

# CLINICAL EPIDEMIOLOGICAL PROFILE OF LEPROSY IN CHILDREN UNDER 15 YEARS IN THE CITY OF JUAZEIRO-BA

*Perfil clínico-epidemiológico da hanseníase em menores de 15 anos no município de Juazeiro-ba*

*Perfil clínico-epidemiológico de lepra em menores de 15 años Del municipio de Juazeiro-BA*

Original Article

## ABSTRACT

**Objective:** To describe the clinical and epidemiological profile of new cases of leprosy in people aged under 15 years, reported to the Municipal Department of Health (Secretaria Municipal de Saúde - SMS) of Juazeiro-BA, in the period from 2001 to 2010. **Methods:** This is a quantitative study, of exploratory and descriptive nature, performed through the analysis of data contained in the Information System for Notifiable Diseases (Sistema de Informação de Agravos de Notificação - SINAN), in municipal level. **Results:** The results showed that 145 (7.94%) new cases of leprosy affected people under 15 years. High detection rates were verified for this age group, with predominance in females (n=81; 55.86%) and greater occurrence in the age group from 10 to 14 years (n=85; 58.62%). The paucibacillary forms (n=107; 74.48%) have predominated over the multibacillary forms of the disease (n=37; 25.52%), being the tuberculoid clinical form (n=80; 55.17%) the most prevalent one. The disabilities reached 18 (12.41%) of the surveyed patients at the diagnosis time and 15 (10.34%) at the hospital discharge time. Many of the cases (n=58; 40.07%) were not assessed or were ignored. **Conclusion:** The clinical and epidemiological profile of the occurrence of new cases of leprosy in Juazeiro-BA showed that both the overall detection coefficients of leprosy as those for people aged under 15 years remained at hyperendemic levels during the surveyed period.

**Descriptors:** Leprosy; Child; Descriptive Epidemiology.

## RESUMO

**Objetivo:** Descrever o perfil epidemiológico e clínico dos casos novos de hanseníase em menores de 15 anos notificados à Secretaria Municipal de Saúde (SMS) de Juazeiro-BA, no período de 2001 a 2010. **Métodos:** Trata-se de um estudo quantitativo, de natureza exploratória e descritiva, realizado a partir da análise dos dados contidos no Sistema de Informação de Agravos de Notificação (SINAN) municipal. **Resultados:** Os resultados mostraram que 145 (7,94%) casos novos de hanseníase ocorreram em menores de 15 anos. Verificaram-se taxas de detecção altas para essa faixa etária, com predominância no sexo feminino (n=81; 55,86%) e maior acometimento na faixa etária entre 10 e 14 anos (n=85; 58,62%). As formas paucibacilares (n=107; 74,48%) da doença predominaram sobre as formas multibacilares (n=37; 25,52%), sendo a forma clínica tuberculoide (n=80; 55,17%) a mais prevalente. As incapacidades atingiram 18 (12,41%) dos pacientes avaliados no diagnóstico e 15 (10,34%) na alta. Uma grande parte de casos (n=58; 40,07%) deixou de ser avaliada ou foi ignorada. **Conclusão:** O perfil epidemiológico e clínico da ocorrência de casos novos de hanseníase no município de Juazeiro-BA evidenciou que os coeficientes de detecção geral de hanseníase e em menores de 15 anos se mantiveram em nível hiperendêmico no período avaliado.

**Descritores:** Hanseníase; Criança; Epidemiologia Descritiva.

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## RESUMEN

**Objetivo:** Describir el perfil epidemiológico y clínico de los nuevos casos de lepra en menores de 15 años identificados en la Secretaría Municipal de Salud (SMS) de Juazeiro-BA, en el periodo de 2001 hasta 2010. **Métodos:** Se trata de un estudio cuantitativo, de naturaleza exploratoria y descriptiva, realizado a partir del análisis de datos del Sistema de Información de Agravos de Notificación (SINAN) del municipio. **Resultados:** Los resultados mostraron que 145 (7,94%) nuevos casos de lepra se dieron en menores de 15 años. Se verificó tasas de detección elevadas para esa franja etaria con predominio del sexo femenino ( $n=81$ ; 55,86%) y mayor afectación en la franja etaria de los 10 a los 14 años ( $n=85$ ; 58,62%). Las formas paucibacilares ( $n=107$ ; 74,48%) de la enfermedad han superado las formas multibacilares ( $n=37$ ; 25,52%), siendo la forma clínica tuberculoide ( $n=80$ ; 55,17%) la más presente. Las incapacidades atingieron 18 (12,41%) de los pacientes en los cuales se evaluó el diagnóstico y 15 (10,34%) el alta. Una gran parte de los casos ( $n=58$ ; 40,07%) no ha sido evaluada o fue ignorada. **Conclusión:** El perfil epidemiológico y clínico de la presencia de nuevos casos de lepra en el municipio de Juazeiro-BA evidenció que los coeficientes de detección general de lepra y en menores de 15 años se mantuvieron en nivel hiperendémico en el período evaluado.

**Descriptor:** Lepra; Niño; Epidemiología Descriptiva.

## INTRODUCTION

Leprosy is an ancient, infectious and chronic disease caused by *Mycobacterium leprae*. It is characterized by a slow evolution, high infectivity and low pathogenicity, and it mainly manifests itself by means of neurological and dermatological signs and symptoms. With the disease progression, nerve lesions arise – especially the ones in the peripheral nerve trunks – which end up causing disabilities and deformities, resulting not only in economic and psychological damages to patients, but also prejudice in relation to them<sup>(1)</sup>.

In the year 2011, of the 219,075 new cases of leprosy registered across the world, 160,132 were reported in Southeastern Asia; 12,673 in Africa; 5,092 in the Western Pacific region; 4,346 in the Eastern Mediterranean and 36,832 in America. In the same year, Brazil reported 33,955 new cases, ranking second in the world ranking, behind only India, with 127,295 new cases<sup>(2)</sup>.

In Brazil, leprosy has been gradually stabilizing the detection coefficients. However, in the North, Midwest and Northeast regions, there are still rates at very high levels – above 20 cases per 100,000 inhabitants – which show the need for performing activities that help decrease the

transmission of the disease in order to achieve the goals proposed by the World Health Organization (WHO)<sup>(3)</sup>.

In the year 2010, the detection coefficient of new cases in Brazil reached 17.65/100,000 inhabitants. The North Region presented a coefficient of 42.65/100,000 inhabitants. In the Midwest Region, the coefficient was 40.40/100,000 inhabitants. The coefficient related to the Northeast Region reached the amount of 26.08/100,000 inhabitants. In the same year, the percentage of new cases among people under 15 years of age accounted for 7.12% ( $n=2,420$ ) of the annual total of cases registered in the country, with the highest percentage found in the Northeast Region ( $n=1,166$ ; 3.43%), followed by the North Region ( $n=670$ ; 1.97%)<sup>(3-4)</sup>.

Data from the State Program for Leprosy Control reveal that 68% of municipalities in the State of Bahia show a heterogeneous dissemination of notified cases. Nonetheless, there are areas of concentration – especially in the North, West and Inner South of the State – that contribute to the high rates of prevalence and detection of leprosy<sup>(5)</sup>. In 2011, the State Department of Health of Bahia registered 2,755 new cases of leprosy (detection coefficient: 19.5/100,000), with 197 (7.15%) cases reported among people under 15 years of age<sup>(6)</sup>.

Although leprosy is considered a disease of adults and young adults, there is a large number of cases among people under 15 years of age. They suggest early exposure and persistent transmission of the disease as sensitive elements to assess its dimension, thus contributing to the perception of the endemic pattern of leprosy in a certain place<sup>(1)</sup>. A region is considered hyperendemic when the detection coefficient among people under the age of 15 is above 10/100,000 inhabitants<sup>(7)</sup>.

The identification and monitoring of areas with higher rates of detection and prevalence of the disease through the delineation of clusters (which concentrate municipalities according to epidemiological criteria) have been one of the main control strategies. These municipalities are mainly located in the North, Northeast and Midwest regions. The delimitation of these areas allows for the orientation of the program for leprosy control in regions where the spread of the disease is higher, increasing the epidemiological effectiveness of the actions<sup>(4)</sup>.

The municipality of Juazeiro, situated in the North of the State of Bahia, located in sub-medium course of the São Francisco River Basin, bordered by the State of Pernambuco, is one of these regions of clusters. The separation between the two states – which is made only by a bridge over the São Francisco River – favors intense daily mobility, which can facilitate the spread of leprosy. In 2010, Juazeiro, BA, showed an overall detection coefficient of 104 cases per 100,000 inhabitants. Regarding people under 15 years of age, the detection coefficient was of 41.9 cases per 100,000

inhabitants, highlighting the hyperendemic situation of leprosy in the municipality at stake<sup>(8)</sup>.

The lack of research to express the magnitude of leprosy in Juazeiro, BA, especially among people under 15 years of age, enhances the importance of this study. It intends to analyze the clinical and epidemiological situation of this disease among people under 15 years of age and deepen the knowledge about the behavior of this endemic disease, thereby contributing to the intensification of health surveillance actions and control of leprosy in this region.

Therefore, the aim of this study is to describe the clinical and epidemiological profile of the occurrence of new cases of leprosy in people under 15 years of age reported to the Municipal Department of Health (*Secretaria Municipal de Saúde* - SMS) in Juazeiro, Bahia, Brazil, in the period from 2001 to 2010.

## METHODS

This is an exploratory and descriptive study using a quantitative design performed from the collection of secondary data contained in the leprosy notification forms of the Diseases and Notification Information System (SINAN) of the municipality of Juazeiro, BA, Brazil. The study comprised all new cases of leprosy among people under 15 years of age, of both sexes, who lived in Juazeiro and were notified in the SINAN during the period from 2001 to 2010.

In order to collect absolute data, it was developed an instrument composed of the following variables: age, classified in age group (under 1 year of age; 1-4 years of age; 5-9 years of age; 10-14 years of age); gender (female, male or ignored); assessment of physical disability (degree 0, degree 1, degree 2, not rated); operational classification (paucibacillary, multibacillary); clinical forms (indeterminate, tuberculoid, dimorphic, virchowian, unclassified); and detection method of new cases (referral, spontaneous demand, collectivity examination, contact examination, other methods, ignored).

Data analysis was conducted through the calculation of the epidemiological and operational indicators recommended by the Brazilian Ministry of Health for monitoring and assessment of leprosy. The following indicators were used: annual detection coefficient of new cases of leprosy per 100,000 inhabitants; annual detection coefficient of new cases of leprosy in the population group aged 0-14 years per 100,000 inhabitants; proportion of new cases of leprosy with a degree of physical disability in people under 15 years of age; and the proportion of cases with physical disability healed per year among people under 15 years of age.

The annual distributions of new cases of leprosy among people under the age of 15 by neighborhood has

also been analyzed to assess the evolution of the disease in the neighborhoods where these cases were detected during the period of the survey. The data were stored and then tabulated using the software Microsoft Office Excel 2007.

The study followed all the guidelines and standards for research involving human subjects according to the Resolution 196/96 of the Brazilian National Health Council, with the signing of the consent letter and the confidentiality agreement by the municipal health secretary of Juazeiro and the researcher. This study was also approved by the Research Ethics Committee of the Federal University of Vale do São Francisco (CAEE 0090.0.441.000-11).

## RESULTS

During the study period, there were 145 new cases of leprosy reported among people under 15 years of age, accounting for 7.94% of the overall new cases diagnosed in the same period.

By analyzing the overall detection coefficient of leprosy, it could be observed a persistent hyperendemic situation according to the parameters of the Brazilian Ministry of Health (above 40 cases per 100,000 inhabitants), even though there was a decline between the years 2005 and 2006 (Figure 1). The detection coefficients of leprosy for people under 15 years of age also remained hyperendemic (above 10 cases per 100,000 inhabitants) – except in 2006, when there was a sharp decrease in the number of cases (but even so, it was considered a high level of the endemic disease) (Figure 2).

There was an increase in the detection of cases in the years 2001 and 2002, a period when the implementation of the Family Health Program (FHP) and actions of decentralization of the Program for Combating Leprosy in the municipality took place. In subsequent years, there was a decrease in these coefficients, reaching one of the lowest values in 2009 (a decrease of approximately 46% in comparison with the highest detection coefficient). Nevertheless, in 2010, there was a sharp increase in relation to the previous year due to the intensification of control actions by the Labor-related Education for Health/Surveillance Program (PET Saúde/VS), which provided the discovery of underreported cases.

Regarding the demographic aspects, there was a female predominance (n=81; 55.86%), with the total distribution of cases in the following age groups: five patients (3.45%) were aged 1-4 years; 55 (37.93%) aged 5-9 years and 85 (58.62%) were 10-14 years old.

When assessing the distribution of cases by neighborhood, it could be observed a higher concentration in the Argemiro (n=9; 6.21%) Quidé (n=7, 4.83%) and Codevasf (n=6; 4.15 %) neighborhoods. An important

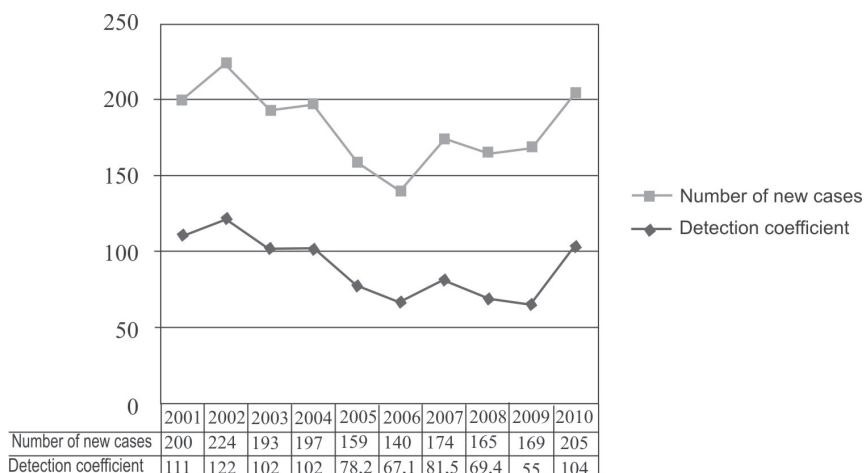


Figure 1 - Number of new cases and overall annual detection coefficient of leprosy per 100,000 inhabitants. Juazeiro-BA, Brazil, 2001-2010.

Source: Diseases and Notification Information System (SINAN) – Database from the Municipal Department of Health/SMS, 2011.

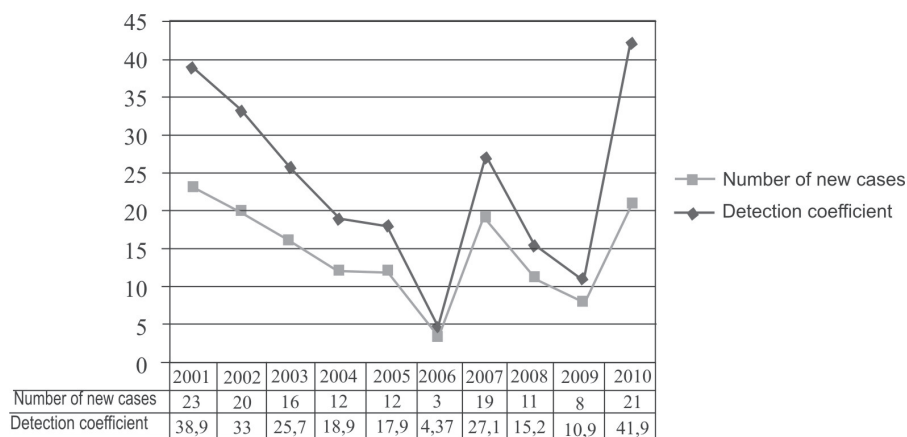


Figure 2 - Number of new cases and annual detection coefficient of leprosy in people under 15 years of age per 100,000 inhabitants. Juazeiro-BA, Brazil, 2001-2010.

Source: Diseases and Notification Information System (SINAN) – Database from the Municipal Department of Health/SMS, 2011.

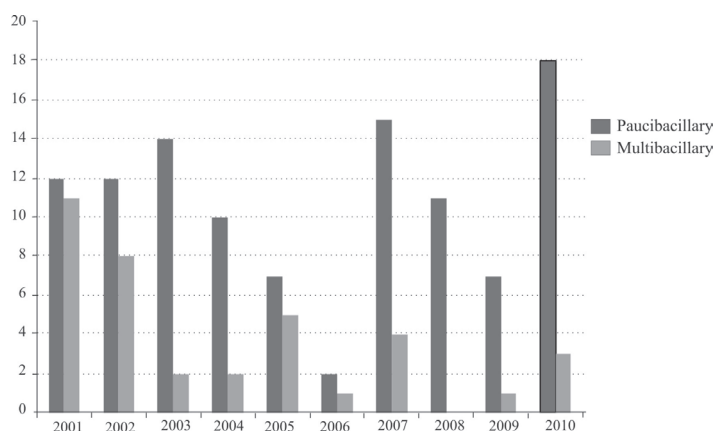


Figure 3 - Distribution of cases of leprosy in people under 15 years of age according to the operational classification. Juazeiro-BA, Brazil, 2001-2010.

Source: Diseases and Notification Information System (SINAN) – Database from the Municipal Department of Health/SMS, 2011.



finding was the lack of registration of the “place of residence (Neighborhood)” in 74 (51%) of the reported cases.

Figure 3 shows that the paucibacillary forms have prevailed in relation to the multibacillary forms over the years. The tuberculoid clinical form accounted for 80 (55.17%) cases (Table I). There was equivalence in this proportion only at the beginning of the surveyed period (in the years 2001 and 2002), when the number of multibacillary cases was close to the number of paucibacillary cases.

Table I - Distribution of cases of leprosy in people under 15 years of age according to the clinical form. Juazeiro-BA, Brazil, 2001-2010.

Clinical form	n	%
Indeterminate	26	17.93
Tuberculoid	80	55.17
Dimorphic	33	22.76
Virchowian	4	2.76
Unclassified	2	1.38
Total	145	100

Source: Diseases and Notification Information System (SINAN) – Database from the Municipal Department of Health/SMS, 2011.

By considering the degree of physical disability (DPD) in the diagnosis, among the 141 (97.24%) assessed patients, there was a predominance of DPD zero; however, 18 (12.41%) patients showed some degree of physical disability at the diagnosis time and only a small percentage (n=5; 3.76%) was not assessed. Regarding the DPD in case of hospital discharge by healing, the majority of the surveyed cases (n=71, 48.96%) showed degree zero. There was disability in 15 (10.34%) patients, and a large number of people (n=58; 40.07%) were ignored or not assessed (Table II).

Table II - Percentage of cases of leprosy in people under 15 years of age according to the degree of physical disability (DPD) at the time of diagnosis and hospital discharge. Juazeiro-BA, Brazil, 2001-2010.

Degree of disability	Diagnosis n=145	Discharge by healing n=145
Degree 0	84.83%	48.96%
Degree 1	10.35%	9.65%
Degree 2	2.06%	0.69%
Not assessed	3.76%	29.7%
Ignored/unanswered	0%	11%

Source: Diseases and Notification Information System (SINAN) – Database from the Municipal Department of Health/SMS, 2011.

As to the method for detection of cases, there was a predominance of the discovery of 116 (80%) new cases of leprosy in a passive way, through referrals and spontaneous demand.

## DISCUSSION

In the municipality of Juazeiro, the overall detection coefficients of leprosy and the detection coefficients for people under 15 years of age remained at hyperendemic levels during the period investigated in this research. The detection rate reflects the real incidence of cases and the fast diagnosis by the health system<sup>(7)</sup>.

A study held in the period from 1980 to 2006 shows that the detection rate of leprosy in Brazil increased in the last two decades of the 20<sup>th</sup> century, coinciding with the sanitary reform that occurred in the same period. According to the author, this increase suggests that the rate reflected the improvement of access to the primary care<sup>(9)</sup>. In Duque de Caxias, Rio de Janeiro State, researchers have found an increase in the detection of cases in the neighborhoods where more strategic actions to control the disease were performed<sup>(10)</sup>. The annual detection coefficient of new cases of leprosy in the population aged from 0 to 14 years per 100,000 inhabitants has the capacity to measure the strength of recent transmission of this endemic disease and its tendency<sup>(7)</sup>.

While leprosy becomes rarer in some countries or regions, in Brazil, the number of cases has remained stable, showing that more occurrences will emerge in the coming years. The behavior of case detection has remained constant over the past 30 years. A worrying fact is this hidden prevalence, which is defined as the set of expected cases that are not diagnosed (or are later diagnosed)<sup>(11-13)</sup>.

Although the disease remains stable, in Brazil, the distribution of new cases of leprosy unevenly takes place across the areas. Accordingly, it becomes necessary that managers know the local epidemiological situation to define priority actions according to each situation.

With respect to gender, in the present study, we have observed a higher prevalence in females. The occurrence of cases of leprosy has apparently an equal frequency in both genders in the general population<sup>(14-16)</sup>. Other studies have found male predominance in people less than 15 years<sup>(17,18)</sup>.

Regarding the distribution by age group in this current study, the highest number of cases of leprosy according to the advance of age – with a prevalence in the age group from 10 to 14 years – was consistent with other researches that justify the lower prevalence of leprosy in children under five years of age due to the natural organic protection and the long incubation time of the bacillus<sup>(14,17)</sup>.

The record of cases in the age group from 1 to 4 years reflects the severity of the disease in the municipality assessed in the current study, since it means that children soon have contact with people bearing leprosy bacillus<sup>(19)</sup>. Although epidemiological studies reveal that occurrences of severe disability in children are rare<sup>(20)</sup>, leprosy in children under five years of age can be potentially disabling because of early involvement and the possibility of the onset of deformities.

Concerning the geographic distribution, the concentration of cases took place in the suburbs of the city, with the exception of three cases occurring in the downtown area. Old and undiagnosed cases contribute to feeding the chain of transmission of the disease in the municipality. In a study held in Teresina, Piauí State, the author reports having found higher detection rates in areas with difficult socioeconomic situation<sup>(20)</sup>; this finding corroborates the findings of other authors in the Rio de Janeiro State, where the highest prevalence of cases occurred in people with lower levels of education and income<sup>(16)</sup>.

This study also allowed for detecting flaws in the SINAN, such as the significant lack of registration of the “place of residence (neighborhood)”, which hinders the actual interpretation of the situation. The non-inclusion of such data can demonstrate inconsistencies in the quality of the information.

According to the operational classification in the current investigation, the paucibacillary forms were prevalent in all surveyed years. Other studies showed the predominance of paucibacillary forms among children, but this finding is considered foreseeable because of the incubation period of the disease<sup>(1,14,18)</sup>. Nonetheless, there are researches that demonstrate a different distribution in relation to the present study, in which it was found a higher concentration of multibacillary forms<sup>(17,21)</sup>.

The paucibacillary forms are common in subjects with resistance to the leprosy bacillus and can be spontaneously healed. The multibacillary forms occur in patients with low resistance to the bacillus. These cases should serve as a warning to the local health service, since they comprise a source of infection and maintenance of the epidemiological chain of the disease, in addition to being considered as contagious and potentially disabling forms<sup>(15)</sup>.

In the current study, the most frequent clinical form was the tuberculoid. Similar findings were observed in other studies<sup>(14,18)</sup>. This form is common among people who are resistant to the *Mycobacterium leprae*, but underwent successive contacts and ended up developing the disease<sup>(1,17)</sup>. The predominance of this form in a certain region is an important epidemiological indicator of the growing trend of leprosy, and only early diagnosis and treatment can break the chain of transmission of the disease<sup>(15)</sup>.

The indeterminate form constitutes itself in the initial stage of leprosy and might progress to spontaneous healing or to polarized forms (tuberculoid, dimorphic or virchowian). The initial stage is ideal for discovering and treating leprosy, since it might prevent the physical deformities and break the chain of transmission of the disease. However, in this study, the percentage of the indeterminate form was lower than the percentage of polarized forms, demonstrating the high prevalence of the disease in the assessed region and the delay in diagnosis<sup>(14,15,21)</sup>.

The early diagnosis is influenced by operational factors<sup>(1)</sup>. Thus, the percentage of cases with DPD allows for assessing both the operational and the epidemiological component, since the delayed diagnosis favors the maintenance of the sources of infection. Most of the sick people, when early diagnosed, do not present disabilities. The risk of onset of disabilities is enhanced by the duration time of the disease. Therefore, the cases discovered with a disability – whether they are only changes in skin sensation (DPD 1) or loss of muscle strength and/or deformations (DPD 2) – might be considered as late diagnoses<sup>(1,22,23)</sup>.

The proportion of new cases with DPD 2 among all new cases reported during the year is used to assess the delay of diagnosis as an indicator of the quality of the activities for case detection<sup>(24)</sup>. The frequency of such cases among the assessed subjects is considered high when it is above 10%; medium, if it is between 5 and 10%; and low, if it is less than 5%<sup>(25)</sup>. This variable was classified as low among people under 15 years of age in the municipality of Juazeiro, BA, Brazil, during the years investigated in the current research.

By comparing the assessment of the DPD at the time of the notifications and healings, it can be noticed that there is an inadequate clinical monitoring of patients. The decreased number of cases assessed at the time of hospital discharge may suggest a failure in the follow-up of cases, neglecting the pre-established routine and hindering the development of a comprehensive health care for the population<sup>(18)</sup>.

Regarding the detection method used for the surveyed group, there was a predominance of spontaneous demand and referrals, considered as passive forms of discovery of cases of leprosy. The high percentage of spontaneous demand – probably due to the family members who suspect the disease and lack fast solutions to ensure early diagnosis and treatment – highlights the precariousness in actions for disease control, which is a fact corroborated by other studies<sup>(1,18)</sup>.

According to the WHO, national programs should promote initiatives such as increased dissemination of information on the early signs and symptoms of leprosy to the general public, encouraging people with suspicion of leprosy to voluntarily go to the nearest healthcare units<sup>(24)</sup>.

With regard to referrals, occurring mainly because of the difficulty in the leprosy diagnosis for this age group and the lack of a capable and active primary healthcare network for the diagnosis of the disease, the number of undiagnosed cases referred for other services has increased<sup>(18)</sup>, which has also happened to the municipality of Juazeiro<sup>(18)</sup>. A study on the training of health professionals shows that the combination of commitment with technical skills is a promising scenario for a good outcome in the disease control<sup>(26)</sup>.

Although the active search is one of the most important strategies for the discovery of cases in patients under 15 years of age, the results of the current study show that this method was only responsible for a small proportion of notified children. The active search provides a more accurate and early detection of cases, i.e., it contributes to decrease the prevalence of hidden cases and disabilities<sup>(1)</sup>.

It is essential that the municipality shall provide good quality information to establish strategies, organize and assess programs and services, and also enable a more efficient and appropriate use of resources.

## CONCLUSION

The clinical and epidemiological profile of the occurrence of new cases of leprosy in the municipality of Juazeiro, State of Bahia, Brazil, showed that the overall detection coefficients and the coefficients for people under 15 years of age remained at hyperendemic levels during the surveyed period. There was also a higher prevalence in women and the age group from 10 to 14 years old, and the most frequent clinical form was the tuberculoid, presenting approximately 12% of patients with some degree of physical disability at the time of diagnosis.

The findings of this study highlighted the need for implementing the decentralization of health surveillance actions, with an emphasis on health education, professional training, early diagnosis, encouragement for the correct notification of cases, follow-up of patients and control of people who have direct contact with an infected person.

The people involved in the program for leprosy control must have a different view of the neighborhoods with characteristics of continuous transmission. They must intensify surveillance activities among schoolchildren who are part of the population susceptible to the disease. Despite the low morbidity and mortality, the onset of leprosy in children, if it is not early diagnosed and treated, can cause a dangerous effect on their future life due to physical, social and psychological troubles that arise from the disease.

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