related to higher levels of disability and transmission.

METHODS

This is an ecological study that used data made available by the Brazilian Health System Information Technology Department (DATASUS - *Departamento de Informática do Sistema Único de Saúde*) and e-SUS Primary Care (e-SUS AB - *e-SUS Atenção Básica*) in the category of the Notifiable Diseases Information System (SINAN - *Sistema de Informação de Agravos de Notificação*). The study was carried out in the state of Pará, which has a population of 8,074 million inhabitants and is 1,248,000 km² in length. New cases of patients reported with a diagnosis of leprosy in this state between 2001 and 2020 were considered.

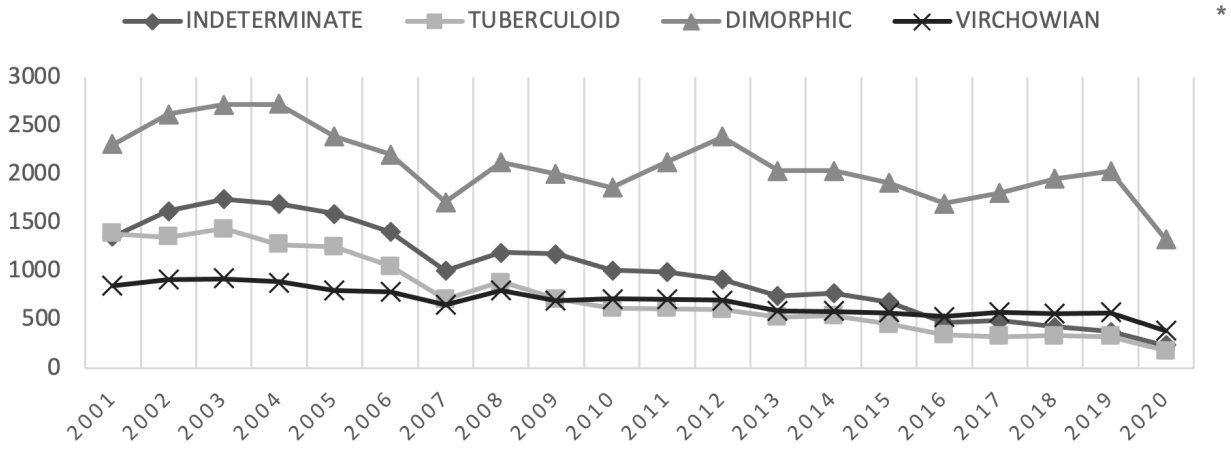
The data collected in DATASUS were acquired following the tabs "Health Information (Tabnet)", "Epidemiological and morbidity", in the group "Tuberculosis Cases "Leprosy Cases - since 2001 (Sinan)", with geographic coverage being the state of Pará. On the Tabnet 3.0 page, notified cases of leprosy were collected according to the municipality of residence, according to classifications: notified clinical form; notified operational classification; and notified degree of disability. As an inclusion criterion, cases reported and tabulated by date of diagnosis in the state of Pará that were diagnosed in 2001 and 2020 were used. As an exclusion criterion, the elimination of incomplete notifications was adopted.

Data were extracted in July 2022 and grouped in Excel 2016® software. After extraction, the data were analyzed by IBM SPSS Statistics 21® software, using the simple linear regression model, expressed in R^2, which means how much the dependent variable (number of cases) is explained by the independent variable (year of notification), with the maximum being 1, the highest association, and the minimum 0, the lowest association between the variables. In addition, the percentage variation (Δ) was calculated, calculated from the equation (*Final value −Initial value/Initial value*) *x* 100, which means, in percentage, the change in the number of cases between the years assessed. Only results with a p-value > 0.05 were considered significant, ensuring high statistical reliability. This criterion ensures that conclusions based on the results are robust and representative of the study population. To better visualize the data, Excel 2016® was used to create the graphs.

As it is information in the public domain, the study was not submitted for assessment by the Research Ethics Committee (REC), in accordance with CNS Resolution 510 of 2016, article 2, VI.

RESULTS

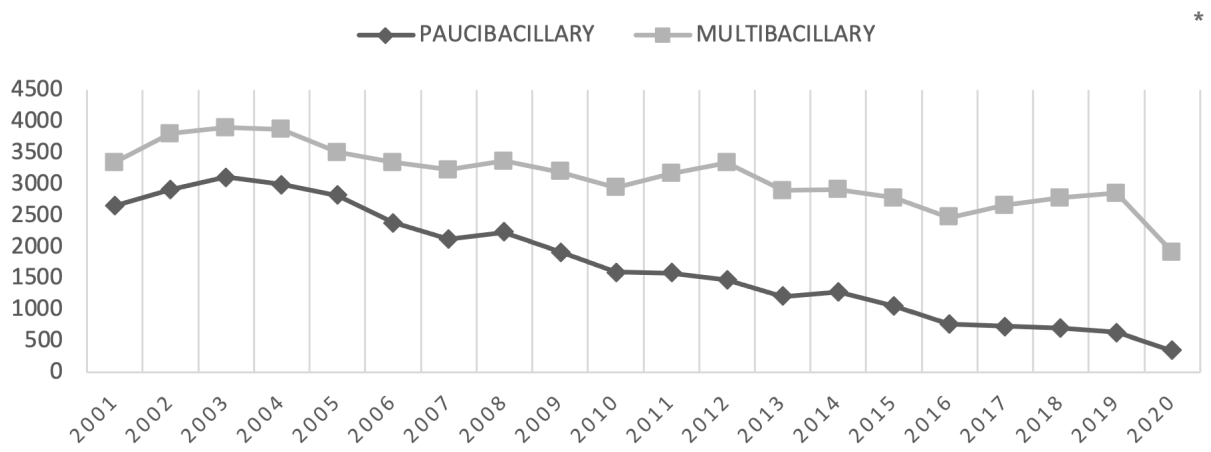
From 2001 to 2020, 99,205 cases of leprosy were recorded in Pará. The highest frequency was recorded in 2003 (n= 7,053), and the lowest, in 2020 (n = 2,277). The results indicated a decrease over the years in the detection rate of the disease, with a greater decrease in the indeterminate (R^2= 0.92; Δ= -0.83) and tuberculoid (R^2= 0.93; Δ= -0 .87) clinical forms instead of the dimorphic (R^2= 0.52; Δ= -0.42) and Virchowian (R^2= 0.87; Δ= -0.55) forms, which showed a smaller drop in the period, as indicated in Figure 1.



** p < 0.05*
Source: own elaboration.

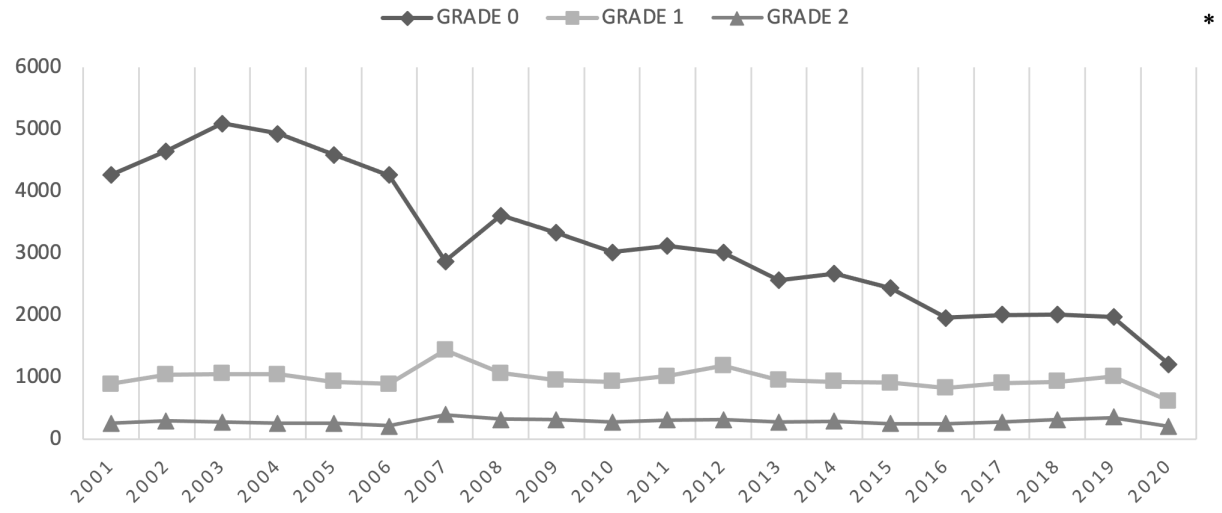
Figure 1. New cases of leprosy according to clinical form in the state of Pará from 2001 to 2020.

Please cite this article as: *Silva LEA, da Silva EL, da Silva DMB, Magno JCP, Pedroza AC, Pereira AA. Análise dos casos de hanseníase no estado do Pará entre 2001 e 2020. Rev Epidemiol Control Infect [Internet]. 12º de julho de 2024 [citado 19º de agosto de 2024];14(2). Disponível em: https://online.unisc.br/seer/index.php/epidemiologia/article/view/18997*



** p < 0.05*
Source: own elaboration.

Figure 2. New cases of leprosy according to the operational classification in the state of Pará from 2001 to 2020.



** p < 0.05*
Source: own elaboration.

Figure 3. New cases of leprosy according to the degree of disability in the state of Pará from 2021 to 2020.

As for distribution according to operational classification, the annual numbers of MB cases were higher than those of PB throughout the assessed period. Furthermore, a greater reduction was identified in PB form (R^2= 0.96; Δ= -87%) when compared to MB form (R^2= 0.77; Δ= -43%), although both modalities have a decreasing incidence, as seen in Figure 2. In relation to the grade of disability assessed, grade zero was the most prevalent and also had the greatest decline (R^2= 0.90; Δ= -72%); however, grades one and two showed inconsistent values and were not considered significant as they resulted in a p > 0.05, and were therefore considered stationary. These findings were summarized in Figure 3.

DISCUSSION

The drop in detection of new cases of leprosy in Pará, during the time interval assessed, suggests a reduction in the dimensions and strength of this endemic. This projection was also confirmed in studies carried out in the municipality of Sobral-CE and in the states of Alagoas, Amapá, Tocantins and Goiás, covering the last two decades. These indices are important for continuous monitoring of the elimination of leprosy as a public health concern; however, they should not be used in isolation, and need to be accompanied by other indicators, such as the number of cases in children under 15 years of age, to avoid possible misinterpretations, especially in endemic regions.[8-13]

Please cite this article as: *Silva LEA, da Silva EL, da Silva DMB, Magno JCP, Pedroza AC, Pereira AA. Análise dos casos de hanseníase no estado do Pará entre 2001 e 2020. Rev Epidemiol Control Infect [Internet]. 12º de julho de 2024 [citado 19º de agosto de 2024];14(2). Disponível em: https://online.unisc.br/seer/index.php/epidemiologia/article/view/18997*

In this context, due to the long incubation period and the difficult control of leprosy, reduced detection may result in a lack of adequate diagnosis, which ideally should be early, with a comprehensive patient assessment, recording degree of disability (measured at zero, one or two), the operational (PB or MB) and clinical (indetermined, tuberculoid, dimorphic or Virchowian) types of the disease, and should encourage the active search for those infected, through analysis of the affected person's household and social contacts. Such measures are useful indicators to estimate the veracity of reported statistical data and, thus, better direct regional actions towards the correct management of the endemic. However, measures do not occur effectively in Brazil, allowing an increase in hidden prevalence, especially at home, late diagnosis, psychosocial impacts and active transmission of the disease, in addition to the lack of surveillance and continuing health education that qualifies professionals about leprosy.[8,10]

Decreases or increases in new recorded cases may be related to the various operational conditions of healthcare services, such as changes in management, professional turnover, decrease or increase in active search, presence or absence of specific projects and protocols for surveillance, among others. This information is proven in other studies. As an example, the project "Innovative Approaches to Intensify Efforts for a Leprosy-Free Brazil" was indicated as justification for the increase in the notification of new cases in Brazil in 2017 and 2018, as it trained Primary Healthcare professionals to diagnose, treat and prevent the disease.[8,10]

The study also concluded that leprosy case records in the general population of Tocantins were boosted between 2003 and 2008 due to the municipalization of disease control actions in this state, which increased the effectiveness of notification coverage by health programs. Furthermore, other research has highlighted the importance attributed to the Family Health Strategy in controlling and reducing the incidence of leprosy, with an important role in strategic planning, training and coordination of health teams in surveillance actions, by valuing diagnosis, treatment, monitoring and active search for new infected people.[8,11,12,14,15]

In the present study, the highest frequency was the dimorphic form, with values decreasing sequentially in Virchowian, indeterminate and tuberculoid, but this distribution pattern of the disease was different in other locations. In new cases of leprosy in the microregion of Crateús-CE, between 2001 and 2015, the indeterminate form prevailed (28.93%), then dimorphic (22.48%), and then tuberculoid, with 18.57%, and Virchowian, with 14.56%, noting that 15.44% of cases were not classified in clinical terms. In a spatio-temporal distribution of leprosy in the city of Belém-PA from 2006 to 2015, the most frequent clinical forms were dimorphic (39.56%), tuberculoid (26.17%) and Virchowian (21.42%), with a lower incidence in the indeterminate form.[14,15]

In relation to operational classification, in this study, the incidence of MB cases was higher and had a smaller decrease than that of PB. This reveals the vulnerability in controlling the disease, supporting the hidden prevalence, late diagnosis and contagion by leprosy in Pará, due to the active transmission chain linked to the MB form, which, by promoting a greater bacillary load in the dermis and mucous membranes, represents the most infectious, debilitating and segregating leprosy pattern. This slow reduction in severe forms demonstrates limitations in Primary Healthcare services, which should mitigate leprosy. In this regard, the precariousness in monitoring transmission is a major obstacle to controlling the disease, as there are failures in notifications and in filling out medical records, making it difficult to break the transmission cycle through early diagnosis and treatment. Late diagnosis also limits the epidemiological slowdown, with the active search for patients being a fundamental combat strategy, through examination of all contacts of the diagnosed case, especially those within households.[16-19]

This epidemiological configuration of MB sovereignty was also mentioned in investigations carried out in several locations: the proportions of MB remained higher and constant in Amapá between 2005 and 2018, but had significant growth in the municipalities of Sobral-CE, between 2001 and 2016, Ribeirão Preto- SP, between 2006 and 2016, and Aracaju-SE, between 2003 and 2017. There was also an increase in the microregion of Crateús-CE, between 2001 and 2015, as well as in the states of Tocantins, between 2001 and 2012, and Paraíba, between 2008 and 2012. This entire situation proves the sustained infection that prevails in Brazil, which is disguise by reducing notifications of the disease.[8,10,11,14,16,19]

The predominance of MB forms may also result in poor reporting of PB forms, as these represent less of a concern for the population when seeking healthcare services, except when accompanied by disabilities or leprosy reactions. Thus, the sudden reduction in the count of milder clinical forms (indeterminate and tuberculoid) tends to express less concern about the initial stages of the disease. The present study does not exclude such a possibility, since, in fact, there was a significant decrease in the registration of PB forms (Δ= -0.87) during the time interval investigated. Furthermore, the SARS-CoV-2 pandemic may have interfered with the 2020 numbers, as there was a general drop in notifiable diseases in the North, including leprosy, which saw a reduction in all states. Thus, two possible effects of the pandemic on the disease are suggested: reduction in contagion, due to restriction of human contact; population's difficulty in accessing healthcare services, which would result in greater underreporting.[19,20]

The greater presence of dimorphic and Virchowian clinical forms and the MB operational classification as well as their lower rates of reduction expresses concern regarding physical damage and neural involvement. A study carried out in a university hospital in northeastern Brazil, with 73 participants, showed that these more serious forms have a greater potential to cause grade one physical disabilities, related to reduced sensitivity in EHF. In this study, they were also the only ones that caused

Please cite this article as: *Silva LEA, da Silva EL, da Silva DMB, Magno JCP, Pedroza AC, Pereira AA. Análise dos casos de hanseníase no estado do Pará entre 2001 e 2020. Rev Epidemiol Control Infect [Internet]. 12º de julho de 2024 [citado 19º de agosto de 2024];14(2). Disponível em: https://online.unisc.br/seer/index.php/epidemiologia/article/view/18997*

grade two physical disability, related to visible deformities and motor deficiencies in these same organs.[21]

The present study assessed the progression of clinical forms of leprosy between 2001 and 2020 in Pará. The linear regression analysis allowed us to observe the total reduction of all clinical forms of leprosy in the period, noting a greater reduction in indetermined and tuberculoid clinical forms, accompanied by a greater reduction in cases identified as PB. The clinical forms considered more serious, such as dimorphic and Virchowian, showed a smaller downward trend, as did smear microscopies, identified as MB, concluding that the most contagious groups that cause more harm to patients remain in vogue in the state.

A limitation of this study is using secondary data, which is subject to underreporting or incorrect completion of notification forms, which may compromise the obtaining of reliable data. Finally, it is urgent to encourage community access to health information, in order to avoid a progression in the rate of infections. Hence, adequate management of affected people, combined with appropriate public knowledge about leprosy contagion, prevention, symptoms and treatment, is essential for early detection and combating the disease.

REFERENCES

1. Barcelos RMF, Sousa GS, Almeida MV, et al. Leprosy patients quality of life: a scoping review. Revista da Escola de Enfermagem 2021;55:1–12. doi: 10.1590/1980-220X-REEUSP-2020-0357
2. BRASIL. Ministério da Saúde. Guia prático sobre a hanseníase. Secretaria de Vigilância Em Saúde Departamento de Vigilância e Doenças Transmissíveis 2017:70. https://bvsms.saude.gov.br/bvs/publicacoes/guia_pratico_hanseniase.pdf
3. BRASIL. Ministério da Saúde. Estratégia Nacional Para Enfrentamento Da Hanseníase 2019|2022. 2021. https://bvsms.saude.gov.br/bvs/publicacoes/estrategia_nacional_enfrentamento_hanseniase_2019.pdf
4. Pinheiro MGC, Lins SLF, Gomes BRS, et al. Análise contextual da atenção à saúde na alta em hanseníase: uma revisão integrativa. Rev Gaucha Enferm 2019;40:1–8. doi: 10.1590/1983-1447.2019.20180258
5. WHO, World Health Organization. Global Leprosy Strategy 2016–2020. 2020. https://www.who.int/publications/i/item/9789290225492-2
6. Macedo CS, Lara FA, Pinheiro RO, et al. New insights into the pathogenesis of leprosy: Contribution of subversion of host cell metabolism to bacterial persistence, disease progression, and transmission. F1000Res 2020;9. doi: 10.12688/f1000research.21383.1
7. García GSM, Souza EA, Araújo VM, et al. Território, doenças negligenciadas e ação de agentes comunitários e de combate a endemias. Rev Saude Publica 2022;56:1–12. doi: 10.11606/S1518-8787.2022056003730
8. Pereira, TMS, Dias, LD, Silva, OM. Tendência temporal da hanseníase em região de alta endemicidade do Nordeste brasileiro. Rev Bras Enferm 2019;72:1424–30. doi: 10.1590/0034-7167-2018-0682
9. Cabral JS, Matos DF, Bezerra LP, et al. Carga Global de Doenças: Estimativa e tendência temporal da carga da hanseníase no estado de Alagoas, Brasil entre 2001 a 2019. Research, Society and Development 2022;11:e44511225528. doi: 10.33448/rsd-v11i2.25528
10. Basso MEM, Andrade RF, Silva RLF. Trend of epidemiological indicators of leprosy in an endemic state of the Amazon region. Rev Gaucha Enferm 2021;42. doi: 10.1590/1983-1447.2021.20190520
11. Monteiro LD, Martins-Melo FR, Brito AL, et al. Leprosy trends in tocantins, a hyperendemic state in the north of Brazil, 2001-2012. Cad Saude Publica 2015;31:971–80. doi: 10.1590/0102-311X00075314
12. Lima MHGM, Nascimento JP, Souza ML, et al. Magnitude and temporal trend of leprosy indicators in Goiás, Brazil: An ecological study 2001-2017. Epidemiologia e Servicos de Saude 2020;29:1–9. doi: 10.1590/S1679-49742020000500012
13. Chaptini C, Marshman G. Leprosy: a review on elimination, reducing the disease burden, and future research. Lepr Rev 2015;86:307–15. doi: 10.47276/lr.86.4.307
14. Feitosa ALM, Dourado FW, Florêncio CMGD. Tendência temporal da hanseníase em uma região de saúde do Ceará, 2001 a 2015. Medicina (Ribeirão Preto) 2020;53:438–46. doi: 10.11606/issn.2176-7262.v53i4p438-446
15. Pereira WMM, Oliveira SS, Sadeck LWR, et al. Hanseníase em metrópole da Amazônia brasileira: cobertura de atenção básica à saúde e sua relação com o perfil clínico e a distribuição espaço-temporal da doença em Belém, estado do Pará, Brasil, de 2006 a 2015. Rev Panamazonica Saude 2019;10:1–14. doi: 10.5123/s2176-6223201900069
16. Campos MRM, Batista AVA, Guerreiro JV. Perfil Clínico-Epidemiológico dos Pacientes Diagnosticados com Hanseníase na Paraíba e no Brasil, 2008 – 2012. Revista Brasileira de Ciências Da Saúde 2018;22:79–86. doi: 10.4034/rbcs.2018.22.01.11
17. Leite TRC, Silva IGB, Lanza FM, et al. Ações de controle da hanseníase na atenção primária à saúde: uma revisão integrativa. VITTALLE - Revista de Ciências Da Saúde 2020;32:175–86. doi: 10.14295/vittalle.v32i3.11080
18. Ramos JS, Costa LBR. Dificuldades Da Enfermagem No Manejo Da Hanseníase Na Atenção Primária 1 Nursing Difficulties in Leprosy Management in Primary Care. Revista JRG de Estudos Acadêmicos-Ano II 2019;II:125–47. doi: 10.5281/zenodo.4320122
19. Moreira RS, Costa JS, Moreira-Junior VT, et al. Tendência temporal da hanseníase em Aracaju, Sergipe, Brasil. Revista de Epidemiologia e Controle de Infecção 2019;9:4–11. doi: 10.17058/reci.v9i1.11957
20. Brito CVB, Formigosa CAC, Neto OSM. Impacto da COVID-19 em doenças de notificação compulsória no Norte do Brasil. Revista Brasileira Em Promoção Da Saúde 2022;35:1–11. doi: 10.5020/18061230.2022.12777
21. Morais, JR, Furtado EZL. The level of physical inability of patients with leprosy. Rev Enferm UFPE on Line 2018;12(6): 162. doi: 10.5205/1981-8963-v12i6a231049p1625-1632

AUTHORS' CONTRIBUTIONS

Lyncoln Eduardo Alves Silva contributed to study conception and design, as well as bibliographical research, writing the discussion and conclusion, interpreting and describing the results, drawing up conclusions, critical review of content, translation of abstract into English and Spanish, choice and translation of the five descriptors according to DeCS (Bireme Health Science Descriptors), and formatting of full text and references according to RECI standards - Journal of epidemiology and infection control. **Ewerton Lima da Silva** contributed to writing the summary, review and statistics. **Dyana Melkys Borges da Silva** collaborated in preparing the abstract, reviewing, statistical analysis and correcting the text. **João Claudio Paes Magno** contributed to project administration, bibliographic research, writing the abstract, introduction, methodology, discussion, interpretation and description of results, conclusions, review and statistics. **Amanda Araujo Pereira** contributed to the bibliographical research, writing the introduction and critical review of content. **Athos Costa Pedroza** contributed to writing the introduction, objectives and formatting of references, critical review of content and bibliographical research.

All authors approved the final version to be published and are responsible for all aspects of the work, including ensuring its accuracy and integrity.