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ORIGINAL ARTICLE

TIME FOR LEPROSY DIAGNOSIS AND ITS RELATION TO SOCIODEMOGRAPHIC AND CLINICAL FACTORS[1]

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ABSTRACT

Objective: to investigate the factors associated with the time that elapsed between the identification of signs and symptoms related to leprosy and the diagnosis of cases seen in primary health care. **Method**: this is a cross-sectional and analytical study carried out in primary health care in a large city located in southern Brazil, with a sample of 245 individuals. The period analyzed was from 2009 to 2016, through notification forms and consultation of medical records. For analysis of the time for the diagnosis of leprosy (categorized as 0 to 5 years or 6 years or more), we performed analyzes of simple relative bivariate frequency and binary logistic regression measured by Odds Ratio (OR) and a confidence interval of 95 %. The statistical significance level was set at 5% for all analyzes. **Results**: the time for diagnosis varied from 1 month to 20 years, requiring, on average, 7.9 consultations and 4.6 years to obtain it. Having three or more hypotheses increased the chance of late diagnosis, compared to the opportune one (adjusted OR = 4.82; 95% CI: 2.13-10.89; P <0.001). **Conclusion**: the time elapsed for the diagnosis had an impact on the characteristics of leprosy, and the greater the number of hypotheses, the longer the time elapsed for the diagnosis and, consequently, the greater the chances of presenting DPD installed.

Keywords: Leprosy. Delayed diagnosis. Nursing. Primary Health Care.

INTRODUCTION

The Pan American Health Organization, part of the World Health Organization (PAHO/WHO), reaffirmed its commitment to work with countries in the region of the Americas to eliminate communicable diseases by 2030, including leprosy. Thus, universal access to detection measures and early treatment is essential to reduce transmission, morbidities, and sequelae, peculiar characteristics to leprosy[1,2].

According to the WHO, the epidemiological scenario shows the existence of underreporting, under-detection, and even late diagnosis[2,3]. All of these data corroborate for the late diagnosis with morbidities and disabilities and reinforce that strategic actions for the achievement of early diagnosis with the help of the main diagnostic methods must be implemented/reinforced in Primary Health Care (PHC), the main entrance to assist the population[2-7].

In 2018, the Brazilian detection rate was 1.37 per 10,000 inhabitants. This number places the country in second place in the global panorama of new cases. Considering the detection with the Degree of Physical Disability II (DPD-II), there was an average rate of 10.1 cases for every million inhabitants of Brazil, in that same year[8].

In this context, individuals with leprosy demand health surveillance mainly by PHC in

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the early recognition of the signs and symptoms characteristic of this condition and immediate care to avoid physical disabilities from a late diagnosis. It is also necessary to know factors that can increase the probability of the degree of disability in individuals.

Based on this, this study aimed to investigate the factors associated with the time elapsed between the identification of leprosy-related signs and symptoms until its diagnosis.

METHODOLOGY

This is a cross-sectional and analytical study, developed in the 54 Basic Health Units (UBS) of the PHC, located in Londrina, northern Paraná, Brazil. This municipality is a reference for leprosy care, as it has two specialized centers focused on the disease, with trained professionals[9].

The inclusion criteria adopted were individuals diagnosed and notified with leprosy in Londrina, from 2009 to 2016 (years that followed the decentralization of actions to control this disease in the municipality), living in the urban area. The exclusion criterion was all reported cases in which the location of the medical record in PHC was not possible. In this sense, we understood that possibly these cases were assisted at the private service level, hindering their analysis.

We used two strategies to compose the database. First, in March 2017, data were collected from the records of the National System of Notifiable Diseases (SINAN) between 2009 and 2016. These files have sociodemographic data of the individuals and complementary information regarding the characteristics of the disease.

In a second stage, from April to July of the same year, we searched medical records in the UBS that were a reference for each of these individuals to verify the data in the records and also subsidize a greater amount of specific and complementary information of the disease, such as the number of consultations that patients went through before the assertive diagnosis, possible diagnostic hypotheses suggested in these consultations and calculating the time between the first symptoms and the diagnosis.

We considered symptoms such as hypochromic, hyperchromic, and reddish lesions (spots, plaques, papules or nodules), sensitivity disorder (in or outside the lesions), and neuritis and neural thickening[10].

We carried out the characterization through key variables for the study such as gender (male or female), age group (up to 15 years old considered pediatric for the disease, 16 to 60 years old and over 60 years old), skin color (white, black/brown, yellow/indigenous, unanswered), education (illiterate, up to 8 years, 9 to 11 and more than 11 years of study), income (up to R$ 800.00, between R$ 800 and R$ 2,200.00 and above R$ 2,200.00 as per notification form; the minimum wage ranged between R$ 465.00 and R$ 880.00 during the period studied), time for diagnosis in years, several diagnostic hypotheses considered (quantitative), clinical form (indeterminate, tuberculoid, dimorphic and Virchowian), operational classification (paucibacillary or multibacillary) and DPD in the diagnosis (degree 0, I or II).

Those diagnoses performed between 0 and 5 years were considered opportune, while those performed in 6 years or more were considered late[10]. The exploratory and analytical statistical analysis was performed using the IBM Statistical Package for the Social Science (SPSS) software, version 20.0.

First, we performed simple and relative frequency analyses to characterize the study population. After this stage, a bivariate analysis identified the association between the time for leprosy diagnosis and independent sociodemographic and clinical variables (age, years of study, income, previous case in the family, number of hypotheses until diagnosis, operational classification, and DPD in the diagnosis).

In this analysis, we used Pearson's chi-square test considering a statistically significant association, p-values <0.05, as well as the calculation of Odds Ratio (OR) and their respective 95% Confidence Intervals (95% CI); then, multiple analysis was performed using binary logistic regression with the enter strategy. In this stage, significant variables ($p <0.2$) were selected in the bivariate analysis.

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RESULTS

Between 2009 and 2016, there were 426 notifications of leprosy in the municipality studied, that is, new cases. Of these, 245 formed the study sample, removing losses/exclusions (n = 91) and inhabitants of the rural area (n = 90). Table 1 shows the information about the individuals' sociodemographic and clinical-operational characteristics.

Table 1. Sociodemographic and clinical-operational characteristics of leprosy cases followed up in Primary Health Care. Londrina (PR), Brazil, 2009 - 2016

Variables	N	%
Gender (n=245)		
Male	133	54.3
Female	112	45.7
Age group (n=245)		
< 15 years old	6	2.4
16 to 60 years old	170	69.4
> 60years old	69	28.2
Race/skin color (n=245)		
White	122	49.8
Non-white	84	34.3
Unanswered	39	15.9
Education level/Years of Study (n=174)		
Illiterate	14	8.1
Up to 8 years	121	69.5
Between 9 and 11 years	28	16.1
More than 12 years	11	6.3
Income (minimum wage*) (n=245)		
≤ 1	29	11.8
> 1	83	33.9
Unanswered	133	54.3
Operational Classification (n=245)		
Paucibacillary	47	19.2
Multibacillary	198	80.8
Degree of Disability in Diagnosis (n=245)		
Degree 0	43	17.5
Degree 1	163	66.5
Degree 2	31	12.7
Not evaluated	8	3.3
Previous case in the family (n=245)		
Yes	36	14.7
No	46	18.8
Unanswered	163	66.5

***Minimum wage= R$ 954,00**

Regarding the time elapsed for diagnosis, 68.6% (n = 174) of the individuals were included in up to 5 years (considered opportune in this study). On the other hand, others took up to two decades and 26 consultations to obtain a real diagnosis. The average number of registered consultations was 7.9, that is, the patient sought the health service for consultation on average almost eight times until presenting a specific diagnosis, since the onset of symptoms.

Regarding the study participants under 15 years old (considered pediatric by WHO), all (n = 6) were diagnosed on time (within 5 years) and, five of these children and adolescents (more than three quarters) had less than three hypotheses for diagnosis. Regarding those who presented a previous case in the family (n = 36), 26 had a timely diagnosis, contrasting the 10 cases with a diagnosis considered late.

Tables 2 and 3 show a comparison between

individuals with a timely and late diagnosis. The number of diagnostic hypotheses greater than three was associated with the longer elapsed time for diagnosis (p <0.001), that is, the chance of a patient with three or more diagnostic hypotheses having a late diagnosis was four times greater than those who presented up to two hypotheses (OR = 4.44; 95% CI; 2.30 -8.57). Among the recorded diagnostic hypotheses, we can mention dermatitis, ringworm, somatization, vitiligo, lupus erythematosus.

Considering the clinical characteristics addressed, the chance of having a late diagnosis was greater in individuals with DPD installed, either Degree I or II (OR = 2.10; 95% CI = 0.92-4.80; p = 0.007).

Table 2 – Descriptive analysis of the characteristics associated with the time for leprosy diagnosis in Londrina, PR, Brazil, 2009-2016

	Time to diagnosis (years) 0 to 56 or more			
	n	%	n	%
Age (years old)* (n=245)				
Up to 60	121	68.8	55	31.2
61 or more	47	68.1	22	31.9
Years of study (n=174)				
Less than 4	40	60.6	26	39.4
4 or more	77	71.3	31	28.7
Per capita income (in reais, Brazilian currency) (n=112)				
Up to 800	16	57.1	12	42.9
801 or more	53	63.9	30	36.1
Previous case in the family (n=82)				
Yes	26	72.2	10	27.8
No	33	71.7	13	28.3
Number of hypotheses until diagnosis (n=181)				
0 to 3	84	80.0	21	20.0
4 or more	36	47.4	40	52.6
Operational classification (n=245)				
Paucibacillary	29	61.7	18	38.3
Multibacillary	139	70.2	59	29.8
Degree of disability in diagnosis (n=237)				
Degree 0	35	81.4	8	18.6
Degree I and II	131	67.5	63	32.5

Table 3. Association of sociodemographic and clinical variables with time for leprosy diagnosis. Londrina, PR, Brazil, 2009-201

Variable	Gross OR	CI95%	p-val	Adjusted OR*	CI95%	p-value
Age (years old)* (n=245)						
Up to 60	1	-				
61 or more	1.03	0.57 ;1.87	0.92			
Years of study (n=174)						
Less than 4	1			1		
4 or more	0.62	0.33 ;1.18	0.14	0.69	0.31-1.53	0.363
Per capita income (in reais Brazilian currency) (n=112)						
Up to 800	1					
801 or more	0.76	0.32 ;1.80	0.52			
Previous case in the family (n=82)						
Yes	1					
No	1.02	0.39 ;2.71	0.96			
Number of hypotheses until diagnosis (n=181)						
0 to 3	1			1		
4 or more	4.44	2.30 ;8.57	<0.0(	4.82	2.13-10.89	<0.001
Operational classification (n=245)						
Paucibacillary	1					
Multibacillary	0.68	0.35 ;1.33	0.25			
Degree of disability in diagnosis (n=237)						
Degree 0	1			1		
Degree I and II	2.10	0.92 – 4.80	0.(	1.62	0.39-6.72	0.510

* OR adjusted by years of study; degree of disability in the diagnosis and number of hypotheses until diagnosis; 95% CI: 95% confidence interval.

The variables mentioned above (number of hypotheses until diagnosis, years of study, and degree of disability in diagnosis) were taken to the adjusted analysis, and the variable number of diagnostic hypotheses remained associated with the outcome, that is, those with three or more hypotheses for the diagnosis are more likely to have a late diagnosis (adjusted OR = 4.82; 95% CI = 2.13-10.89; p <0.001).

DISCUSSION

This study investigated the factors associated with the time elapsed between the identification of signs and symptoms related to leprosy until the time of diagnosis in a municipality located in the north of the state of Paraná, considered as the third most important city in the south of the country.

The time for diagnosis of leprosy was high in this study, with an average of 4.6 years, considering from the first symptom until its confirmation. This means that government efforts at the national, state, and municipal levels have not been sufficient and carried out according to the WHO proposal in the last quadrennium, especially for the active search and early diagnosis of leprosy. In this scenario, PHC, the central foundation of SUS, is the main ally in the fight against the disease, mainly through the Family Health Strategy (FHS), considering that the decrease in the incidence of leprosy is closely related to the FHS and the development of their duties[2; 11].

The FHS is developed through interdisciplinary activities to a limited number of families, in a given geographic area, by multi-professional teams whose work begins with the activities of Community Health Agents (CHA), who represents a link between the service and the community, based on health promotion actions with families, disease prevention and health surveillance through home visits[11]. In other realities, the average years elapsed for the diagnosis of the disease ranged from 12 months in the United States of America, passing through 17.9 months in India, 2 years in the state of São Paulo, up to 6 years in Minas Gerais and 4.2 years in Nigeria, data published between 2015 and 2018[2, 11-15].

Regarding sociodemographic variables, there were no statistically significant associations for late diagnosis in univariate analysis. The incompleteness of data in the notification forms for this variable is highlighted, and similar results are pointed out in another study conducted in Brazil[16].

Individuals under 15 years old whose notification forms were eligible for the study were diagnosed within 5 years and most of them with less than three diagnostic hypotheses. The occurrence of leprosy in this age group suggests an intense circulation of the microorganism in the region, as well as a high rate of transmission and unidentified cases[7,17]. The search for contacts is included as a primary measure in the identification of cases. In this study, most individuals who had a previous case in the family had an early diagnosis. In this case, the search for contacts was relevant to these diagnoses. This monitoring must be carried out within 5 years after the diagnosis of the index case.

Some socioeconomic characteristics meet what is expected and described in the literature, such as the higher prevalence of men than women and low education, which is closely linked to low family income, becoming a risk factor for the development of the disease[12, 18]. As for skin color/race, the higher prevalence of white people may be related to the study site, where 70.4% of the population is considered white, while only 21.8% are brown[9]. Authors from areas further north of the country reported a greater number of browns[12], with regionality as a determining factor.

More developed municipalities are more likely to offer their population access to a more qualified health network. In this research, the sociodemographic characteristics increased in the sense of less social need, reinforcing the importance of these better social conditions in the diagnosis of the disease in endemic areas, resulting in that access to health services encompasses multidimensional understanding, which includes political, social, economic and cultural aspects, which is why we just raised the idea in this text. Also, the methodological reference adopted in the study is not capable of addressing this issue, requiring research to

analyze the influence of access on the rate of detection of leprosy in these areas.

We had a concern in this study on the age of the individuals affected. Most are between the economically active age group (from 16 to 60 years old), burdening the government, social security, and causing deficiencies in the local labor market. A study conducted in India, between 2008 and 2015, showed that costs increase significantly with late diagnosis, since individuals already have disabilities and, consequently, need to be absent from their activities, as well as increase costs with transportation and stay from the first symptoms to diagnosis, treatment, and cure[14].

The higher prevalence of multibacillary cases and their corresponding clinical forms also follows a trend verified in the literature[12,19-20]. The same trend is evident in the degree of disability. There is a substantial and, therefore, unsatisfactory number of individuals who present the diagnosis with disabilities already installed, whether they are degree I or II, creating burdens on the patient and society[6,18-19, 21].

In this study, we considered that the time elapsed until the diagnosis was influenced by the number of diagnostic hypotheses received by the individuals, demonstrating the expected trend. The greater the number of hypotheses, the greater the chances of this diagnosis occurring late.

In a study conducted in the state of São Paulo, we found that individuals who presented another diagnosis a priori were three times more likely to have a late diagnosis compared to those not diagnosed incorrectly (diagnosed correctly or that no diagnosis was given at the first consultation)[16].

The study shows a deficiency in knowledge about the disease since professionals who do not think about leprosy at the patient's first search also do not consider this possibility in later consultations. Although not statistically significant, individuals with DPD installed were twice as likely to have a late diagnosis than those without a disability. Early detection reduces disability and, specifically for DPD II, the WHO target is a rate of less than one per million inhabitants through campaigns, improving coverage and access for marginalized populations[2].

In this sense, based on the findings of Chinese researchers, the non-specificity of symptoms can be a crucial factor for diagnostic errors[7]. The coexistence of cutaneous, rheumatic, and neurological symptoms leads to a dubious diagnosis. However, hypoesthesia is a determining factor in the differential diagnosis. Other studies carried out still show as recurring hypotheses allergy, furunculosis, rheumatism, circulatory problems, and other dermatoses[22,23].

Stigma is also described as a predictive factor for the delay in seeking health services, with findings in other locations revealing that those who feared isolation from the community were ten times more likely to delay seeking care than those who did not fear this isolation[16].

Thus, we observed that late diagnosis, stigma, and discrimination are closely interrelated[2]. Other studies have also pointed out this characteristic. In India, the reasons found for the non-timely diagnosis were lack of knowledge regarding symptoms and free treatment and the reduced capacity of the health system for disease control and self-diagnosis[24]. In the Northeast of Brazil, the reasons for this phenomenon were cited as the lack of training of professionals in health services, stigma, and prejudice[23].

We must consider some limitations of the study such as the use of secondary data, due to the incompleteness in filling out the Sinan notification form, and a substantial number of records not found in the UBS or containing little/no information. In this sense, we must consider the demand for private and highly complex services, such as hospitals. Regarding the analyzed medical records, they may have gaps regarding the existence of symptoms since the individual may have taken a long time to seek care, the notes may not be reliable or may not be specifically related to leprosy.

CONCLUSION

Leprosy is prevalent in white, male individuals, of economically active age, with low education level and family income. Its diagnosis occurs more frequently in the multibacillary classification. The time elapsed for the diagnosis had an impact on the clinical forms of the disease, and the greater the number of

hypotheses presented, the longer the time elapsed for the diagnosis and, consequently, the greater the chances of presenting DPD installed.

This study shows the need for nurses, doctors, nursing technicians, and CHAs to act in leprosy surveillance and control actions in PHC for the early identification of leprosy cases in the community, and rethinking practices and enabling health education activities for the reduction of disabilities at the time of diagnosis, often irreversible, causing changes in the lives of those affected by it.

TEMPO PARA O DIAGNÓSTICO DA HANSENÍASE E SUA RELAÇÃO COM FATORES SOCIODEMOGRÁFICOS E CLÍNICOS

RESUMO

Objetivo: investigar os fatores associados ao tempo decorrido entre a identificação dos sinais e sintomas relacionados à hanseníase até o diagnóstico dos casos atendidos na atenção primária à saúde. **Método:**estudo transversal e analítico, realizado na atenção primária à saúde em um município de grande porte localizado no sul do Brasil, com amostra de 245 indivíduos. O período analisado foi de 2009 a 2016, por meio das fichas de notificação e consulta ao prontuário. Para análise do tempo para o diagnóstico de hanseníase (categorizado em 0 a 5 anos ou 6 anos ou mais), conduziram-se análises de frequência relativa simples, bivariada e regressão logística binária aferida pelo OddsRatio (OR) e intervalo de confiança de 95%. Nível de significância estatística estabelecido de 5% para todas as análises.**Resultados:** o tempo para o diagnóstico variou de 1 mês a 20 anos, sendo necessários, em média, 7,9 consultas e 4,6 anos para obtê-lo. Ter três ou mais hipóteses aumentou a chance de diagnóstico tardio, comparado ao oportuno (OR ajustado=4,82; IC95%: 2,13-10,89; P<0,001). **Conclusão:**o tempo decorrido para o diagnóstico teve impacto nas características da hanseníase, sendo que quanto maior o número de hipóteses apresentadas, maior o tempo decorrido para o diagnóstico e, consequentemente, maiores as chances de apresentar GIF instalado.

Palavras-chave: Hanseníase; Diagnóstico Tardio; Enfermagem; Atenção Primária à Saúde.

TIEMPO PARA EL DIAGNÓSTICO DE LEPRA Y SU RELACIÓN CON LOS FACTORES SOCIODEMOGRÁFICOS Y CLÍNICOS

RESUMEN

Objetivo: investigar los factores asociados tras el tiempo entre la identificación de las señales y los síntomas relacionados a la lepra hasta el diagnóstico de los casos atendidos en la atención primaria a la salud. Método: estudio transversal y analítico, realizado en la atención primaria a la salud en un municipio de gran tamaño ubicado en el sur de Brasil, con muestra de 245 individuos. El período analizado fue de 2009 a 2016, por medio de las fichas de notificación y consulta al registro médico. Para análisis del tiempo para el diagnóstico de lepra (categorizado en 0 a 5 años o 6 años o más), se condujeron los análisis de frecuencia relativo simple, bivariante y regresión logística binaria probada por elOdds Ratio (OR) e intervalo de confianza de 95%. Nivel de significación estadística establecido de 5% para todos los análisis. Resultados: el tiempo para el diagnóstico varió de 1 mes a 20 años, siendo necesarios, en promedio, 7,9 consultas y 4,6 años para obtenerlo. Tener tres o más hipótesis aumentó la probabilidad de diagnóstico tardío, comparado al oportuno (OR ajustado=4,82; IC95%: 2,13-10,89; P<0,001). Conclusión: el tiempo transcurrido para el diagnóstico tuvo impacto en las características de la lepra, siendo que cuanto mayor el número de hipótesis presentadas, mayor el tiempo transcurrido para el diagnóstico y, consecuentemente, mayores las probabilidades de presentar grado de discapacidad física instalado.

Palabras clave: Lepra. Diagnóstico tardío. Enfermería. Atención Primaria de Salud.

REFERENCES

1. Organização Pan-Americana de Saúde. OPAS/OMS reafirma compromisso em trabalhar com países para eliminar doenças transmissíveis até 2030. Brasília (DF); 2018. [citado 25 jan 2019]. Disponível em: https://www.paho.org/bra/index.php?option=com_content&view=article&id=5752:opas-oms-reafirma-compromisso-em-trabalhar-com-paises-para-eliminar-doencas-transmissiveis-ate-2030&Itemid=812

2. Organização Mundial da Saúde. Estratégia global para Hanseníase 2016-2020: aceleração rumo a um mundo sem Hanseníase. 2016. [citado 25 jan 2019]. Disponível em: https://apps.who.int/iris/bitstream/handle/10665/208824/9789290225201-pt.pdf;jsessionid=D9FDF5113A70D6933CA964D9255FD227?sequence=17.

3. Laurindo CR, Vidal SL, Gama BMBM, Loures LF, Fernandes GAB, Coelho ACO. Trajetória de casos de hanseníase e fatores relacionados. CiencCuidSaude, 2018; Jul-Set 17(3) e42275.

4. Nobre ML, Illarramendi X, Dupnik KM, Hacker MDA, Nery JADC, Jerônimo SMB, et al. Multibacillary leprosy by population groups in Brazil: Lessons from an observational study. PLoSNeglTropDis. 2017;11(2):e0005364. https://doi.org/10.1371/journal.pntd.0005364.

5. Araújo AERA, Aquino DMC, Goulart IMB, Pereira SRF, Figueiredo IA, Serra HO, et al. Complicações neurais e incapacidades em hanseníase em capital do nordeste brasileiro com alta endemicidade. RevBrasEpidemiol. 2014;17(4):899-910. http://dx.doi.org/10.1590/1809-4503201400040009.

6. Leano HAM, Araujo KMFA, Rodrigues RN, Bueno IC, Lana FCF. Indicators related to physical disability and diagnosis of leprosy. Rev Rene. 2017;18(6):832-9.

http://dx.doi.org/10.15253/2175-6783.2017000600018.

7. Xiong M, Li M, Zheng D, Wang X, Su T, Chen Y, et al. Evaluation of the economic burden of leprosy among migrant and resident patients in Guangdong Province, China. BMC InfectiousDiseases. 2017;17(1):160. https://doi.org/10.1186/s12879-017-2869-8.

8. BRASIL. Secretaria de Vigilância em Saúde. Vigilância em Saúde no Brasil 2003 a 2019: da criação da Secretaria de Vigilância em Saúde aos dias atuais. BolEpidemiol. Brasília (DF); Set, 2019. [citado 24 jan 2020]. Disponível em: https://portalarquivos2.saude.gov.br/images/pdf/2019/setembro/25/boletim-especial-21ago19-web.pdf

9. Londrina. Prefeitura Municipal. Londrina em dados. Londrina; 2018. [citado 25 jan 2019]. Disponível em: http://www1.londrina.pr.gov.br/index.php?view=article&catid=21%3Aplanejamento-&id=543%3Alondrina-em-dados-2017-ano-base-2016&format=pdf&option=com_content&Itemid=558.

10. BRASIL. Secretaria de Vigilância em Saúde. Guia de Vigilância em Saúde: volume único. Brasília (DF), 2019. [citado 27jan 2020]. Disponível em:http://bvsms.saude.gov.br/bvs/publicacoes/guia_vigilancia_saude_3ed.pdf

11. Pedraza DF, Santos I. Perfil e atuação do agente comunitário de saúde no contexto da Estratégia Saúde da Família em dois municípios da Paraíba. Interações, 2017;18(3):97-105. http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1518-70122017000300097&lng=en&nrm=iso>.

12. Porto ACS, Figueira RBFC, Barreto JA, Lauris JRP. Evaluation of the social, clinical and laboratorial profile of patients diagnosed with leprosy in a reference center in São Paulo. An Bras Dermatol. 2015;90(2):169-77. http://dx.doi.org/10.1590/abd1806-4841.20153385.

13. Leon KE, Jacob JT, Franco-Paredes C, Kozarsky PE, Wu HM, Fairley JK. Delayed diagnosis, leprosy reactions, and nerve injury among individuals with Hansen's Disease Seen at a United States Clinic. Open Forum Infect Dis. 2016;3(2):)ofw063. https://doi.org/10.1093/ofid/ofw063.

14. Muthuvel T, Isaakidis P, Shewade HD, Kattuppara L, Singh R, Govindarajulu S. Leprosy trends at a tertiary care hospital in Mumbai, India, from 2008 to 2015. Glob Health Action. 2016;9:32962. https://doi.org/10.3402/gha.v9.32962.

15. MekaAO, Chukwua JN, Nwafora CC, Oshia DC, Madichiea NO, Ekekea N, et al. Diagnosis delay and duration of hospitalisation of patients with Buruli ulcer in Nigeria. Trans R SocTropMedHyg, 2016;110(9):202. https://doi.org/10.1093/trstmh/trw065.

16. Henry M, Galan N, Teasdale K, Prado R, Amar H, Rays M, et al. Factors contributing to the delay in diagnosis and continued transmission of leprosy in Brazil: an explorative, quantitative, questionnaire based study. PLOS NeglTropDis. 2016;10(3):e0004542. https://doi.org/10.1371/journal.pntd.0004542

17. Organização Mundial da Saúde. Global leprosy update, 2015: time for action, accountability and inclusion. WklyEpidemiol Rec. 2016;91(35):405-20. Disponível em: https://apps.who.int/iris/bitstream/handle/10665/249601/WER9135.pdf?sequence=1

18. Souza EA, Rerreira AF, Boigny RN, Alencar CH, Heukelbach J, Martins-Melo, FR. et al. Hanseníase e gênero no Brasil: tendências em área endêmica da região Nordeste, 2001–2014. Rev Saúde Pública. 2018;52(20). http://dx.doi.org/10.11606/s1518-8787.2018052000335.

19. Freitas BHBM, Cortela DCB, Margarida S, Ferreira B. Tendência da hanseníase em menores de 15 anos em Mato Grosso (Brasil), 2001-2013. Rev Saúde Pública. 2017;51(28). http://dx.doi.org/10.1590/s1518-8787.2017051006884

20. Lima AS, Pinto KC, Bona MPS, Mattos SML, Hoffmann MP, Mulinari-Brenner FA, et al. Leprosy in a University Hospital in Southern Brazil. An Bras Dermatol. 2015;90(5):654-9. http://dx.doi.org/10.1590/abd1806-4841.20153959.

21. Gracie R, Peitoxo JNB, Soares FBR, Hacker MAV. Análise da distribuição geográfica dos casos de hanseníase. Rio de Janeiro, 2001 a 2012. Ciênc. Saúde Colet. 2017;22(5):1695-704. Disponível em:http://dx.doi.org/10.1590/1413-81232017225.24422015.

22. Zawar V, Kumavat S, Pawar M, Desai, D. Tuberculoid leprosy masquerading as systemic lupus erythematosus: an interesting observation. Acta Dermatovenerol APA. 2017;26(3):81-3. doi: 10.15570/actaapa.2017.25

23. Martins PV, Iriart JAB. Itinerários terapêuticos de pacientes com diagnóstico de hanseníase em Salvador, Bahia. Physis. 2014;24(1):273-89. http://dx.doi.org/10.1590/S0103-73312014000100015.

24. Muthuvel T, Govindarajuu S, Isaakidis P, Shewade HD, Rokade V, Singh R, et al. I wasted 3 years, thinking it's not a problem: patient and health system delays in diagnosis of leprosy in India: a mixed-methods study. PLOS NeglTropDis. 2017;11(1):e0005192. https://doi.org/10.1371/journal.pntd.0005192.

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