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Self-reported clinical history of misdiagnosed leprosy cases in the State of Mato Grosso, Brzil, 2016-2019

Histórico clínico autorreferido de casos mal classificados de hanseníase no Estado do Mato Grosso, Brasil, 2016-2019

Historia clínica autorreportada de casos de lepra mal diagnosticados en el estado de Mato Grosso, Brasil, 2016-2019

Karine Vila Real Nunes Neves [1]
Lúbia Maieles Gomes Machado [1]
Maurício Nobre Lisboa [2,3]
Peter Steinmann [4,5]
Eliane Ignotti [6]

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Abstract

This study aimed to analyze the self-reported clinical history of patients misdiagnosed with leprosy in the State of Mato Grosso, Brazil. This is a cross-sectional study of new leprosy cases diagnosed in the State of Mato Grosso from 2016 to 2019, with individuals who were released from multidrug therapy due to misdiagnosis after starting treatment. Data were collected via telephone interviews. Over the study period, 354 leprosy cases were released from treatment due to misdiagnosis, of which 162 (45.8%) could be interviewed. All interviewees expressed dissatisfaction with their treatment, which prompted them to seek a reevaluation of their diagnosis before they were released due to "misdiagnosis". Among them, 35.8% received a final diagnosis of a musculoskeletal or connective tissue disease – mainly fibromyalgia and degenerative changes in the spine – followed by 13.6% with diagnoses of skin and subcutaneous tissue diseases. For 23.5% of the respondents, no alternative diagnosis was established, whereas 7.4% were later re-diagnosed with leprosy. Fibromyalgia and spinal problems were the most common alternative diagnoses for erroneous leprosy. Although the diagnosis of leprosy is usually clinical and does not require access to technical infrastructure in most cases, some more complex situations require diagnostic support via complementary tests, as well as close collaboration between primary care and reference services.

Diagnosis; Fibromyalgia; Differential Diagnosis

Correspondence
K. V. R. N. Neves
Programa de Pós-graduação em Ciências da Saúde, Universidade Federal de Mato Grosso.
Av. Fernando Corrêa da Costa 2367, Cuiabá, MT 78060-900, Brasil.
karinereal@hotmail.com

[1] Programa de Pós-graduação em Ciências da Saúde, Universidade Federal de Mato Grosso, Cuiabá, Brasil.
[2] Hospital Giselda Trigueiro, Secretaria de Saúde do Estado do Rio Grande do Norte, Natal, Brasil.
[3] Instituto de Medicina Tropical, Universidade Federal do Rio Grande do Norte, Natal, Brasil.
[4] Swiss Tropical and Public Health Institute, Allschwil, Switzerland.
[5] University of Basel, Basel, Switzerland.
[6] Universidade do Estado de Mato Grosso, Cáceres, Brasil.

Introduction

Accurate diagnosis of leprosy is essential for appropriate treatment as well as targeted efforts to control and eliminate the disease. Mato Grosso is a hyperendemic state in Brazil, whose new case detection rate (NCDR) in 2019 and 2020 was 153.31 and 92.68/100,000 inhabitants, respectively. From 2003 to 2017, 1.3% of all new leprosy cases registered in Brazil were later classified as "misdiagnosis" and had their treatment interrupted; while in Mato Grosso this percentage was 2.17% among 46,293 new cases detected in the same period [1].

Although the diagnosis of leprosy is based on simple tests, it requires skill and knowledge to avoid both false positive and false negative diagnosis [2]. In addition to the absence of a gold standard diagnostic test [3], there are several diseases with leprosy-like skin lesions. Laboratory tests for leprosy include bacilloscopy, as well as histopathology of skin lesion biopsies. Currently, serological tests as well as tests based on DNA and RNA amplification using the polymerase chain reaction (PCR) approach are the new tools for diagnosis [4]. Differential diagnosis may be even more difficult when only neurological symptoms are present – as in pure neural leprosy [5]. Often, the diagnosis of pure neural leprosy depends on careful clinical evaluation associated with complementary exams, laboratory analyses, electroneuromyography, and molecular methods to confirm the diagnosis [6]. However, these technologies are largely scarce in primary health care, which can lead to false diagnoses. During active case searches, health professionals may detect more cases if they consider that the pure neural leprosy can occur, increasing the sensitivity to diagnose leprosy but reducing specificity. In Brazil, leprosy has been misdiagnosed in cases with no skin lesions, and the highest percentage of misdiagnosis occurred among women, children, and indeterminate clinical types, or when the diagnosis was based only on the presence of affected nerves, without skin lesions [1].

Some infectious diseases – such as syphilis and tuberculosis – can also present leprosy-like symptoms. Schettini et al. [7] reported the case of a patient with erythematous plaques of varying sizes in the skin, which biopsy showed a granulomatous infiltrate compatible with tuberculoid leprosy. Since the patient had not improved after three months of multidrug therapy (MDT), a review of histopathology was requested and a serological test for syphilis was performed, which proved to be reactive. Specific treatment for leprosy was suspended and treatment for syphilis was started.

Incorrect diagnosis may cause irreversible damage to the patient and postpone or reduce the chances of cure [7,8]. The high workload in health facilities further compromises the quality of care. Adverse work conditions – such as scarce material resources, work overload with an excessive number of patients, limited diagnostic and treatment resources – favor errors, in addition to the lack of technological resources to assist in diagnosis [9].

Our first study on this topic was based on secondary data from the Brazilian National Information System for Notifiable Diseases (SINAN), via notification forms and case follow-up bulletins [1]; thus, a more in-depth analysis of differential diagnosis was not possible. Therefore, the current study was conducted to investigate the self-reported clinical history of patients misdiagnosed with leprosy in the State of Mato Grosso.

Method

Study design

This is a cross-sectional exploratory study of new cases of leprosy, notified in the State of Mato Grosso from 2016 to 2019, who were later released from MDT due to misdiagnosis.

Population and data source

The Brazilian Ministry of Health uses an electronic database, interconnected nationwide, to register all notifiable diseases, called SINAN. This system enables continuous data consolidation, monitoring and evaluation of actions related to leprosy control, and contains individual information about every new case of leprosy, which are continuously updated from local to central levels. The updated

information includes the number of supervised MDT dosis administered, the number of registered and examined contacts, treatment length and causes for its conclusion, such as "cure", "death", "misdiagnosis" among others.

Each State keeps their local registers, which can be consulted individually after ethical approvals. Alternatively, anonymous data from all brazilian states or municipalities are available online through the link: https://datasus.saude.gov.br/acesso-a-informacao/casos-de-hanseniase-desde-2001-sinan/.

The study area was the State of Mato Grosso and its 141 municipalities, of which 77 (55%) had at least one case that met the inclusion criteria for this study. All leprosy cases notified from January 2016 to December 2019, whose treatment was interrupted due to "misdiagnosis", as recorded in the SINAN database, and requested by the authors to the Mato Grosso State Department of Health, were eligible for inclusion.

The following variables were extracted from SINAN for each case: full name, telephone number, municipality of residence, sociodemographic information (year of diagnosis, gender, age categorized as age group, race/skin color, and educational level), and clinical information (type of leprosy, operational classification, mode of detection, number of MDT doses received, bacilloscopy, and disability grade). Individuals released from treatment in the study period were selected for telephone interviews to facilitate contact with them. One case with confirmed positive bacilloscopy at diagnosis, but inexplicably released from treatment due to misdiagnosis, was excluded from the sample. Those cases that met the inclusion criteria but were not located for interview were kept in the study for comparison.

Secondary data management and analysis

The SINAN database was used to: locate the study participants; compare the characteristics of the group of interviewees and nonrespondents; map regional differences in the NCDRs; and identify the absolute number of cases, cases released due to misdiagnosis, and the number of interviewees per municipality.

The chi-square test (χ^2) was used to compare characteristics between interviewees and nonrespondents regarding age groups, gender, race/skin-color, educational level, operational classification, clinical type, mode of detection, and disability grade at the time of diagnosis.

Population data used to calculate the average NCDR was obtained from the Brazilian Institute of Geography and Statistics (IBGE), and the ArcGis 10.5 (http://www.esri.com/software/arcgis/index.html) program was used to build overlapping maps of NCDRs, number of misdiagnoses, and number of interviewees. The cartographic projection system adopted was the Universal Transverse Mercator (UTM_Zone_21S) and Datum SIRGAS_2000.

Questionnaire application

Individual interviews were conducted from July 2019 to November 2020, via telephone calls, using a questionnaire composed of open- and close-ended questions, including questions about the diagnosis of leprosy and the final diagnosis after being released from MDT due to misdiagnosis. The answers were recorded during the interview. A conclusive diagnosis was defined as the first diagnosis received after the leprosy diagnosis was discarded. Questions focused on signs and symptoms, time of disease evolution before the initial leprosy diagnosis, medical specialists consulted after stopping MDT due to misdiagnosis, and type of health service for the conclusive diagnosis (public or private). The quantitative questionnaire was adapted from questions proposed by Henry et al. [10]. Up to ten contact attempts were made for each individual, carefully varying days and times. The only exclusion criterion was that the case had been registered as a diagnostic error – however, as verified during the interviews, the interruption of their treatment was due to another reason.

Primary data management and analysis

Data from questionnaires were consolidated in frequency tables. A word cloud was built to characterize proportions of conclusive diagnoses by participants. Thereby, different sizes and letter fonts were used according to the frequency of occurrences of the words reported by interviewees [11].

Ethical considerations

Participants provided verbal informed consent during telephone calls at the beginning of interviews. This study was approved by the Ethics Research Committee of the Júlio Müller University Hospital (CAAE protocol n. 2,761,449, approved on July 9th, 2018).

Results

Out of 354 individuals identified for inclusion in the study, 228 (64.4%) were successfully contacted; 124 (35%) could not be located or did not answer the telephone calls; one case (0.3%) died, and one case (0.3%) was excluded because of confirmed positive bacilloscopy for *Mycobacterium leprae*. A total of 162 individuals (70.7% of those contacted) agreed to participate in the study. Among them, 151 had a second conclusive diagnosis and 11 (6.8%) were re-diagnosed with leprosy after being released due to misdiagnosis, and restarted MDT (Figure 1).

The average NCDR in Mato Grosso State from 2016 to 2019 was 137.8 new cases/100,000 inhabitants. Municipalities with very high average NCDRs (defined as those above 40/100,000 inhabitants) were located in the northern and eastern regions of the state. Although cases of misdiagnosis were registered in 77 municipalities, the interviewees lived in only 50 municipalities located in all regions of the state. The number of misdiagnosed cases ranged from one to 39 cases per municipality and that of the survey participants ranged from one to 24 individuals (Figure 2).

Figure 1

Flowchart of participants in the investigation of the self-reported clinical history of leprosy cases classified as misdiagnosis. Mato Grosso State, Brazil, 2016-2019.

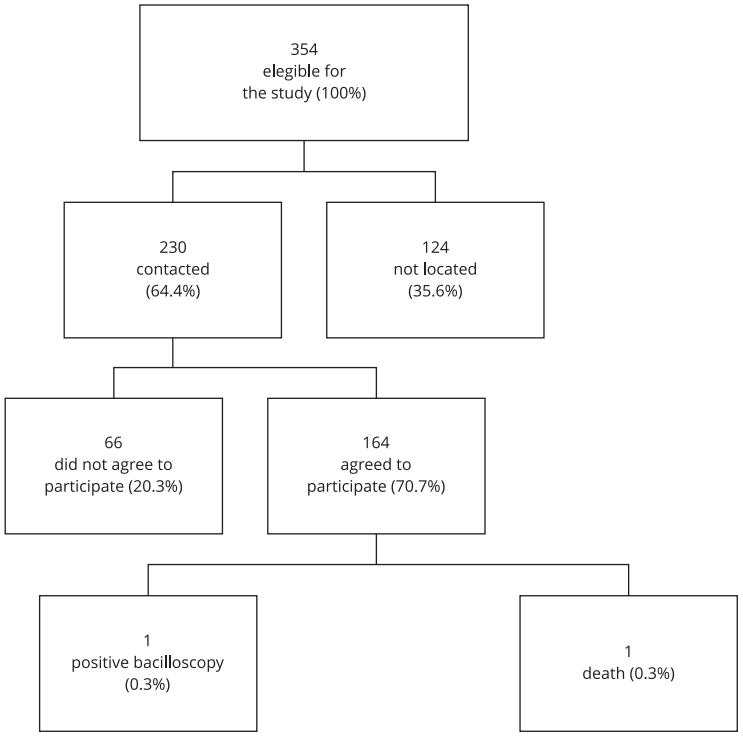
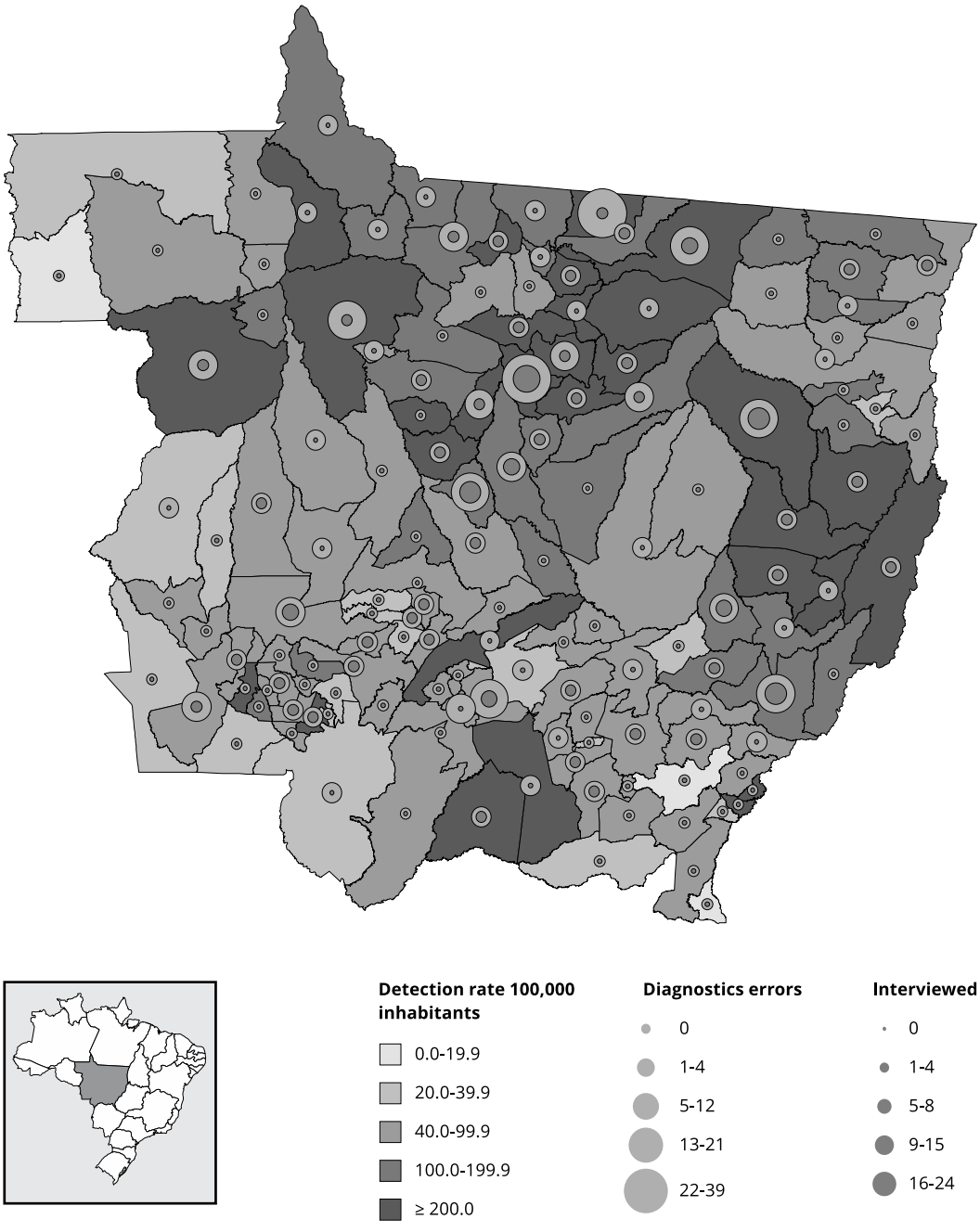


Figure 2

Average leprosy new case detection rate (NCDR) by municipality, distribution of cases discharged by misdiagnosis and spatial location of interviewees. Mato Grosso State, Brazil, 2016-2019.



The characteristics of the 162 interviewed individuals, who represent 45.9% of the total number of misdiagnosed leprosy patients, did not differ from those of the nonresponse group, except for the year of diagnosis, with a small number of participants diagnosed in 2016. Among the interviewees, there was a predominance of cases notified in 2018 (n = 62; 38.3%). Most were women (n = 110; 67.9%) and aged 16-59 years (n = 122; 75%); 74 self-declared as mixed-race (45.7%) and 66 as white (40.7%). The multibacillary (MB) operational classification (n = 142; 87.7%), borderline clinical type (n = 123; 76.5%), cases detected by self-presentation (n = 68; 42%), and those classified with disability grade 0 (n = 89; 54.9%) or 1 (n = 49; 30.2%) stood out (Table 1)

Table 1

Sociodemographic and clinical characteristics of leprosy misdiagnosis cases registered. Mato Grosso State, Brazil, 2016-2019.

Characteristics	Interviewees		Nonrespondents		Total		χ^2	p-value
	n	%	n	%	n	%		
Year								
2016	19	11.7	43	22.5	62	17.6	10.66	0.014
2017	39	24.1	36	18.8	75	21.2		
2018	62	38.3	53	27.7	115	32.6		
2019	42	25.9	59	30.9	101	28.6		
Gender								
Man	52	32.1	72	37.7	124	35.1	1.20	0.162
Woman	110	67.9	119	62.3	229	64.9		
Age group (years)								
≤ 15	8	5.0	8	4.2	16	4.6	4.47	0.107
16-59	122	75.0	126	66.0	248	70.1		
≥ 60	32	20.0	57	29.8	89	25.4		
Race/Skin color								
White	66	40.7	65	34.0	131	37.1	10.59	0.102
Black	18	11.1	14	7.3	32	9.1		
Yellow	1	0.6	0	0.0	1	0.3		
Mixed-raced	74	45.7	111	58.1	185	52.4		
Indigenous	0	0.0	1	0.5	1	0.3		
Ignored	3	1.8	0	0.0	3	0.9		
Educational level								
Illiterate	3	1.9	9	4.7	12	3.4	16.89	0.111
Incomplete primary education	54	33.3	75	39.2	129	36,5		
Complete primary education	12	7.4	25	13.1	37	10.5		
Incomplete secondary education	51	31.5	52	27.2	103	29.2		
Complete tertiary education	27	16.7	11	5.8	38	10.8		
Ignored or not registered	15	9.3	19	9.9	34	9.5		
Operational classification								
Paucibacillary	20	12.3	21	11.0	41	11.6	0.15	0.409
Multibacillary	142	87.7	170	89.0	312	88.4		
Clinical type								
Undetermined	17	10.5	14	7.3	31	8.8	1.31	0.933
Tuberculoid	7	4.3	7	3.7	14	4.0		
Borderline	123	76.5	153	80.1	277	78.5		
Lepromatous	4	2.5	5	2.6	9	2.5		
Ignored	10	6.2	12	6.3	22	6.2		

(continues)

Table 1 (continued)

Characteristics	Interviewees		Nonrespondents		Total		χ^2	p-value
	n	%	n	%	n	%		
Detection mode								
Referral	40	24.7	43	22.5	83	23.5	7.71	0.173
Spontaneous demand	68	42.0	96	50.3	164	46.5		
Collective examination	9	5.6	11	5.8	20	5.7		
Contact examination	43	26.5	36	18.8	79	22.4		
Other	0	0.0	4	2.1	4	1.1		
Not informed	2	1.2	1	0.5	3	0.8		
Disability grade at diagnosis								
Grade 0	89	54.9	87	46.5	176	49.9	6.90	0.141
Grade 1	49	30.2	65	34.0	114	32.3		
Grade 2	5	3.1	15	7.9	20	5.7		
Not evaluated	19	11.9	24	12.5	43	12.2		
Total	162	45.9	191	54.1	353	100.0		

Note: comparison between interviewees and non-interviewed cases.

Source: Mato Grosso State Department of Health. Brazilian Information System for Notificable Deseases (https://datasus.saude.gov.br/acesso-a-informacao/casos-de-hanseniase-desde-2001-sinan/, accessed on 21/Oct/2021).

The interviewees reported an average waiting time of 12 months between the onset of symptoms and their initial leprosy diagnosis. The symptoms that most led them to seek health care were tingling (38.3%), skin spots (18.5%), and muscle weakness in limbs (8.6%).

All interviewees started leprosy treatment but were unsatisfied with the therapy, and looked for another diagnosis, being thereafter released due to "misdiagnosis". Of these, 54 individuals (33.3%) reported that the symptoms did not disappear or even worsened. A total of 43 (26.5%) reported feeling unwell under MDT; of these 28 (65,1%) individuals sought private medical services after adverse drug reactions. Reactions included fever, nausea, vomiting, tachycardia, arrhythmia, skin rash, anemia, fatigue, weakness, visual loss, dizziness, headache, and dyspnea. Due to these adverse effects, five individuals were hospitalized and two were treated in the Intensive Care Unit (ICU) (Table 2).

According to the participants' answers, 33.3% were encouraged to seek another health care provider to seek another diagnosis since the symptoms did not disappear, 53.1% received the second diagnosis in public health services, where care was provided by general physicians (69.8%), followed by dermatologists (29%), and neurologists (22.8%). When asked about how they perceived the time until they received the updated diagnosis, about 52.4% believed that there was a delay for their conclusive diagnosis. On average, interviewees consulted four different physicians (ranging from one to 19) before reaching the conclusive diagnosis and took on average three doses of MDT (up to 12 doses) until the leprosy treatment was interrupted. Two participants had not received a single dose of MDT even after the diagnosis of leprosy (Table 3).

The wrong diagnoses were received in the public health service, mainly in primary health care units. Most interviewees (n = 58; 35.8%) received a conclusive diagnose of diseases of the musculoskeletal system and connective tissue (International Classification of Diseases, 10th revision – ICD-10 – chapter XIII), followed by diseases of the skin and subcutaneous tissue (22; 13.6%/ICD-10 – chapter XII). Notably, 38 (23.5%) of the interviewees reported having no disease and were not undergoing any type of health treatment after discontinuation of MDT. On the other hand, 11 (6.8%) of the interviewees reported that they returned to the health services and finished the leprosy therapy after the diagnosis of this disease was reconfirmed (Table 4).

In the word cloud regarding conclusive diagnoses, the chronic conditions fibromyalgia and spinal disorders stood out among a variety of illnesses and other acute manifestations (Figure 3).

Table 2

Issues related to leprosy diagnosis, which culminated in exit due to misdiagnosis and conclusive diagnosis. Mato Grosso State, Brazil, 2016-2019.

Leprosy diagnosis	n	%
How long did you wait to seek health care after presenting any symptoms until you were diagnosed with leprosy?		
0-2 weeks	36	22.0
15 days-4 weeks	20	12.3
1-3 months	20	12.3
3-6 months	14	8.6
6 months-1 year	11	6.8
More than 1 year	59	36.4
Don't know	2	1.2
Which symptom(s) did you have at the time of the leprosy diagnosis?		
Skin blemishes	64	39.5
Nosebleed	1	0.6
Visual difficulty	5	3.1
Pain and tingling	74	45.7
Loss of sensitivity	9	5.6
Muscle weakness in limbs or difficulty in moving them	27	16.7
Muscle weakness around the eyes	2	1.2
Cuts, wounds and ulcers	5	3.1
Other	29	17.9
No symptom	24	148.0
Which of the above symptoms made you seek the medical service that made the leprosy diagnosis?		
Skin blemishes	30	18.5
Nosebleed	0	0.0
Visual difficulty	0	0.0
Pain and tingling	62	38.3
Loss of sensitivity	2	1.2
Muscle weakness in limbs or difficulty in moving them	14	8.6
Muscle weakness around the eyes	0	0.0
Cuts, wounds and ulcers	1	0.6
Other	50	30.9
Don't know	3	1.9

Discussion

This is the first study to address individual characteristics of people diagnosed as leprosy patients and later released from treatment due to misdiagnosis, i.e., "false positive cases". It was found that misdiagnoses were discovered after patients presented adverse effects to MDT or worsening of symptoms. The diseases most frequently reported by the interviewees as conclusive diagnosis were: osteoarticular and connective tissue diseases (fibromyalgia, herniated disc, rheumatoid arthritis, arthrosis, arthritis, carpal tunnel syndrome, repetitive strain injury/work-related illness, lupus); skin and subcutaneous tissue diseases (dermatitis, melanosis, allergy, mycosis); and nervous system diseases (amyotrophic lateral sclerosis, neuropathies, psychosomatic/depressive disorders). Although some of these diseases, such as fibromyalgia, arthrosis, herniated discs, and psychosomatic/depressive conditions, are not included in the literature as potential differential diagnoses for leprosy, it seems relevant to consider them due to their similar symptoms [12,13].

Fibromyalgia, a rheumatic and systemic disease, which main characteristic is diffuse and chronic musculoskeletal pain [14], was the most common condition reported by interviewed cases. The most

Table 3

Questions asked to individuals participating in the research who were discharged due to "misdiagnosis". Mato Grosso State, Brazil, 2016-2019.

	n	%
What encouraged you to seek another health care provider to have another diagnosis?		
The symptoms did not disappear	54	33.3
Symptoms worsened	45	27.8
A friend encouraged me to seek a physician	15	9.3
The treatment I was undergoing was not working	7	4.3
I was at another appointment and I mentioned the symptoms	13	8.0
I was at another appointment and the physician noticed the symptoms	2	1.2
Had an undesirable reaction to leprosy medication	43	26.5
Which health service made the conclusive diagnosis?		
Public	86	53.1
Private	74	45.7
Do not know	2	1.2
Which medical specialty or specialties did you visit until the conclusive diagnosis?		
Orthopedist	32	19.8
Neurologist	37	22.8
Rheumatologist	27	16.7
Dermatologist	47	29.0
General practitioner	114	69.8
Infectologist	32	19.8
Other	79	48.8
Average number of physicians visited until a conclusive diagnosis [X_M (95%CI)]	4	(1-19)
How long after the leprosy diagnosis did you receive the second conclusive diagnosis?		
0-2 weeks	14	8.6
15 days-4 weeks	38	23.5
1-3 months	50	30.9
3-6 months	28	17.3
6 months-1 year	19	11.7
More than 1 year	8	4.9
Don't know	5	3.1
Average MDT doses until conclusive diagnosis [X_M (95%CI)]	3	(0-12)
Do you believe that there was a delay in the conclusive diagnosis? *		
Yes	86	53.1
No	71	43.8
Don't know	5	3.1

95%CI: 95% confidence interval; X_M: mean.

* For some questions, it was possible to report more than one option. Individuals who had later confirmation of leprosy were excluded.

accepted pathophysiology for fibromyalgia is an alteration in central pain control mechanisms, which could result in neurohormonal dysfunction, with deficiency of inhibitory neurotransmitters or hyperactivity of excitatory neurotransmitters [15]. Physical examination should investigate specific anatomical sites, distributed throughout the body and tenderness on palpation, called "tender points" or pain points [16]. Notably, fibromyalgia – like most cases of leprosy – is diagnosed by clinical examination in the absence of complementary tests of high sensitivity and specificity.

According to Ribeiro et al. [17], several clinical complaints – such as muscle fatigue, paresthesia, and musculoskeletal disorders – associated with skin lesions contribute to the similarity of leprosy with other diseases since many rheumatic diseases have an insidious clinical evolution and are a diagnostic challenge in the first months of clinical manifestation. Inflammatory and nonspecific arthropathies present patterns similar to those seen in some cases of leprosy [18]. Pure neural leprosy is a clinical

Table 4

Frequencies of conclusive diagnoses of individuals participating in the research who were discharged for "misdiagnosis". Mato Grosso State, Brazil, 2016-2019.

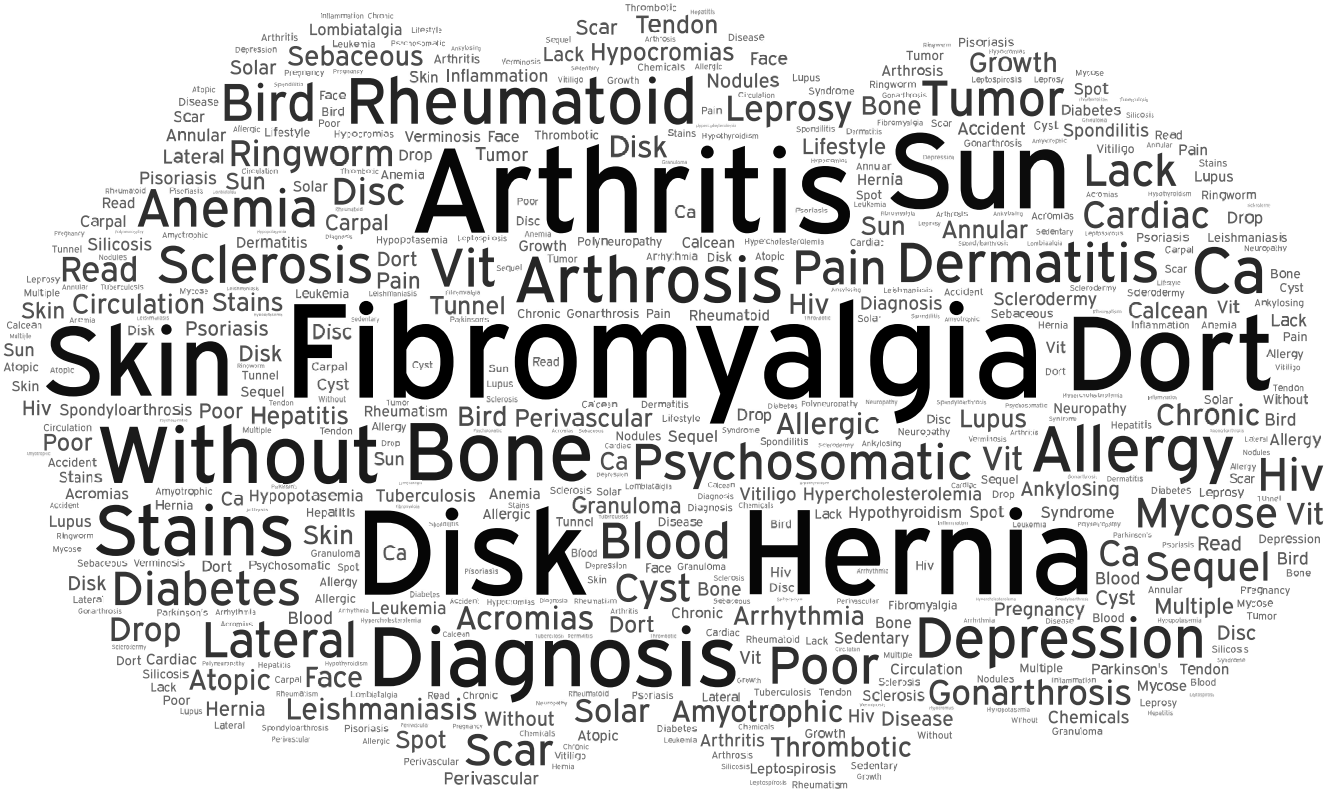
Disease group according to ICD-10	n	%
Chapter XIII	58	35.80
Chapter XII	22	13.58
Chapter VI	10	6.17
Chapter I	4	2.47
Others	19	11.73
No disease and no diagnosis	38	23.46
Leprosy confirmation	11	6.79
Total	162	100.00

ICD-10: International Classification of Diseases – 10th revision.

Chapter I: certain infectious or parasitic diseases; Chapter VI: diseases of the nervous system; Chapter XII: diseases of the skin and subcutaneous tissue; Chapter XIII: diseases of the musculoskeletal system and connective tissue.

Figure 3

Word cloud regarding the conclusive diagnosis of participants who were discharged for leprosy "misdiagnosis". Mato Grosso State, Brazil, 2016-2019.



presentation of the disease with no skin lesions, which may increase the risk of misdiagnosing leprosy with other neuropathic conditions. Electrophysiologic studies and imaging methods, such as ultrasound and magnetic resonance imaging may be used in such cases to complement the evaluation and assist in the differential diagnosis [19]. However, such tests are not easily available in primary health care services in Brazil.

In patients with neuropathy, the symptoms most often confused with leprosy were muscle weakness in the limbs. Muscle weakness may be present in both central nervous system diseases and neuromuscular diseases [20]. Some diseases reported by the study participants are considered neurodegenerative (multiple sclerosis or amyotrophic lateral sclerosis), and present as generalized muscle weakness. The neuropathy observed in leprosy is characterized by the involvement of the peripheral nerves – reaching from the endings in the dermis to the nerve trunks –, being clinically a mixed neuropathy, which usually compromises sensory, motor, and autonomic nerve fibers, leading to the alteration of sensitivity in its thermal, painful, and tactile modalities [21].

The 38 individuals (23.4%) among those classified as misdiagnosed and interviewed in this study who had later been found to be "healthy" are both interesting and concerning cases. In this group, 24 people (63.15%) reported a previous contact with a leprosy patient and, apparently, for that reason, were started on MDT, although they had no signs and symptoms of the disease. Contact tracing is the main strategy for active leprosy case detection, whose purpose is the early detection of new cases among those who live or have lived with the index case for a long time [3]. The municipalities in Mato Grosso that presented the highest number of misdiagnosed leprosy patients in the years selected for this study in ascending order were: Guarantã do Norte, Sinop, Querência, Lucas do Rio Verde, Juara, Cuiabá, and Barra do Garças. Some of these municipalities have a Reference Center with specialized services, such as Cuiabá and Sinop, and all of them are members of the primary care network to treat leprosy cases. Considering that the result reflects some difficulties for the diagnosis of leprosy, we emphasize the need for investments in the development of tools that can help health professionals to confirm the diagnosis of doubtful cases. We also observed weak surveillance in some situations, such as when some contacts were treated even in the absence of symptoms of the disease.

Neves et al. [1] showed an increased number of misdiagnoses in the most endemic areas in Brazil, similarly to what this study has shown for Mato Grosso. This fact might be influenced by the trivialization of the clinical diagnosis in such areas. This study showed that several people (54 – 33.3%) decided to look for another health service after complaining that the symptoms of the disease had not disappeared with MDT. However, it is worth mentioning that the remission of leprosy symptoms will depend on the clinical presentation and bacillary index at diagnosis. It may take a few years for the skin lesions to disappear completely, and motor and sensory deficits can be permanent depending on the degree of nerve damage [2]. Therefore, preventing or minimizing peripheral neuropathy is the main objective of leprosy treatment.

Note that 43 interviewees (26.5%) sought advice from another health service to confirm the diagnosis of leprosy after presenting adverse MDT reaction. According to Goulart et al. [19], important side effects may affect 15% of all cases treated with MDT; thus, it is essential that the health teams are aware of this event and ready to prevent and identify them. Thus, clinical and laboratory follow-up of leprosy patients showing adverse reactions to treatment is fundamental. In this group, five people have reported being hospitalized, two of them were admitted to the intensive care units. Such adverse effects are often addressed by the health professional only when the clinical consequences are pointed out by the patient [22]. In the studied cases, the individuals had adverse effects to the treatment of a disease they did not even have.

Most participants were women aged from 16-59 years. Several studies [23,24] showed that the reported risk of developing leprosy is higher in men than in women. This characteristic may be related to cultural values of self-care and environmental factors in the work performed by the individual, but hormonal factors may also be involved in the immune response against the bacilli. It is worth noting that rheumatic conditions are more common in women [25,26].

The operational classification of most interviewees at the time of leprosy diagnosis was multibacillary, with borderline clinical type, detected after self-presentation (spontaneous demand), and without peripheric neuropathy (disability grade 0). Borderline leprosy is characterized by immunological instability and presents the most varied signs and symptoms, ranging from tuberculoid to

lepromatous poles, sometimes with negative bacilloscopy [12]. Thus, it is possible that health professionals classified doubtful cases under this clinical type due to their more complex characteristics associated with diverse symptoms.

Nearly half of all participants believed that there was a delay until their disease was correctly diagnosed. Access to health services can be delayed due to the individual's reluctance to seek help, and due to poor quality of care. In our sample, interviewees consulted four general physicians and specialists, on average, to obtain the final diagnosis. Operational failures occurred at all levels of the health system, making the search for a diagnosis challenging for patients [27].

Some limitations of our research must be highlighted. Studies based on self-report can be influenced by factors such as memory bias, socially desirable responses, and diagnostic suspicion bias. Although not all individuals who were released from MDT due to misdiagnosis were interviewed, the groups of participants and nonparticipants did not differ significantly according to gender, age group, and educational level. The year with the lowest frequency of interviewees was 2016, indicating that the longer the delay since registration and exit from the SINAN system, the more difficult it becomes to locate the individuals, possibly due to population mobility.

The study was able to deepen our understanding of individuals misdiagnosed with leprosy. The conclusive diagnosis, reported by the participants, resulted in the identification of health problems not consistently considered in differential diagnosis – such as fibromyalgia and spinal problems – in addition to the absence of real disease. Despite this, we highlighted the importance of health professionals working in primary care for the detection and the treatment of leprosy, and in the quality of surveillance actions, such as the examination of contacts. It is notable that most participants who reported not having any disease had had contact with someone with leprosy, which indicates failures in understanding the surveillance protocol regarding contacts. This is particularly worrying considering that the Brazilian Ministry of Health has recently approved a serological rapid test (ML Flow test) to be used as a screening tool for contacts of leprosy patients [2]. It is not a diagnostic test since it may be positive in up to 15-20% of healthy contacts of leprosy patients [4]; however, it is useful to detect early MB cases with little clinical manifestations. The official protocol indicates to take blood samples from seropositive contacts with doubtful signs of leprosy. However, considering our outcomes, there is a real risk that this test increases overdiagnosis by undertrained health staff, who may confirm the diagnosis of leprosy for any seropositive contact, which may lead to an even higher number of misdiagnosed cases.

In conclusion, although the diagnosis of leprosy is clinical and mostly great technical infrastructure, in some more complex situations, such as in the manifestation of pure neural leprosy or in the occurrence of atypical symptoms of the disease, diagnostic support via complementary tests would be necessary, as well as better collaboration between primary care and reference services. Only experienced health workers supported by laboratorial exams should conduct complex differential leprosy diagnosis. The results of our study also suggest the need for continuing education of health care professionals, addressing differential diagnosis, examination, and follow-up of contacts, especially in highly endemic areas, where there may occur overdiagnosis of leprosy.

Contributors

K. V. R. N. Neves participated on the conceptualization of the article, data collection, writing and revision, and approved the final version for publication. L. M. G. Machado contributed on the writing and revision of the paper, and approved the final version for publication. M. N. Lisboa contributed on the writing and revision of the paper, and approved the final version for publication. P. Steinmann contributed on the writing and revision of the paper, and approved the final version for publication. E. Ignotti collaborated on the conceptualization of the article, writing and revision, and approved the final version for publication.

Additional information

ORCID: Karine Vila Real Nunes Neves (0000-0001-9673-5981); Lúbia Maieles Gomes Machado (0000-0003-4538-5138); Maurício Nobre Lisboa (0000-0003-4932-3137); Peter Steinmann (0000-0003-4800-3019); Eliane Ignotti (0000-0002-9743-1856).

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Resumo

O objetivo deste estudo foi analisar o histórico clínico autorreferido de pacientes diagnosticados erroneamente com hanseníase no Estado do Mato Grosso, Brasil. Trata-se de um estudo transversal de novos casos de hanseníase diagnosticados no Estado do Mato Grosso, de 2016 a 2019, que após o início da poliquimioterapia foram liberados do tratamento devido a erros de diagnóstico. Para a coleta de dados, foram realizadas entrevistas telefônicas. Durante o período do estudo, 354 indivíduos com hanseníase foram liberados do tratamento por erro de diagnóstico, dos quais 162 (45,8%) puderam ser entrevistados. Todos os entrevistados expressaram insatisfação com o tratamento, levando à reavaliação do diagnóstico antes de serem liberados por "erro de diagnóstico". Dentre eles, 35,8% tinham como diagnóstico final uma doença musculoesquelética ou do tecido conjuntivo, principalmente fibromialgia e alterações na coluna vertebral, seguidos por 13,6% com diagnósticos de doenças de pele e tecido subcutâneo. Para 23,5% dos entrevistados, nenhum diagnóstico alternativo foi estabelecido, enquanto 7,4% foram posteriormente rediagnosticados com hanseníase. Diagnósticos errôneos de hanseníase foram mais frequentemente reclassificados como fibromialgia e problemas na coluna vertebral. Embora o diagnóstico da hanseníase seja geralmente clínico e não exija acesso à infraestrutura técnica na maioria dos casos, algumas situações mais complexas requerem apoio ao diagnóstico por meio de exames complementares, bem como estreita colaboração entre a atenção primária e os serviços de referência.

Diagnóstico; Fibromialgia; Diagnóstico Diferencial

Resumen

El objetivo de este estudio fue analizar la historia clínica autorreportada de pacientes con diagnóstico erróneo de lepra en el estado de Mato Grosso, Brasil. Se trata de un estudio transversal de nuevos casos de lepra diagnosticados en el estado de Mato Grosso, en el periodo de 2016 a 2019, que, después de iniciar la quimioterapia multimedicamentosa, fueron dados de alta del tratamiento por errores diagnósticos. Para la recolección de datos se realizaron entrevistas telefónicas. Durante el periodo de estudio, 354 individuos con lepra fueron dados de alta del tratamiento por diagnóstico erróneo, de los cuales 162 (45,8%) fueron entrevistados. Todos los encuestados manifestaron su insatisfacción con el tratamiento, lo que llevó a una reevaluación del diagnóstico antes de ser dados de alta por "error de diagnóstico". Entre ellos, el 35,8% tenía como diagnóstico final una enfermedad musculoesquelética o del tejido conectivo, principalmente fibromialgia y cambios en la columna, seguidos de un 13,6% con diagnóstico de enfermedades de la piel y del tejido subcutáneo. El 23,5% de los encuestados no recibieron un diagnóstico alternativo, mientras que el 7,4% fueron rediagnosticados posteriormente con lepra. Los diagnósticos erróneos de lepra se reclasificaron con mayor frecuencia como fibromialgia y problemas de columna. Aunque el diagnóstico de lepra es generalmente clínico y, en la mayoría de los casos, no requiere acceso a infraestructura técnica, algunas situaciones más complejas necesitan pruebas complementarias para su diagnóstico, así como una estrecha colaboración entre la atención primaria y los servicios de referencia.

Diagnóstico; Fibromialgia; Diagnóstico Diferencial

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