JOURNAL OF NURSING
Revista de Enfermagem
UFPE On Line
JNUOL
ISSN: 1981-8963

ORIGINAL ARTICLE

CLINICAL AND EPIDEMIOLOGICAL ASPECTS OF LEPROSY
ASPECTOS CLÍNICOS E EPIDEMIOLÓGICOS DA HANSENÍASE
ASPECTOS CLÍNICOS Y EPIDEMIOLÓGICOS DE LA LEPRA

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ABSTRACT

Objective: to analyze the clinical and epidemiological aspects of leprosy. *Method:* this is a quantitative study, descriptive, cross-sectional, involving 35,853 cases of leprosy in the period from 2005 to 2015. Informs you that the analysis of the data came from the Information System of Reportable Diseases, and the results were presented in the form of table and figure. *Results:* it was registered 35,853 cases of leprosy, the majority being male aged between 40-59 years old, brown color, with incomplete primary education and residing in the urban area. It turns out that the dimorphic clinical form, multibacillary leprosy and the zero degree of physical disability were the most incidents, and the mode of entry more frequent was the new cases; the cure was the main form of output, the sputum smear microscopy was not performed in the majority of cases and the initial therapeutic regimen was the polychemotherapy for multibacillary patients. *Conclusion:* it is concluded that leprosy is endemic and still constitutes a public health problem, and it is essential to be developed educational activities on a permanent basis, especially for the vulnerable population. You must substantiate this action in the understanding of the social representation that these population groups have about leprosy. *Descriptors:* Neglected Diseases; *Mycobacterium leprae*; Leprosy; Public Health; Epidemiology; Infection.

RESUMO

Objetivo: analisar os aspectos clínicos e epidemiológicos da hanseníase. *Método:* trata-se de um estudo quantitativo, descritivo, transversal, envolvendo 35.853 casos de hanseníase, no período de 2005 a 2015. Informa-se que a análise dos dados adveio do Sistema de Informação de Agravos de Notificação, e os resultados foram apresentados em forma de tabela e figura. *Resultados:* registraram-se 35.853 casos de hanseníase, sendo a maioria do sexo masculino na faixa etária entre 40-59 anos, de cor parda, com nível fundamental incompleto e residente em zona urbana. Revela-se que a forma clínica dimorfa, multibacilar e o grau zero de incapacidade física foram os mais incidentes, e o modo de entrada mais frequente foi o de casos novos; a cura foi a principal forma de saída, a baciloscopia não foi realizada na maioria dos casos e o esquema terapêutico inicial foi a poliquimioterapia para multibacilares. *Conclusão:* conclui-se que a hanseníase é endêmica e ainda constitui um problema de saúde pública, e é fundamental que sejam desenvolvidas atividades educativas de forma permanente, sobretudo para a população vulnerável. Deve-se fundamentar esta ação na compreensão da representação social que esses grupos populacionais têm acerca da hanseníase. *Descritores:* Doenças Negligenciadas; *Mycobacterium leprae*; Hanseníase; Saúde Pública; Epidemiologia; Infecção.

RESUMEN

Objetivo: analizar los aspectos clínicos y epidemiológicos de la lepra. *Método:* se trata de un estudio cuantitativo, descriptivo y transversal que envuelven 35,853 casos de lepra en el período de 2005 a 2015. Le informa de que el análisis de los datos proviene del Sistema de Información de Agravios de Notificación, y los resultados se presentaron en forma de tablas y figuras. *Resultados:* se registraron 35,853 casos de lepra, la mayoría son varones con edades comprendidas entre 40-59 años, de color marrón, con primaria incompleta y que residen en el área urbana. Resulta que la forma clínica dimorfa, lepra multibacilar y el grado cero de la discapacidad física fueron la mayoría de los incidentes, y el modo de entrada más frecuente fue el de casos nuevos; la curación fue la principal forma de producción, la baciloscopía no se llevó a cabo en la mayoría de los casos y la pauta terapéutica inicial fue la poliquimioterapia para pacientes multibacilares. *Conclusión:* se concluye que la lepra es endémica y aún constituye un problema de salud pública y es esencial que se desarrollen actividades educativas sobre una base permanente, especialmente para la población más vulnerable. Debe justificar esta acción en la comprensión de la representación social que estos grupos de población tienen acerca de la lepra. *Descriptores:* Enfermedades Olvidadas; *Mycobacterium leprae*; lepra; Salud Pública; Epidemiología; Infección.

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INTRODUCTION

It is known that leprosy is a chronic infectious disease caused by the *Mycobacterium leprae*, which has high infectivity and low pathogenicity; it affects the peripheral nerves and can be transmitted through droplets or aerosols.[1]

Explains that its geographic distribution is not uniform and the highest prevalence rates are located in regions of low socioeconomic development, such as Latin America, Africa and Asia, and India, Brazil and Indonesia are the most endemic countries, because, together, these countries reported 81% of new cases throughout the world. It turns out that, 2013, India and Brazil registered, respectively, 126,913 and 31,044 cases, and, in the year 2014, the Indonesia registered 17,025 new cases.[2-3]

It stands out in the scenario of leprosy in Brazil, that the State of Bahia occupies the 11th place among those with the highest prevalence and with high detection rate. It has been like another relevant aspect the increase of multibacillary cases (MB) and the coefficient of detection in patients younger than 15 years old (6,07/100,000 inhabitants), which reveals active transmission. [4-5]

OBJECTIVE

- To analyze the clinical and epidemiological aspects of leprosy.

METHOD

We study the State of Bahia. It is located in the Northeast Region of Brazil, possessing a territorial extension of 564,732.642 km^2 and it is formed by 417 municipalities. The population was estimated at 15,276,566 inhabitants in 2016.[6]

This is a descriptive and quantitative study with transversal cut. Of all new cases of leprosy in residents of the State of Bahia, there were reported in the period from 2005 to 2015 and that obtained clinical and laboratory confirmation. We obtained the data in the System of Computerized Database Notifications of Leprosy, linked to the State Health Secretariat of Bahia and the Department of Informatics of the Unified Health System (DATASUS), from the Information System of Reportable Diseases (SINAN). We excluded records with diagnostic error, duplicates and cases not classified according to the operational classification for leprosy, as well as the cases of residents in other States.

It was evaluated the demographic variables, the area of residence (urban or rural), the clinical form of the disease (tuberculoide indeterminate, borderline lepromatous, or not classified), the operational classification (paucibacillary and multibacillary), the mode of entry to and exit from the program of attention to Hansen's disease patients, the type of discharge, the therapeutic regimen and the physical disability degree evaluation in the diagnosis.

It was obtained population data in the Brazilian Institute of Geography and Statistics (IBGE)[7] based on data from population censuses of the State (2010) and population estimates for the years between censuses (2005 to 2015).

It was used for the calculation of the coefficient of incidence, in the numerator, the new cases and the denominator of the estimated population in the year under study multiplied by 100 thousand. It is considered the population according to the 2005 census of 2010 and, for the years between censuses, population estimate was made for each year studied.[7]

It is considered, for purposes of this study, as fertile age, the age range between 18 and 45 years old for the maternal variable.

Built and evaluated the indicators according to Decree N° 3,125, from 7th October 2010. Consider, regarding the evaluation of epidemiological and operational indicators, the following parameters recommended by the Ministry of Health: Hyperendemic, when the rate of detection is ≥ 4.0/10 thousand inhabitants; very high, when the detection rate is between 2.0 to 3.9/10 thousand inhabitants; high, when the detection rate is 1.0 to 1,9/10 thousand inhabitants; medium, when the detection rate is between 0.2 to 0.9/10 thousand inhabitants and low, when there is less to 0.2/10 thousand inhabitants.[8,9]

The statistical analysis with the aid of the statistical package SPSS (Statistical Package for Social Sciences), version 23.0. It was evaluated the descriptions of the demographic profile of leprosy cases using the absolute frequencies of cases with their respective percentages. We performed for the detection rate and the coefficient of incidence of clinical form, the test of normality of the incidence coefficient using the Kolmogorov-Smirnov test, demonstrating to normality, and, thus, we applied the independent T-Test. It was used for comparative analysis of clinical characteristics with the sex based on Pearson Chi-square test, and the level of significance used was 5% ($p < 0.05$).

It should be emphasized that this study was carried out with secondary data available in the database, public free access, and the information submitted does not bind or imply damage and/or consequences of ethical character to third parties, as the prerogatives of the National Committee for Ethics in Research of N 510/2016.

RESULTS

Results are presented in tables 1, 2, 3, 4.

Table 1. Socio-demographic characteristics of cases of leprosy. Bahia, Brazil, 2005-2015.

Socio-demographic data	N	%	GL	X^2	P*
Gender					
Female	17243	48.1			
Male	18610	51.9	1	52.1	<0.001
Age (in years old)					
≤ 14	849	2.4			
15-19	1362	3.8			
20-39	10515	29.3			
40-59	12544	35.0	5	188.2	<0.001
60-69	5061	14.1			
> 70	5522	15.4			
Pregnant					
1st trimester	22	0.3			
2nd trimester	42	0.6	2	6.20	0.04
3rd trimester	34	0.5			
Ignored**	6908	98.6			
Race					
Yellow	354	1.0			
White	6268	17.5			
Pardo	20795	58.0	4	416.5	<0.001
Indigenous	171	0.5			
Black	6248	17.4			
Ignored**	2017	5.6			
Schooling					
Elementary incomplete	22003	61.4			
High school incomplete	2662	7.4			
High school complete	3089	8.6	4	580.1	<0.001
Higher education incomplete	251	0.7			
Higher education complete	859	2.4			
Ignored**	6989	19.5			
Zone					
Rural	6814	19.0			
Periurban	348	1.0	2	319.2	<0.001
Urban	25841	72.1			
Ignored**	2850	7.9			

Source: SINAN/SVS-MS. *Chi-square; GL = Degree of freedom. ** The variables ignored did not compose the significance test.

Table 3. Detection rate of cases of leprosy per 10000 inhabitants. Bahia, Brazil, 2005-2015.

Time	N of cases	Detection rate/10.000	Result	R^2	P*
2005	3980	2.9	Very high		
2006	3571	2.6	Very high		
2007	3315	2.4	Very high		
2008	3357	2.3	Very high		
2009	3322	2.3	Very high	0,785	0,0001
2010	3205	2.3	Very high		
2011	3198	2.3	Very high		
2012	3024	2.1	Very high		
2013	2697	1.8	High		
2014	3169	2.1	Very high		
2015	3015	2.0	Very high		

Source: SINAN/SVS-MS   *Test T independent

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Table 2. Clinical characteristics of cases of leprosy. Bahia, Brazil, 2005-2015.

Clinical aspects	N	%	GL	X²	P*
Clinical form					
Undetermined	6089	17.0			
Tuberculoide	7123	19.9	3	150.2	<0.001
Dimorphous	9640	26.9			
Virchowian	5337	14.9			
Ignored**	7664	21.3			
Degree of incapacity in the diagnosis					
Degree zero	21902	61.1			
Degree I	6289	17.5	2	213.7	<0.001
Degree II	2188	6.1			
Ignored**	5474	15.3			
Operational classification in diagnosis					
Multibacillary	20551	57.3	1	768.1	<0.001
Paucibacillary	15302	42.7			
Input mode					
New case	31004	86.5	3	715.4	<0.001
Recidivous	1351	3.8			
Transference	2333	6.5			
Other reingresses***	1095	3.0			
Ignored**	70	0.2			
Output type					
Abandonment	1884	5.2	3	602.1	<0.001
Cure	26707	74.5			
Death	476	1.3			
Transference	2458	6.9			
Ignored**	4328	12.1			
Smear					
Not performed	7439	20.7	2	629.6	<0.001
Negative	6365	17.8			
Positive	4676	13.0			
Ignored**	17373	48.5			
Initial therapeutic scheme					
Other substitutive schemes	338	0.9	2	179.5	<0.001
PQT/MB/ 12 DOSES	20245	56.5			
PQT/PB/6 DOSES	15050	42.0			
Ignored**	220	0.6			

Source: SINAN/SVS-MS   *Chi-square; GL = Degree of freedom. ** The variables ignored did not compose the significance test. *** Situations in which the patient has received any kind of high and returns requiring specific treatment, except recidivous1.

Tabela 4. Prevalência do abandono do tratamento da hanseníase segundo a forma clínica. Bahia, Brasil, 2005-2015.

Forma clínica	N	%
Indeterminada	360	19.0
Tuberculoide	291	15.4
Dimorfa	499	26.4
Virchowiana	260	13.7
Não classificado	483	25.5
Total	1893	100

Source: SINAN/SVS-MS

Indicates, by the results, the growing trend of the coefficient of incidence/100 thousand inhabitants for the dimorphic clinical form (R^2 = 0.2301; p < 0.001) and descending to the clinical forms tuberculoide (R^2= - 0.8084; p < 0.001) and indeterminate (R^2 = - 0.8727; p< 0.001). There is stability for the clinical form virchowian (R^2 = 0.3678; p < 0.001), according to figure 1.

ISSN: 1981-8963

https://doi.org/10.5205/1981-8963-v13i02a236224p346-362-2019

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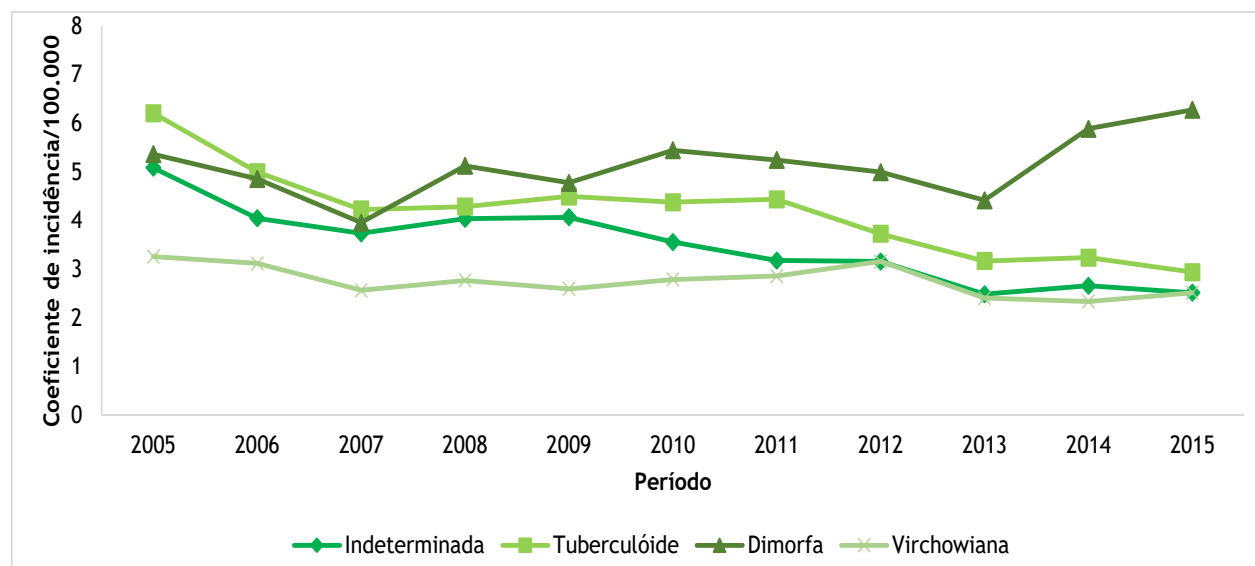
Figure 1. Incidence coefficient/100.000 inhabitants of leprosy cases according to clinical form, in the period from 2005 to 2015, in the State of Bahia, Brazil. Source: SINAN/SVS-MS.

DISCUSSION

Warns that leprosy is a public health problem that affects people from different countries. Undertook, among these, Brazil to use all the measures for the control and elimination of leprosy until the year 2000, but this objective has not been achieved.[10-2]

It should be emphasized that the incidence of leprosy occurs in both genders, but with greater impact on the male population, but which differs between countries and regions of the same country. It is necessary, therefore, to examine whether the difference in incidence of the disease, in relation to gender, occurs in relation to the proportion of cases between one gender and another or if this difference is related to cultural factors, biological and genetic. Proved by genotyping of isolates of *M. leprae*, which is not showed significant differences on the basis of the clinical form or the gender of the patient.[10,13]

It should be emphasized that elements related with the male and female behavior try to explain the difference in the incidence in both genders. It is perceived that men are concerned with their health and esthetics, unlike women who often seek medical services and perform dermatologic examinations. It is perceived that the chances of men do not adhere to treatment is three times higher than women, in addition to have a higher risk of exposure to *M. leprae* through social contact and frequent exposure to risk environments.[14-5]

It is noted that the great period of incubation of *M. leprae* contributes to the disease manifests itself most commonly in the economically active population influencing the productive activities due to leprosy reactions and physical disabilities. Indicates that,

although it is lower the incidence of leprosy in children, this is a sensitive indicator of disease transmission and indicates that the child had a contact with the carrier of the disease without treatment. It is suggested; therefore, that, in areas of high or low endemicity, is done the lifting of contact in a family that has children with leprosy to early detect the disease.[14,16]

It was detected in this study that 48.1% of patients with leprosy were female; from these, only 1.4% of cases of gestational status among those in the reproductive age were notified. It is called the attention that the gestational age was ignored in 98.6% of cases, which suggests the possibility of underreporting of gestational status, and this variable is very important in view of the therapeutic plan will be defined on the basis of the existence or not of pregnancy.[17]

Warns that, considering the importance of identifying the existence of pregnancy or not for the treatment of women with leprosy, it is imperative that the professionals responsible for notification of the disease adequately fulfill the notification to be made adequate planning of care to pregnant women with leprosy, as well as the proper interpretation of the parameters of endemicity. Entail, for the underreporting of data, information system failures.[17]

It is advised by the World Health Organization, the necessary maintenance treatment with multiple drugs, once it is safe for both mother and child. It shows that the condition of being pregnant or is not a necessary element for the definition of the therapeutic plan and prevention of adverse effects arising from the use of drugs such as thalidomide. We recommend the use of thalidomide for women of childbearing age

after the exclusion of pregnancy and the proof of the use of two contraceptive methods, being a barrier method effective.[18]

It is understood that leprosy is a disease that does not discriminate against color. It is known, however, that the brown color is that predominates in the population of the area under study, but social determinants are associated with higher frequencies of leprosy in certain population groups, especially among those with worse social conditions, including the blacks, and this indicates that the most vulnerable populations should be the focus of the campaigns for the prevention and control of disease. Can this condition be a reflection of the migration and colonization, the mixture of races, and yet, the occupation of Brazilian territory.[12]

It has been demonstrated that the level of schooling of the lepers of the studied area is low, a characteristic common to other regions of Brazil. Denotes that the absence or low level of schooling constitutes an important factor making them more vulnerable to disease, since the access to information is limited, because it affects, in a straightforward way, the understanding of information about leprosy, which complicates the implementation of guidelines on the treatment, prevention, care about the disease, access to health services, the abandonment of MDT, as well as the degree of incapacity. You can consider, in this way, the educational level higher a determinant for the improvement of the disease and a protective factor for the occurrence of disabilities.[14,19-20]

It is based, so that the planning of a popular education is crucial in leprosy control, once the individual knowledge is capable of promoting their own health and the family and can generate positive impact on prevention of leprosy.[21]

It is believed that higher urban concentrations of leprosy cases may be associated with conditions that favor the transmission dynamics of the disease as the precarious conditions of life and restricted access to goods and services collectives. It consists, by these elements, an overview of illness and death.[22]

It is proved by the highest incidence of the dimorphic clinical form and the operational classification MB, that the diagnosis of the disease is slow and that the sanitary conditions of the State of Bahia favor the maintenance of the epidemiological chain of transmission of *M. leprae*. It should be emphasized that the results of this nature are not rare for identification in studies conducted in Brazil and in other countries.[14,23]

It is inferred that, among the clinical forms, the dimorphous is the most transferable and potentially incapacitating. Proves that individuals are more vulnerable to the MB leprosy due to cellular immune response may not be effective, adopting the microorganisms avoidance mechanisms of the immune response.[24]

It is understood that the increase in the number of cases of leprosy patients with grade II of physical disability is a factor of concern for the health authorities, once this clinical condition is also associated with the maintenance of the chain of transmission of the disease. It says that the diagnosis is early and immediately started the treatment in order to prevent the development of leprosy to higher degrees of disabilities and promote the breakage of the epidemiological chain of transmission of the disease.[25]

Reiterates that the disabling of leprosy has ramifications of economic, social and psychological. You will notice that the incapacitating disease interferes in productive capacity, quality of life and the social life of individuals contributing to psychological trauma and economic losses. Indicates the presence of cases with physical disability at the time of diagnosis, that the detection of cases is occurring so late, and this highlights the low ability to perform active searches for cases of leprosy.[20]

It should be emphasized that the primary mode of entry of patients in the public health system was by means of diagnosis of new cases and cure was the main form of output, as already demonstrated in other studies. Please note that high incidence of new cases reveal that the chain of transmission of the disease is active and favor the maintenance of transmission of the disease.[14]

It is expected that the dropout rate is low (5.2%), but it is important to highlight the need to rescue of all these cases to restart the treatment. This implies breaking the chain of transmission, the onset of physical disabilities and resistance to chemotherapy.[26] We need even greater attention on the part of health services, to give greater emphasis to the guidance to carriers of the disease awakening the conscience for adherence to treatment. It is also noticeable, in greater frequency, a high percentage of cases ignored (12.1%), and this variable compromises the quality of the filling of the connectors of compulsory notification, something that hinders the understanding of the distribution of the disease in the state of Bahia.[17]

Ignore it if, when not performing sputum smear microscopy, in most cases, its

importance in the set of exams that assist in the diagnosis of leprosy, also demonstrated in other studies. It shows that this laboratory procedure is fast, low cost, low invasive and has a high specificity (100%) when analyzed in conjunction with other clinical manifestations of the disease. Explains that its sensitivity is low when less than 50% of individuals are positive, which may occur in the paucibacillary cases (PB).[27]

It is perceived that the sputum smear microscopy is one of the complementary tests confirming the diagnosis and also serves as one of the criteria for confirmation of recurrence when compared to the result at the time of diagnosis and cure. It is recommended that is made of skin smear for the classification of cases of PB and MB, because, if the examination presents positive, regardless of the number of lesions, the case will be classified as MB.[8]

It is recommended that the initial therapeutic regimen established for the majority of patients, which was the MDT with 12 doses. It is known that this scheme, in addition to derail and disrupt the epidemiological chain of transmission of *M. leprae*, has good therapeutic results with the reduction of physical disabilities and deformities through the healing of individuals treated.[1,28]

The following standardized regimens for the treatment of leprosy are according to the operational classification. It performs, in the cases of BP, the treatment with rifampicin and dapsone, for a period of up to nine months, and is complete with six doses supervised. It is the treatment performed with the use of rifampicin, dapsone and clofazimine in up to eighteen months and informs you that the MDT is not contraindicated in pregnancy or breastfeeding, however, in women of childbearing age, you should consider the use of rifampin, because it may interact with oral contraceptives and decrease the therapeutic response. You can replace it, in cases of resistance to one or more drugs used in the default schema, by alternative schemes under the guidance of health services of greater complexity.[8,28]

It is suggested the occurrence of new cases of leprosy in the face of high rates of detection, in different clinical forms, demonstrating that exposure to M. leprae may reflect lower levels of living conditions, economic development and health care. It is suggested, by the identification of new cases, the improvement of detection capacity, which is linked to the operational capability of the

system of surveillance of leprosy; however, this indicator does not reflect the real situation in the reference period and does not allow to detect variations in trend in a short space of time, because the diagnosis of leprosy is usually delayed.[9] It is also noted that, in the year 2013, the detection rate, although it has been high, may indicate underreporting or low detection of cases when observed the historical series that was always too high.[9]

It is observed that the majority of patients who abandoned the treatment was like finding the dimorphic clinical form, and this condition contributes to the ongoing transmission of the M. leprae impacting negatively on the actions of control and elimination of leprosy. Indicates that the abandonment of treatment can be associated to the long duration of the same, the distance between the patient and the health unit, the lack of knowledge about the disease, to discredit the cure, due to the lack of encouragement and also for leprosy reactions.[29-30]

Stresses that, regardless of the factors that are associated with the abandonment of treatment, it is important the integration among the professionals who appreciate the psychological aspects socioenvironmental and during treatment promoting motivation and education and to minimize the abandonment and to maximize the indicators of healing.[29]

Examines the positive trend of growth in the dimorphic clinical form, in this study, it is also peculiar to that was demonstrated in other Brazilian studies. It is known that the growing trend of incidence coefficient of dimorphic form and the stability of the lepromatous indicate late detection and that the chain of transmission of M. leprae continues to occur contributing to the maintenance of the transmissible forms and disabling of the disease.[14]

It is perceived that the clinical forms dimorphous and virchowian are able to eliminate large quantities of bacilli present in the nasal mucosa and, in this way, individuals MB are the main route of elimination of the *M. leprae* bacillus. It shows that the constant growth of the dimorphic clinical form with the maintenance of virchowian and, yet, the presence of low frequency, with decreasing trend of indeterminate forms and tuberculoide, demonstrate the maintenance of the endemy in the State of Bahia.[28]

CONCLUSION

It was concluded, from this study, that leprosy in the State of Bahia is endemic and

still constitutes a major public health problem. It shows that the largest number of cases of the disease in the economically active population and males may influence the economic impact and contribute to the maintenance of the cycle of poverty. It is reported, otherwise, that the greater frequency of the dimorphic clinical form and MB evidences that the transmission of M. leprae is active and that the diagnosis of the disease is being done lately.

It is, due to the low level of schooling, the necessary intervention by health professionals for the implementation of permanent educational activities, with positive reinforcement, in order to increase the accession to treatment and reduce dropout rates. It is known that Bahia is a State with a high coefficient of detection; therefore, it is essential to be developed educational activities, on a permanent basis, especially for the vulnerable population. You must substantiate this action in the understanding of the social representation that these population groups have about leprosy.

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