ISSN 2316-9281

Scientific Electronic Archives
Issue ID: Vol.19 (4), Jul/Aug 2026, p. 1-7
DOI: http://dx.doi.org/10.36560/19420262231
+ Corresponding author*:* airtonlima123.al@gmail.com

Leprosy in children under 15 years of age: characterization and prevalence in the hyperendemic state of Mato Grosso

Airton Lima +, Letícia Lage Silva, Jéssika Ribeiro da Costa Campos, Marina Albano Bezerra Tavares, Júlia Costa de Oliveira Lima, Emerson Giuliano Palácio Favaro, Fernando Antônio Santos e Silva

Universidade de Cuiabá

Abstract. Leprosy is a chronic infectious disease caused by Mycobacterium leprae. The pathology mainly affects the skin and peripheral nerves and the consequences arising from its evolution, in the absence of adequate treatment, can be irreversible. The occurrence in children under 15 years of age is worrying due to its severity, therefore, the present research aims to evaluate the prevalence and characterization of leprosy cases in children under 15 years of age in the state of Mato Grosso, by macro-regions, in the period 2011- 2022. The study is descriptive, retrospective, with a quantitative approach and was carried out through the analysis of data collected in the Data Repository of the Information Systems of the State Department of Health of Mato Grosso (DwWeb/SES-MT). According to the results, 1569 cases were reported in this period of time and age group, with a higher prevalence between 10 and 14 years old, in females, in the urban area of the Northern Health Macroregion and with a dimorphic clinical form. Therefore, strategies are needed to contain the spread through early diagnosis, thus avoiding complications and physical disabilities.
Keywords: Spatial distribution; epidemiology; leprosy; minors

Introduction

Leprosy, a chronic infectious disease with dermatoneurological manifestations and disabling potential, can affect individuals of both sexes and all age groups. It is a slowly progressive disease caused by *Mycobacterium leprae*. The pathogenicity of this agent is due to a combination of delayed hypersensitivity and high microbial invasion, as the microorganism can grow within macrophages, leading to characteristic lesions. Consequently, this disease, in addition to being marked by the appearance of skin patches, can progress to facial changes and affect the upper and lower limbs (SALOMÃO, 2017; BRASIL, 2022a).

Leprosy is classified as one of the neglected tropical diseases by the World Health Organization (WHO), which persist globally despite the existence of tools for its prevention and control, thus constituting a public health problem, particularly in more vulnerable populations. However, the disease is curable, and those affected have access to treatment and rehabilitation services provided by the Brazilian Unified Health System (SUS) (BRASIL, 2022b).

The importance of early diagnosis is emphasized, as it can be achieved through a thorough physical examination, allowing for the timely initiation of appropriate treatment. Regularity and early initiation of treatment are factors that contribute to a faster and safer cure. Treatment is administered through a regimen involving rifampicin, clofazimine, and dapsone in all cases of leprosy, regardless of operational classification—both paucibacillary (PB) and multibacillary (MB) forms use the same therapeutic regimen. The difference lies in the duration of treatment, which is six monthly doses for PB cases and 12 monthly doses for MB cases, potentially extending up to nine months and 18 months, respectively, with dosage variations depending on age and body weight (BRASIL, 2021; BRASILa).

In cases of leprosy in children under 15 years of age, a detailed clinical evaluation and investigation of epidemiological links through

contact tracing are preferred over laboratory diagnosis. This preference is due to the potentially traumatic nature of tests such as bacilloscopy and biopsy, coupled with the predominance of paucibacillary cases in this age group where bacilli are rarely detected, and histopathological examination may be inconclusive (BRASIL, 2022C).

This age group serves as an important epidemiological indicator, reflecting the expansion of the endemic and thus becoming a priority for the National Leprosy Control Program. Furthermore, children and adolescents affected by leprosy may suffer physical, emotional, and social impacts due to the disabling potential of the disease, compounded by the challenges in diagnosing this group early (ANDRADE et al., 2022).

In Brazil, the incidence of leprosy is high, ranking second among countries with the highest number of new cases of this pathology, accounting for about 14% of all new diagnoses worldwide (TRAÚZOLA, 2022). In this context, it is known that the regions of the country show differences in the affected populations, with the Northeast region ranking first and the Midwest region ranking second in the number of leprosy cases (TAVARES, 2021). Additionally, it is known that within the vast geographical territory of the state of Mato Grosso (MT), there is significant heterogeneity regarding access to healthcare, which is why this study seeks to analyze how leprosy is distributed across the state's macro-regions of health, as recommended by the State Health Department of Mato Grosso.

Thus, it is understood that analyzing the prevalence of leprosy cases in the population aged 0 to 14 years is important for tackling the disease, as this age group is a relevant indicator for monitoring leprosy control as a public health problem. Moreover, it helps identify high endemicity, early exposure, high transmissibility, and insufficient control measures (WHO, 2021).

Given the above and the severity of leprosy in this age group, this study aims to analyze the prevalence of leprosy cases in children under 15 years of age in the state of Mato Grosso during the period from 2011 to 2022.

Material and Methods

Study Type and Data Source

This is a descriptive cross-sectional study with a quantitative approach, conducted in the state of Mato Grosso. The population consisted of all 1,569 cases of leprosy in children under 15 years of age diagnosed between 2011 and 2022, as available in the Data Repository of the Information Systems of the State Department of Health of Mato Grosso (DwWeb/SES-MT). Access to the data was obtained on September 4, 2023.

The data are anonymous and publicly accessible, therefore the study did not require approval from the Research Ethics Committee (CEP) or the National Research Ethics Commission (CONEP) according to Resolutions 466/2012 and *510/20 (*MAIA *et al, 2022).*

Health Macro-regions

The state of Mato Grosso is composed of 141 municipalities, divided into six health macro-regions: North (comprising 35 municipalities), Center-Northwest (comprising 24 municipalities), Center-North (comprising 11 municipalities), East (comprising 30 municipalities), West (comprising 22 municipalities), and South (comprising 19 municipalities) (Figure 1).

Among these, the most populous macro-region is the Center-North, with 1,028,372 inhabitants, followed by the North macro-region with 794,433 inhabitants, the South macro-region with 543,133 inhabitants, the Center-Northwest macro-region with 531,559 inhabitants, the East macro-region with 348,796 inhabitants, and the West macro-region with 320,968 inhabitants (Figure 2).

Additionally, it is important to highlight the number of Family Health Teams (ESF) and Primary Care Teams (EAP) homologated in each macro-region, reflecting the healthcare structure panorama in Mato Grosso.

These data reflect not only the population distribution but also the distribution of healthcare resources and services in each region, playing a crucial role in the planning and implementation of public health policies.

Study Variables

The study variables included age group, sex, residence/origin, diagnosis, operational classification, clinical form, evolution, therapeutic regimen, and type of discharge. The variables were used as per the original format available in the DwWeb SES-MT repository.

Data Analysis

Absolute frequency distributions and percentages were used to describe the cases of leprosy in children under 15 years of age.

All analyses were performed using the Epi Info program.

Results and discussion

In the historical series (2011-2022), the state of Mato Grosso reported 1,569 diagnoses of leprosy in children under 15 years of age. The highest detection rates occurred in 2014 (204 cases) and 2015 (183 cases), while the lowest rate was recorded in 2011 (26 cases). Additionally, there was a 311.54% increase in the detection rate over the analyzed period, rising from 26 cases in 2011 to 107 cases in 2020 (Figure 2a).

A stability in the number of diagnoses from 2017 to 2019 was also observed, followed by a sharp reduction in 2020, with a 39.20% decrease compared to the previous year (2019), likely attributable to the distancing measures established by the government for COVID-19 prevention.

Regarding the number of discharges from leprosy treatment, the highest detection rates were in 2016 (192 discharges), 2015 (188 discharges), and 2020 (184 discharges). A stable trend was

observed in the years 2017, 2018, and 2019, similar to the diagnostic year analysis (Figure 2b).
Figure 02: Management of Patients Under 15 Years of Age: Relationship Between Year of Diagnosis and Year of Leprosy Discharge.

Regarding sociodemographic aspects, leprosy occurred more frequently in children aged 10 to 14 years (66.92%; n=1050), female sex (52.07%; n=817), in the urban zone (78.67%; n=1199), and those residing in the Northern macro-region of the state (35.25%; n=553).

Regarding clinical aspects, cases with a dimorphic clinical form predominated (60.48%; n=949), the current therapeutic regimen of PQT/MB 12 doses (70.62%; n=1101), with no reaction during treatment (72.98%; n=1145), and with patients who evolved with cure (76.42%; n=1199).

As demonstrated by the results, leprosy in children under 15 years of age in the state of Mato Grosso was most prevalent in 2014 and 2015, and least prevalent in 2011. In comparison, a study conducted in São Luís, Maranhão, showed the highest leprosy rates in 2013 and 2015, and the lowest rate in 2016, analyzing the period from 2010 to 2019 (SILVA et al., 2022). Similarly, the state of Bahia had higher prevalence in 2015 and lower in 2016, based on a study conducted between 2007 and 2017 (SANTOS et al., 2020).

Analyzing the relationship between leprosy diagnoses and the number of ESF and EAP per macro-region, significant patterns were observed. For example, macro-regions with a higher proportion of ESF/EAP tend to have higher detection rates of leprosy. This can be attributed to the presence of a well-established primary care network, facilitating access to healthcare services and promoting preventive examinations and early diagnosis of the disease.

However, in areas with unequal distribution of ESF/EAP, such as the East macro-region, where there are fewer teams compared to the population, leprosy diagnoses may be compromised. The scarcity of primary healthcare services can result in delayed disease detection, leading to more advanced cases at the time of diagnosis and increasing the risk of complications.

In the present study, the reduction in diagnoses during the COVID-19 pandemic in 2020 can be explained by several scientific studies describing the challenges healthcare professionals faced in monitoring leprosy-affected individuals during the pandemic. Most appointments were rescheduled, many diagnoses were not made, and patients were not followed up monthly, leading to significant treatment interruption (CHAVES et al., 2023).

Moreover, the impact of the measures adopted during COVID-19 was not limited to leprosy but also affected other infectious diseases, such as tuberculosis and Acquired Immunodeficiency Syndrome (AIDS), which saw a reduction in notifications, either due to the reasons mentioned above or due to the benefits provided by the promotion of social distancing, asepsis, and antisepsis measures (MAIA et al., 2022; FERREIRA et al., 2022).

Regarding the sociodemographic aspects presented in this study, the most affected patient profile was children aged 10 to 14 years, female. In the capital of the state of Maranhão, the highest prevalence was also in the 10 to 14 age group, however, among males, as was the case in Bahia, corroborating the data presented by the Ministry of Health in the 2023 Epidemiological Bulletin on the proportion of new leprosy cases by sex and age group in Brazil from 2017 to 2021 (SILVA et al., 2022; SANTOS et al., 2020; BRASIL, 2023).

Regarding the location of prevalence, in Mato Grosso, the North urban macro-region stood out. In comparison, in the state of Maranhão, most cases were concentrated in the capital, and in Bahia also in the urban area due to the higher concentration of people in these areas (SILVA et al., 2022; SANTOS et al., 2020). Therefore, it is evident that the prevalent age within the age group determined in the study is similar in some Brazilian states. This may be related to later exposure to *M. leprae* or to the incubation period of the pathology, which averages 5 years but can last up to 20 years or more before the onset of symptoms (BRASIL, 2022a).

The dimorphic clinical form was the most detected in the state of Mato Grosso, as well as in the state of Maranhão, demonstrating the healthcare system's deficiency in making earlier diagnoses in certain regions to prevent progression to more severe forms that would leave more significant sequelae in patients. However, in the state of Bahia, the tuberculoid form showed a slight prevalence over the dimorphic form, reflecting a lower rate of community transmissibility due to early diagnosis (SILVA et al., 2022; SANTOS et al., 2020).

Another study comparing priority and non-priority municipalities in Mato Grosso, specifically from 2011 to 2013, showed the tuberculoid form prevailed in priority municipalities, while the indeterminate form was more common in non-priority municipalities. The state of Bahia showed a prevalence of milder forms compared to the states of Mato Grosso and Maranhão, indicating better health system structuring in terms of preventing severe leprosy.

Regarding the evolution of patients, which includes the mode of entry and type of discharge, the most prevalent in the state of Mato Grosso, as shown, were new cases and cure. In the study conducted in São Luís-MA, the main mode of entry was also new cases, while in Bahia, it was through referrals, also showing a decreasing trend in cures, especially in 2017 due to failure to follow up on patients after diagnosis (SILVA et al., 2022; SANTOS et al., 2020).

The most commonly used therapy in Mato Grosso during the period determined by this study was the PQT/MB 12-dose regimen, which in most cases did not present a reaction episode, as shown

in the study conducted in Mato Grosso specifically from 2011 to 2013 in priority municipalities (FREITAS et al., 2018).

The time period determined for this study was chosen based on the objective of analyzing the number of cases and the characteristics of patients with leprosy under 15 years of age that occurred in the last 10 years. However, as mentioned earlier, there is a maximum period of 18 months for the multibacillary patient to complete their treatment, thus explaining the choice to analyze patients diagnosed between 2011 and 2020, allowing for the follow-up of these patients' outcomes until the end, being then analyzed regarding the year of discharge between 2013 and 2022.

Leprosy remains a public health challenge in various regions of the world, requiring a holistic approach that includes early detection, appropriate treatment, and prevention of disabilities. In contexts like the state of Mato Grosso, where the disease is still endemic, the availability and effectiveness of primary healthcare services play a crucial role in its detection and proper management.

Therefore, ensuring equitable and adequate distribution of ESF/EAP across all macro-regions is essential to strengthen the health system's capacity to respond to the challenge of leprosy. This not only facilitates early detection and timely treatment of the disease but also contributes to reducing its incidence and effectively controlling its transmission throughout the state of Mato Grosso.

Table 1. Quantification of Health Macro-regions in Primary Care

Macro-region	Number of Homologated ESF/EAP
Center-North	280
North	245
South	156
Center-Northwest	142
East	123
West	98

[1] Caption: Distribution of Family Health Teams (ESF) and Primary Care Teams (EAP) homologated by macro-region in the state of Mato Grosso.

Figure 1. Geopolitical Division of Health Macro-regions in the State of Mato Grosso.

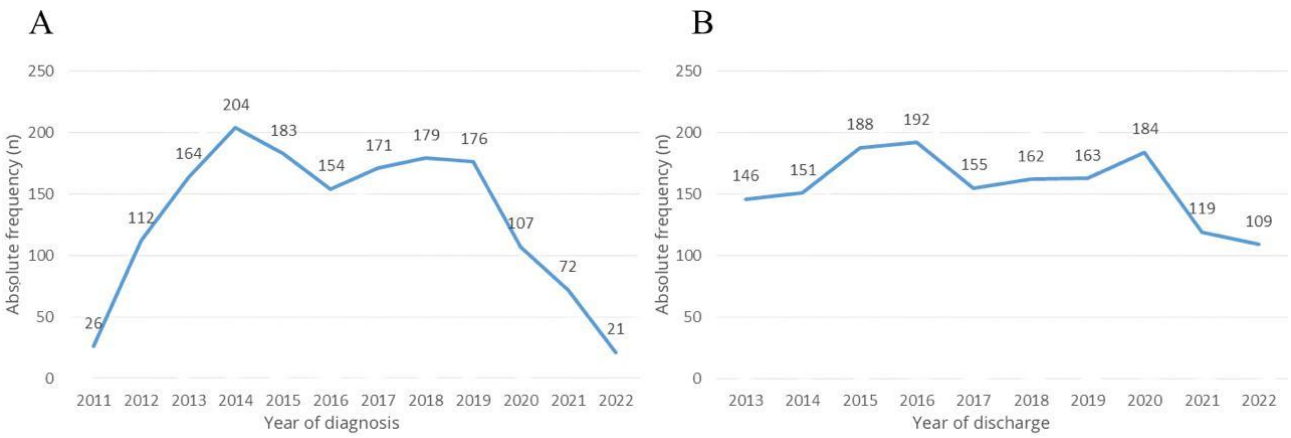

Figure 2. Management of patients under 15 years of age: relationship between year of diagnosis and year of leprosy discharge.

Table 2. Relationship Between Sociodemographic Aspects Involved in Leprosy (n = 1569)

Sociodemographic Aspects	n	%
Age Group		
10 to 14 years	1050	66.92%
05 to 09 years	478	30.47%
01 to 04 years	41	2.61%
Total	1569	100.00%
Sex of Patient		
Female	817	52.07%
Male	752	47.93%
Macro-region of Notification		
North	553	35.25%
Center-North	294	18.74%
East	286	18.23%
Center-Northwest	231	14.72%
South	140	8.92%
West	65	4.14%
Zone of Residence		
Urban	1199	78.67%
Rural	306	20.08%
Periurban	19	1.25%

Caption: Sociodemographic aspects of leprosy cases in children under 15 years of age in Mato Grosso from 2011 to 2022.

Table 3. Relationship Between Clinical Aspects Involved in Leprosy (n=1569)

Clinical Aspects	n	%
Clinical Form		
D (Dimorphic)	949	60.48%
I (Indeterminate)	242	15.42%
T (Tuberculoid)	202	12.87%
Not Classified	79	5.04%
V (Virchowian)	63	4.02%
Blank	34	2.17%
Mode of Entry		
New Case	1364	86.93%
Transfer from Another Municipality	85	5.42%
Other Re-entries	53	3.38%
Transfer from Same Municipality	38	2.42%
Transfer from Another State	21	1.34%
Recurrence	8	0.51%
Current Therapeutic Regimen		
PQT/MB 12 doses	1101	70.17%
PQT/PB 6 doses	387	24.67%
Other Regimens	71	4.53%
Blank	10	0.64%
Reaction Episode During Treatment		
No Reaction	1145	72.98%
Blank	303	19.31%
Type 1 Reaction	100	6.37%
Type 2 Reaction	12	0.76%
Type 1 and 2 Reaction	9	0.57%
Type of Discharge		
Cure	1199	76.42%
Transfer to Another Municipality	118	7.52%
Abandonment	104	6.63%
Transfer to Same Municipality	68	4.33%
Diagnostic Error	45	2.87%
Transfer to Another State	31	1.98%
Death	2	0.13%
Transfer to Another Country	2	0.13%

Conclusion

The study highlighted that during the research period, the occurrence of leprosy in children under 15 years of age in Mato Grosso was heterogeneous among macro-regions, which may indicate active transmission and the persistence of the disease's severity in the region. On the other hand, it may demonstrate greater active case finding and coverage by the Family Health Program.

The detection of leprosy, particularly in the age group between 10 and 14 years, stands out as one of the main results. Furthermore, most cases had a multibacillary operational classification and a transmissible dimorphic clinical form. These data suggest early exposure, late diagnosis of the disease, persistent transmission foci, and a high risk for the development of complications and physical disabilities. Therefore, specific control and prevention strategies are needed for the population under 15 years of age, aiming to minimize the transmission chain of the disease and the number of reported cases.

In this sense, it is necessary to conduct health actions in schools and other community settings as a means of disseminating knowledge, with the aim of early diagnosis and contributing to the reduction of incidence rates in children under 15 years of age. Additionally, it is essential to actively seek out contacts to conduct dermatoneurological examinations and properly handle notification forms.

References

___. Ministério da Saúde. Caderno Temático do Programa Saúde na Escola: Prevenção de doenças negligenciadas. Brasília: Ministério da Saúde (BR), Ministério da Educação, 2022b. 54 p.

___. Ministério da Saúde. Protocolo Clínico e Diretrizes Terapêuticas da Hanseníase. Brasília: Ministério da Saúde, 2022c. 152 p.

___. Ministério da Saúde. Secretaria de Vigilância em Saúde. Brasil. Boletim Epidemiológico. Número Especial. Janeiro de 2023.

___. Ministério da Saúde. Secretaria de Vigilância em Saúde. Orientações a Estados e Municípios para a implementação da “ampliação de uso da clofazimina para o tratamento da hanseníase paucibacilar, no âmbito do Sistema Único de Saúde”. Brasília: Ministério da Saúde, 2021.

___. Rumo à zero hanseníase: Estratégia Global de Hanseníase 2021-2030. [S. l.]: WHO, 2021.

54972+0180016

74. Available from: https://doi.org/10.1590/0103-11042022E704.

BRASIL, Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Articulação Estratégica de Vigilância em Saúde. Guia de Vigilância em Saúde. 5. ed. rev. e atual. Brasília: Ministério da Saúde (BR), 2022a 1.126 p.

DA SILVA, Natália Barboza et al. Comparison of epidemiological profile of leprosy from 2010 to 2020 in the city of Alfenas, state of Minas Gerais, with Brazil. Scientific Electronic Archives, v. 16, n. 10, 2023.

DE MENEZES FILHO, Antonio Carlos Pereira; DE OLIVEIRA FILHO, Josemar Gonçalves; DE SOUZA CASTRO, Carlos Frederico. Estudo físico-químico, fitoquímico e atividades biológicas do extrato do fruto maduro de (Brosimum gaudichaudii Tréc.)(Moraceae). Scientific Electronic Archives, v. 14, n. 7, p. 74-83, 2021.

FREITAS, BHBM.; XAVIER, DR; CORTELA, DCB; FERREIRA, SMB. (2018).

GHV et al. Panorama geral da hanseníase no Brasil: uma análise epidemiológica. REAS. 2022; 15(6): 1-10.

GOULART, Letícia Silveira et al. Hansen’s disease: life quality analysis according to clinical characteristics. Scientific Electronic Archives, v. 14, n. 10, 2021.

Jezus, S. V., Masochini, R. G., & Cunha, A. N. (2018). Assessment of patients’ perceptions towards the diagnosis of leprosy. *Scientific Electronic Archives*, *11*(1), 107–115. https://doi.org/10.36560/1112018580

JÚNIOR, JM. Percepção dos profissionais de saúde acerca das ações de controle da Hanseníase frente a pandemia COVID-19. Contribuciones a las Ciencias Sociales. São José dos Pinhais, v.16, n.10, p. 19065- 19083, 2023 19065.

LEMOS, M. H. S. et al. Epidemiological characterization of neglected diseases in the state of Piauí. Scientific Electronic Archives, v. 13, n. 11, p. 89-96, 2020.

leprosy (Hansen disease) update, 2020: impact of COVID-19 on global leprosy control. Weekly Epidemiological Record, v. 96, n. 36, p. 421-444, 2021.

LIMA, A.; SOUZA, L. A.; VEIGA, M. P. M. Incidence and Cure Rate of Leprosy from 2006 to 2010 in Sinop, Mato Grosso. Scientific Electronic Archives, v. 5, p. 34-38, 2014.

MAIA, CMF; MARTELLI, DRB; SILVEIRA, DMML; OLIVEIRA, EA; JÚNIOR, HM. PEREIRA, CR; CRUZ, MM; COTA, VL. RGCF; PAIVA, MFL. Hanseníase em menores de 15 anos: caracterização sociodemográfica e clínica dos casos em um município hiperendêmico. Cogitare Enferm [Internet]. 2022;27:e82221. Available from:

RGCF; PAIVA,FL. Hanseníase em menores de 15 anos: caracterização sociodemográfica e clínica dos casos em um munícipio hiperendêmico. Cogitare Enferm. 2022; 27: 1-13.

SALOMÃO, R. Infectologia: Bases Clínicas e Tratamento. (2nd edição). Guanabara Koogan: Grupo GEN; 2023.

SANTOS, AN; COSTA, AKAN; SOUZA, JER; ALVES, KAN; OLIVEIRA, KPMM; PEREIRA, ZB. (2020). Perfil epidemiológico e tendência da hanseníase em menores de 15 anos. Revista da Escola de Enfermagem da USP, 54, e03659. https://doi.org/10.1590/S1980- 220X2019016803659

Sexualidade, sociabilidade, trabalho e prevenção do HIV entre populações vulneráveis na pandemia da Covid-19. Saúde debate [Internet]. 2022;46(spe7):62–

SILVA, FJLA; AQUINO, DMC; MONTEIRO, EMLM; COUTINHO, NPS; CORRÊA, SILVA, FJLA; AQUINO, DMC; MONTEIRO, EMLM; COUTINHO, NPS; CORRÊA, TAVARES, AM. Perfil epidemiológico da hanseníase no estado de Mato Grosso: estudo descritivo. Einstein. 2021; 19: 1-5.

TRAÚZOLA, TR; RIBEIRO, AE; MARINS, AS; MENEGUCI, CAG; AHMAD, ITK; LIMA, Tuberculose no Brasil: o impacto da pandemia de COVID-19. J Bras Pneumol. 2022;48(2):e2022008.