

Characterization of leprosy in children under 15 years in an important municipality of north-eastern Brazil

Caracterização da hanseníase em menores de 15 anos em município prioritário do nordeste brasileiro

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Carlos Dornels Freire de Souza*
Thais Silva Matos**

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Abstract

The presence of leprosy in children younger than 15 years is a strong indicator of the maintenance of the epidemiological chain of transmission and evidences of the early exposure. This study aims to identify the family, clinical and epidemiological characteristics of individuals younger than 15 years who were diagnosed with leprosy in the city of Juazeiro-BA. This is an observational, cross-sectional and descriptive study. The study population consisted of all cases of leprosy diagnosed in children under 15 between 2012 and 2014, in the city of Juazeiro-BA. The Complementary Protocol for the Diagnostic Investigation of Cases of Leprosy in Children Under 15 (PCID <15) was used as the data source. The protocol was completed at the time of diagnosis at the Leprosy Reference Centre of the municipality under study. This document is part of the medical records of the patients being treated, and is filed in the outpatient clinic. After the data collection, the data were analyzed using the SPSS software version 20. Adoption of significance was 95%. 42 cases were diagnosed in the age group studied, and the mean annual detection coefficient was 24.85 cases / 100,000 individuals in this age group. Of the total, 66.7% were female. The mean age of the girls was lower than the mean age of the boys, with a significant difference between the genders ($p = 0.021$). The anamnesis showed that in 33.3% of the cases, the first diagnosis was wrong and leprosy was treated as other diseases. It is also noted that 54.8% of patients had a family history of leprosy. The tuberculoid form and paucibacillary operational classification stood out (88.0% and 90.5%, respectively). The study showed that PCID <15 years is an important instrument capable of identifying problems in the quality of leprosy services, such as the fragility in the diagnosis of the disease in the population under 15 years.

Keywords: Leprosy. *Mycobacterium leprae*. Diagnosis.

Resumo

A presença da hanseníase em menores de 15 anos é um forte indicador da manutenção da cadeia epidemiológica de transmissão, além de evidenciar a exposição precoce. Este trabalho teve como objetivo identificar as características familiares, clínicas e epidemiológicas dos indivíduos menores de 15 anos diagnosticados com hanseníase no município de Juazeiro/BA. Trata-se de um estudo observacional, transversal e descritivo. A população do estudo foi composta por todos os casos de hanseníase diagnosticados em menores de 15 anos entre 2012 e 2014, no município de Juazeiro/BA. Como fonte de dados foi utilizado o Protocolo Complementar de Investigação Diagnóstica de Casos de Hanseníase em menores de 15 anos- PCID<15 anos, preenchidos no momento do diagnóstico no Centro de Referência em Hanseníase do município estudado. Este documento é parte do prontuário dos pacientes atendidos e arquivados no referido ambulatório. Após a coleta, os dados foram analisados utilizando o software SPSS, versão 20. Adotou significância de 95%. Foram diagnosticados 42 casos na faixa etária estudada, sendo o coeficiente de detecção médio anual de 24,85 casos/ 100 mil indivíduos nessa faixa etária. Desse total, 66,7% eram do sexo feminino. A média de idade das meninas foi inferior à média de idade dos meninos, com diferença significativa entre os gêneros ($p=0,021$). A anamnese mostrou que em 33,3% dos casos houve um primeiro diagnóstico errado, sendo a hanseníase tratada como outras doenças. Chama atenção também que 54,8% dos pacientes tinham histórico de hanseníase na família. A forma tuberculóide e a classificação operacional Paucibacilar destacaram-se (88,0% e 90,5%, respectivamente). O estudo mostrou que o PCID<15 anos é um importante instrumento capaz de identificar problemas na qualidade dos serviços de hanseníase, como a fragilidade no diagnóstico da doença na população menor de 15 anos.

Palavras-chave: Hanseníase. *Mycobacterium leprae*. Diagnóstico.

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*Federal University of Alagoas (UFAL). Arapiraca / AL, Brazil. E-mail: carlos.freire@arapiraca.ufal.br

** Leprosy Program of the City Hall of Juazeiro. Juazeiro / BA, Brazil.

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INTRODUCTION

Leprosy is a granulomatous and infectious disease caused by *Mycobacterium leprae*. It is an obligate intracellular parasite with an affinity for cutaneous cells and peripheral nerves, being characterized as having high infectivity and low pathogenicity. After entry into the body, the bacillus will settle in Schwann cells and cutaneous tissue, resulting in the appearance of dermato-neurological lesions. Neural injury is, however, the most important element of the disease^{1,2}.

The representation of Brazil in the world scenario of leprosy is a worrying condition. The country appears as the first in the world in a new case detection coefficient, the second in the world in absolute numbers, losing only to India, and the only one not being able to eliminate the disease as a public health problem. Currently, leprosy is the leading cause of preventable physical disabilities worldwide³⁻⁷.

Due to the global epidemiological scenario, WHO launched in 2016 the World Leprosy Elimination Strategy 2016-2020. Three pillars were established by the proposal: 1) strengthen government control, coordination and partnership; 2) combating leprosy and its complications; and 3) combating discrimination and enabling the promotion of inclusion. One of the key actions seeks to contribute to universal health coverage with a special emphasis on children, women and underserved populations, including migrants and displaced persons⁷.

Leprosy in children may be potentially disabling due to early involvement of peripheral nerves, immaturity of the immune system and the possibility of deformities. These deformities can result in physical and functional disabilities⁸. Disabilities, when present, contribute to social stigma in relation to individuals affected by the disease, and result in decreased social participation and increased vulnerability, often resulting in psychological disorders that impair the insertion of the individual in society and the labour market^{9,10}.

As there is no gold standard for the diagnosis of leprosy, the Brazilian Ministry of Health recommends that clinical examination in children under 15 be even more judicious. For this reason, professionals should use

the Complementary Protocol for Diagnostic Investigation of Cases of Leprosy in Children Under 15 (PCID <15), as recommended by Ministerial Order No. 149/2016. The PCID <15 is composed of 27 questions, divided into two parts: the characterization of the clinical and family history and the physical examination¹¹.

Thus, the main objective of this study was to identify the clinical and epidemiological characteristics of leprosy cases in children younger than 15 years, reported in Juazeiro-BA, between 2012 and 2014, based on PCID <15.

METHODOLOGY

This is an observational, cross-sectional and descriptive study involving all new cases of leprosy in children under 15 living in Juazeiro-BA diagnosed between the years of 2012 and 2014. All cases of the municipality are diagnosed in the Dr. Altino Lemos Santiago Reference Center.

The municipality of Juazeiro is located in the northern region of the state of Bahia, Brazil, bordering the city of Petrolina, in Pernambuco. In 2013, the estimated population was 214,748 inhabitants, of which 56,346 were less than 15 years old. It is considered one of the 40 highest priority municipalities for investments in actions to combat the disease, according to the December 16, 2013 ordinance, N^o 3097, due to the high burden of the disease. These municipalities together hold about 24% of the new cases of leprosy diagnosed in the country, 30% of new cases diagnosed in children under 15 years and 21% of cases with grade 2 physical disabilities in the diagnosis⁵.

Data were collected from the Complementary Protocol for Diagnostic Investigation of Cases of Leprosy in Children Under 15 (PCID <15), a document that composes the patients' medical records. There were selected variables for analysis: previous treatment for spot (yes, no), history of skin disease in the family (yes, no), family history of leprosy (yes, no), other diagnoses performed (yes, which, no), number of contacts in the family, time between onset of first lesions and date of diagnosis (less than 6 months, between 6 and 12 months, and greater

than 12 months), clinical form (Indeterminate, Tuberculoid, Dimorphous (borderline), Lepromatous), classification (Paucibacillary, Multibacillary), number of nerves affected, histamine test (yes, no) and degree of physical disability at diagnosis (zero, one, two).

After the construction of the database, descriptive statistical analysis was performed

using the Statistical Package for Social Sciences software (SPSS Inc., version 20). Student's T-test was used to compare means. Significance was 95%.

The present study was built obeying the ethical principles that govern the research, according to the resolution of the National Health Council (CNS) nº 466/2012.

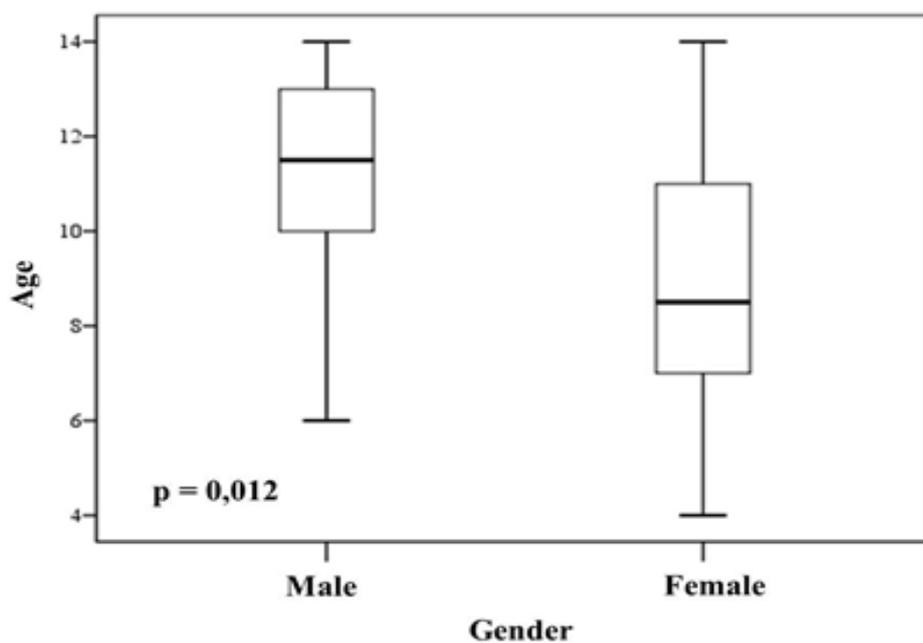
RESULTS

During the study period, 42 new cases of leprosy were diagnosed in children under 15 years of age, of which 14 (33.3%) were male and 28 (66.7%) were female. The mean age at diagnosis was 9.48 ± 3.2 (CI 8.48-10.47) years, the mean age of the boys being higher than the mean age of the girls ($11 \pm 2, 69$ and 8.7 ± 3.2 , respectively / $p = 0.021$), as shown in graph 1. In the box plot, the ends represent the upper and lower limits of age.

The highest age was 14 years for both sexes. On the other hand, the youngest case identified in the girls was 4 years old and, in the boys, 6 years. The cross bar inside the box represents the second quartile, that is, the median age, being equal to 11.5 years for males and 8.5 for females.

The limits of the box represent the 1st and 3rd quartiles and between them is the interquartile range, being higher in girls.

Graph 1 – Stratification of the age of new cases of leprosy in children under 15, according to gender. Juazeiro, Bahia, Brazil, 2012-2014.



Source: PCID <15 years (Juazeiro / BA, 2012-2014).

Table 1 shows the characterization of the anamnesis of the cases diagnosed in the period. From the analysis, what is most striking is the fact that 33.3% of the cases have already undergone previous treatment for the same spot, diagnosed and treated erroneously as ringworm, allergic process or verminosis.

Still according to table 1, 38.1% of the cases had a history of skin diseases in the family and 54.8% had a family history of leprosy, demonstrating an inconsistency in the data. 54.8% of the under-15's diagnosed had at least one in-patient contact with leprosy.

As to the time between the appearing of the first lesions and the date of diagnosis, in 42.8% the diagnosis occurred in the first six months after the appearing of the first signs / symptoms. In 50% (n = 14) of the girls, the time between the appearing of the first lesions and the time of diagnosis was less than six months, while in boys, half of them were between six and twelve months.

As for the clinical forms, the tuberculoid form was highlighted, corresponding to 88.0% of the cases, although all clinical forms were diagnosed. The paucibacillary classification was highlighted with 38 cases (90.5%). Eleven cases (26.12%) had at least one affected nerve at the time of diagnosis. The histamine test was used in only one diagnosis, all of which were performed only by the clinic (Table 2).

Grade of Physical Impairment: Grade 0 - No problem in eyes, hands or feet due to leprosy; Grade I - Decreased or lost sensation in eyes, hands or feet due to leprosy; And Grade II - Severe deformities due to leprosy such as claws, bone resorption, fallen hand / foot, lagophthalmus, ectropion, or trichiasis.

There was also a high proportion of individuals with zero degree of physical disability at the time of diagnosis, corresponding to 92.9% (n = 39) of the diagnosed individuals. It is noteworthy that 100% of the cases had the degree of physical disability assessed at the time of diagnosis.

Table 1 – Characterization of the anamnesis of new cases of leprosy in children under 15 years. Juazeiro, Bahia, Brazil, 2012-2014.

Variables		n	%
Previous treatment for spot	Yes	14	33.3
	No	28	66.7
History of skin disease in the family	Yes	16	38.1
	No	26	61.9
Family history of leprosy	Yes	23	54.8
	No	19	45.2
Number of contacts in the family	0	19	45.2
	1	17	40.5
	2	4	9.5
	3 or more	2	4.8
Time between onset of first lesions and date of diagnosis (months)		2	4.8
	Less than 6	18	42.8
	6 to 12	12	28.6
	Greater than 12	12	28.6

Source: PCID <15 years (Juazeiro / BA, 2012-2014).

Table 2 – Clinical and epidemiological characterization of new cases of leprosy in children under 15 years. Juazeiro, Bahia, Brazil, 2012-2014.

Variables		n	%
Clinical form	Indeterminate	2	4.8
	Tuberculoid	37	88.0
	Dimorphous	1	2.4
	Lepromatous	2	4.8
Classification	Paucibacillary	38	90.5
	Multibacillary	4	9.5
Number of nerves affected	0	31	73.8
	1	10	23.8
	2	1	2.4
Histamine test	Yes	1	2.4
	No	41	97.6
Degree of physical disability at diagnosis	0	39	92.9
	1	3	7.1
	2	0	0.0

Source: PCID <15 years (Juazeiro / BA, 2012-2014).

DISCUSSION

The study of the family history and the clinical and epidemiological characteristics of leprosy make it possible to understand the nuances involved in the process of illness of the individuals, especially with regard to the profile of newly diagnosed cases and the natural history of the disease.

When comparing the mean age at the time of diagnosis, it was found that males had a mean age significantly higher than the mean age of the female subjects. This finding may indicate lesser concern of parents or guardians with boys, resembling the pattern reported in different studies involving the adult population, where men present more severe clinical forms than women.

The late search for care suggests the existence of a process of neglect of the male body. Studies have shown that lower concern with the body and aesthetics are reasons why men seek less

health services. This cultural process of neglect seems to begin in childhood, where there is greater attention by the family and society to the female body^{4,12,13}. According to Machin¹⁴, the characteristics of traditional masculinity, built by the idea of strength, dexterity and “strong sex”, make these individuals seek less health services, corroborating a certain invisibility of men in these services.

There have been many consequences of this process, such as the higher proportion of diagnosed female subjects, the higher prevalence of more severe forms in males, which, in turn, implies a greater risk of developing neuromotor sequelae^{4,15,16}.

Differently from the majority of studies that showed a predominance of males in all age groups, the predominance of females found in this study is corroborated by Horo et al¹⁷, in a study conducted in India, Rao¹⁰, Nigeria, and

by Lana et al¹⁸, in Brazil.

A second issue observed in this study is the fact that 33.3% (n = 14) of children under 15 years of age with leprosy were initially treated as mycoses, allergic processes or verminosis. Of the fourteen cases, ten of them received treatment for ringworm, one for verminosis, and two for allergic processes. The proportion found in this study is much higher than that found by Flach et al¹⁶, where 18.9% of the cases were previously treated as another disease. This finding indicates a fragility of health services in diagnosing the disease in the population under 15 years of age.

It should be emphasized that, in this age group, the diagnosis of the disease is not always easy, since it can present as a single lesion and does not always have tactile, thermal and painful anaesthesia. In many cases there is no typically hypochromic and anaesthetic lesion, but only an area with thinning of the hair and / or loss of the sweating mechanism. In addition, in children there is still the difficulty in applying and interpreting the sensitivity tests⁸.

This finding should be understood as an alert, not only for the need to qualify professionals for diagnosis in this population, but also for the development of judicious methods that reduce the occurrence of diagnostic errors. Although some methods have already been developed, such as pathology, serological tests and Polymerase Chain Reaction (PCR), they are still very expensive and are not available in most services^{8,19-21}. It is also worth noting that these tests are not very specific for the diagnosis of leprosy in children, due to the subjectivity in the findings and the atypical clinical presentations.

An auxiliary tool in the diagnosis of leprosy in children is the Histamine test. The test is based on the integrity of nerve branches of the skin. A drop of thousands of histamines in a drop of solution is applied over the suspected area and over a healthy area.

Then the skin is scarified with a needle through the drop, without bleeding. The intention is to verify the triple response of Lewis, which in a leprous cutaneous lesion will be incomplete, and there is no secondary reflex erythema due to neural lesions^{8,19}. Although it is a simple test that could help in the diagnosis, in this study only one patient was submitted to

the examination. Failure to perform the test was also observed in a study conducted by Flach et al¹⁶ in priority municipalities in the state of Rio de Janeiro, where in 92.7% of the cases the histamine test was not performed.

In the anamnesis, a third question that raises the need for analysis refers to the finding that 54.8% of the cases had at least one ill contact. However, in the question concerning the existence of people with skin disease in the family, only 38.1% reported having someone ill. This finding reflects an inconsistency in the responses provided to the professional at the time of the investigation.

Another finding that stands out is that 45.2% of the diagnosed cases had no ill contact in the family. Since leprosy is a disease that requires prolonged contact and has a long incubation period, in childhood, contamination occurs predominantly within the family, the hypothesis of maintaining the epidemiological chain of transmission, the high occult prevalence of the disease, and hyperendemicity of the environment. Similar results are reported by Flach et al¹⁶.

Regarding the clinical variables, the findings of this study are in agreement with others, in which the tuberculoid clinical form and the paucibacillary operational classification predominate. Similar results were described in the studies by Lana et al¹⁸ and Imbiriba et al²², where 60.9% and 70.7%, respectively, were paucibacillary forms. These findings may reflect questions about the immunity of individuals, the slow evolution of the disease, and the early diagnosis.

One of the major concerns in leprosy is the existence of peripheral nerves affected, which directly influence the emergence of physical disabilities. In that study, 73.8% had no affected nerves and 92.9% had zero degrees of physical disability. Similar results are found by Flach et al¹⁶, where 82.2% of the cases had no affected nerves and 89.8% presented zero degree of physical disability at the time of diagnosis.

The assessment of the degree of physical disability at the time of diagnosis is an important tool to monitor the timing of the diagnosis, reflecting the operational capacity of the health services to catch early cases of the disease. Studies indicate that high proportions of

individuals with some type of disability at the time of diagnosis suggest the passivity of the services in catching ill patients^{9, 17}.

The proportion of patients with some type of physical disability found in this study (7.1%) was lower than the proportion found in the study by Lana et al¹⁸, in the Jequitinhonha Valley, which corresponded to 18.6%, and similar to that found by Imbiriba et al²², in Manaus, where the proportion was 6%.

If, on the one hand, the high proportion of cases diagnosed and treated, initially, like other diseases, and the long periods between diagnosis and treatment are elements that demonstrate weaknesses in the services of the municipality studied. On the other hand, the large proportion of individuals without affected nerves and without any physical disability demonstrate the effective aspects of the services.

CONCLUSION

The coefficient of detection of new cases of leprosy in children under 15 indicates that the disease is an important public health problem in the city of Juazeiro.

The study showed that the great majority of cases of the disease in the studied population was detected early, since there was a predominance of the tuberculoid clinical form and a paucibacillary operational classification, low peripheral nerve involvement, and no individual with grade II physical disabilities.

The PCID <15 years also showed that the under-15's had contact with a leprosy patient and a third of the patients were treated for

other diseases. In addition, most patients were diagnosed before completing six months of the onset of the first lesions.

PCID <15 is an instrument that, besides favouring a careful diagnosis, makes it possible to highlight problems in the quality of the services provided, such as the diagnostic error and the time between the first signs and symptoms, and the diagnosis. It is recommended that the weaknesses pointed out by this study be carefully observed by the health authorities in order to seek the continuous improvement of health services, contributing to the reduction of the burden of leprosy.

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