Original Article

Epidemiological and spatial profile of new leprosy cases notified at Feira de Santana (Brazil) between 2005 and 2015

Perfil epidemiológico e espacial dos casos novos de hanseníase notificados em Feira de Santana no período de 2005- 2015

Jucileide Moreira Alves[1]
Roquenei da Purificação Rodrigues[2]
Monalisa Cristiany Santos Carvalho[3]

[1,3]Faculdade Estácio de Feira de Santana (Feira de Santana). Bahia, Brazil. jucileidealves24@hotmail.com, monalisa.cristiny@hotmail.com
[2]Corresponding author. Hospital Estadual da Criança (Feira de Santana). Bahia, Brazil. roquenei@gmail.com

ABSTRACT | INTRODUCTION: Leprosy is an infectious disease of chronic evolution caused by Mycobacterium leprae and represents a public health problem. **OBJECTIVE:** The objective of this study was to describe the epidemiological and spatial profile of new cases of leprosy reported in the municipality of Feira de Santana -BA, from 2005 to 2015. **METHODS:** This is an epidemiological, descriptive study with a quantitative approach in that the data were collected from the Notification of Injury Information System. **RESULTS:** Between 2005 and 2015, 1239 new cases of leprosy were reported in the municipality in question. Of these cases, the largest number of cases occurred among males and in both sexes, brown individuals, aged 35-49 years and with low schooling, had the highest occurrence of the disease. As for the clinical form, the dimorph preponderated. Furthermore, most people did not have any disability related to the disease. Regarding the spatial distribution of leprosy, the neighborhoods that presented the largest number of cases were: Tomba, Brasília, Calumbi, Gabriela, Campo Limpo, Mangabeira, and the rural districts were Bonfim da Feira and Humildes. **FINAL REMARKS:** The epidemiological characterization and spatial distribution of the data become important for intensifying health promotion and protection strategies to reduce the pathology's occurrence.

KEYWORDS: Leprosy, Incidence, Epidemiology. Spatial distribution.

RESUMO | INTRODUÇÃO: A Hanseníase é uma doença infectocontagiosa de evolução crônica causada pelo *Mycrobacterim leprae* e representa um problema de saúde pública. **OBJETIVOS:** Objetivou-se com este estudo descrever o perfil epidemiológico e espacial dos casos novos de hanseníase, notificados no município de Feira de Santana – BA, no período de 2005 a 2015. **MÉTODOS:** Trata-se de um estudo epidemiológico, descritivo com abordagem quantitativa, em que os dados foram coletados do Sistema de informação de agravos de notificação. **RESULTADOS:** Entre os anos de 2005-2015 foram notificados 1239 casos novos de hanseníase no município em questão. Destes casos, o maior número se deu entre os indivíduos do sexo masculino e entre os indivíduos pardos. A faixa etária de 35-49 anos e com baixa escolaridade apresentaram a maior ocorrência da doença. Quanto à forma clínica, a dimorfa preponderou. E a maioria das pessoas não apresentou qualquer tipo de incapacidade relacionada à doença. A respeito da distribuição espacial da hanseníase, os bairros que apresentaram o maior número de casos foram: Tomba, Brasília, Calumbi, Gabriela, Campo Limpo, Mangabeira e os distritos rurais, foram Bonfim da Feira e Humildes. **CONSIDERAÇÕES FINAIS:** A caracterização epidemiológica e a distribuição espacial dos dados tornam-se importante para intensificação de estratégias de promoção e proteção à saúde, a fim de se reduzir a ocorrência da patologia.

PALAVRAS-CHAVE: Hanseníase, Incidência, Epidemiologia. Distribuição Espacial.

Submitted 02/22/2021; Accepted 04/30/2021; Published 05/12/2021
J. Physiother. Res., Salvador, 2021 May;11(2):334-341
http://dx.doi.org/10.17267/2238-2704rpf.v11i2.3682 | ISSN: 2238-2704
Designated editors: Helena Fraga-Maia, Katia Sá

How to cite this article: Alves JM, Rodrigues RP, Carvalho MCS. Epidemiological and spatial profile of new leprosy cases notified at Feira de Santana (Brazil) between 2005 and 2015. J Physiother Res. 2021;11(2):334-341. http://dx.doi.org/10.17267/2238-2704rpf.v11i2.3682

Introduction

Leprosy is an infectious-contagious pathology caused by Mycobacterium leprae known in the early days of humanity as "leprosy." This morbidity is characterized by the appearance of asymptomatic and anesthetic lesions on the skin, lightly pigmented patches, and reddish nodules, in addition to compromising the peripheral nerves. Its transmissibility occurs from person to person by respiratory means.[1-4]

This pathology composes the list of the other 35, of compulsory notification and mandatory investigation in Brazil, through the completion of the notification form of the Sistema de Informações de Agravo de Notificação (SINAN), after the diagnosis of the disease. At the national level, leprosy is classified into virchowian, tuberculoid, indeterminate, and dimorphic. It is worth considering that the first two classifications are considered stable, while the others are configured as unstable.[5-7]

In Brazil, leprosy remains an important public health problem, affecting mainly young people and adults in productive age, causing high costs, especially in rehabilitation. Although the country has been committed, since 1991, to eradicating this pathology by the year 2000, the goals have not been achieved, and new goals have been set for the period 2006 to 2010.[8,9] In 2011, the Ministry of Health, through the Integrated Plan of strategies for the elimination of leprosy and other diseases, idealized as a goal to promote the development and implementation of effective and evidence-based integrated and interprogrammatic public policies for reducing the burden of diseases under elimination by the year 2015. The following goals were established to achieve the goal related to leprosy: to reach a prevalence of less than one case per 10,000 inhabitants; to achieve and maintain a 90% cure rate in new leprosy case cohorts by 2015; to increase the coverage of household contact examination to ≥ 80% of new leprosy cases by 2015; to reduce the detection coefficient of new leprosy cases in children under 15 years old by 26.9% by 2015.[9]

In 2016, the Ministry of Health, through the Guidelines for surveillance, attention, and elimination of leprosy as a public health problem, established the following actions to minimize this pathology: health education, epidemiological investigation for the timely diagnosis of cases, treatment until cure, prevention, and treatment of disabilities, epidemiological surveillance, contact examination, guidance and application of Bacillus Calmette-Guérin (BCG).[10]

Between the years 2012 to 2016, 151,764 new cases of leprosy were reported in the country, corresponding to an average incidence of 14.97 new cases for every 100,000 inhabitants. Of these, 84,447 new cases were among the male population.[11] In the state of Bahia, in 2016, 2,060 new cases of this pathology were reported, corresponding to an incidence rate of 13.48/100,000 inhabitants.[12] In Feira de Santana, 268 new cases were reported for the same year, with a significant increase compared to previous years.[13] Feira de Santana is on the list of 12 priority municipalities in the state of Bahia for leprosy control.[14] Thus, the present study is justified by the importance of knowing the epidemiological profile and the spatial distribution of new cases of this pathology in the city, as a way of contributing to more successful actions of health promotion and protection, besides confirming the importance of the decentralization of assistance and the implementation of these actions in the Family Health Units.

The objective of this study was to describe the epidemiological and spatial profile of new leprosy cases in Feira de Santana, Bahia, between 2005 and 2015.

Methodology

This is an epidemiological, descriptive, historical series study conducted in the Municipality of Feira de Santana from 2005 to 2015. The city of Feira de Santana is located 107 km from the capital of Bahia. It is the second-most populous city in the state of Bahia and the largest city in the Northeast interior. According to the Brazilian Institute of Geography and Statistics (IBGE) demographic census, in 2010 the population was 556,642 inhabitants.[15]

To prepare this study, we used secondary data obtained from the Sistema de Informação de Agravos de Notificação (Information System of Notifiable Diseases) made available in the form of printed tables, by the municipal health department of Feira de Santana, consisting of all the new cases of leprosy reported from 2005 to 2015, in the municipality of Feira de Santana, Bahia.

The variables selected for analysis were: sex, color/race (referred), age group, education, clinical form, and disabilities of leprosy patients. The information was systematized in tables, with the help of the Excel Program Microsoft Corporation (2007), following the sequence and distribution of the study variables.

The average incidence of leprosy in the rural districts and neighborhoods was calculated as shown below:

$$\frac{\text{Average incidence} = (\text{No. new leprosy cases}/10) \times 100{,}00 \text{ inhab}}{\text{Population of the neighborhood or rural district by (2010 Census)}}$$

After calculating the average incidence of cases, the data were stored in a Geographic Information System environment through the Qgis software, version 2.18. Then, a choropleth map was made through the Quantil classification to represent the spatial distribution of the average incidence of new leprosy cases in Feira de Santana - Bahia.

For this study, it was not necessary to submit the work to the Research Ethics Committee, according to art. 1 of the National Health Council Resolution No. 510/2016.

Results

From 2005 to 2015, 1,239 new cases of leprosy were reported in the municipality of Feira de Santana. Of these cases, 53% were male. The age group with the highest frequency of cases was among individuals aged 35-49 years. Regarding race/color, people who declared themselves as black or brown showed the highest percentages of the disease. Regarding education, 37.3% of the individuals with leprosy had incomplete elementary school education (Table 1).

Table 1. Epidemiological characteristics of leprosy cases in Feira de Santana - BA, 2005 to 2015

Features	N=1239	%
Sex		
Male	658	53%
Female	581	47%
Race		
Ignored/White	27	2%
White	99	8%
Black	312	25%
Brown	801	65%
Age		
1--4	4	0,5%
5--9	22	1,8%
10--14	51	4,0%
15--19	69	5,5%
20--34	314	25,5
35--49	336	27%
50--64	261	21%
65--79	156	12,5%
80+	26	2,1%
Education		
Ignored/White	157	12,7%
Illiterate	72	5,8%
Incomplete elementary school	463	37,3%
Complete elementary school	151	12,2%
Incomplete High school	111	9.0%
Complete High school	218	17,6%
Incomplete Higher education	14	1,0%
Complete Higher education	43	3,5%
Not applicable	10	0,8%

Source: SMS, 2018.
Prepared by the authors, 2018.

Regarding clinical-epidemiological characteristics, 33% of the cases were in the dimorphic form. Regarding the degree of disability resulting from this pathology, 19.6% had Grade 1 disability, while 63% had Grade 0 (Table 2).

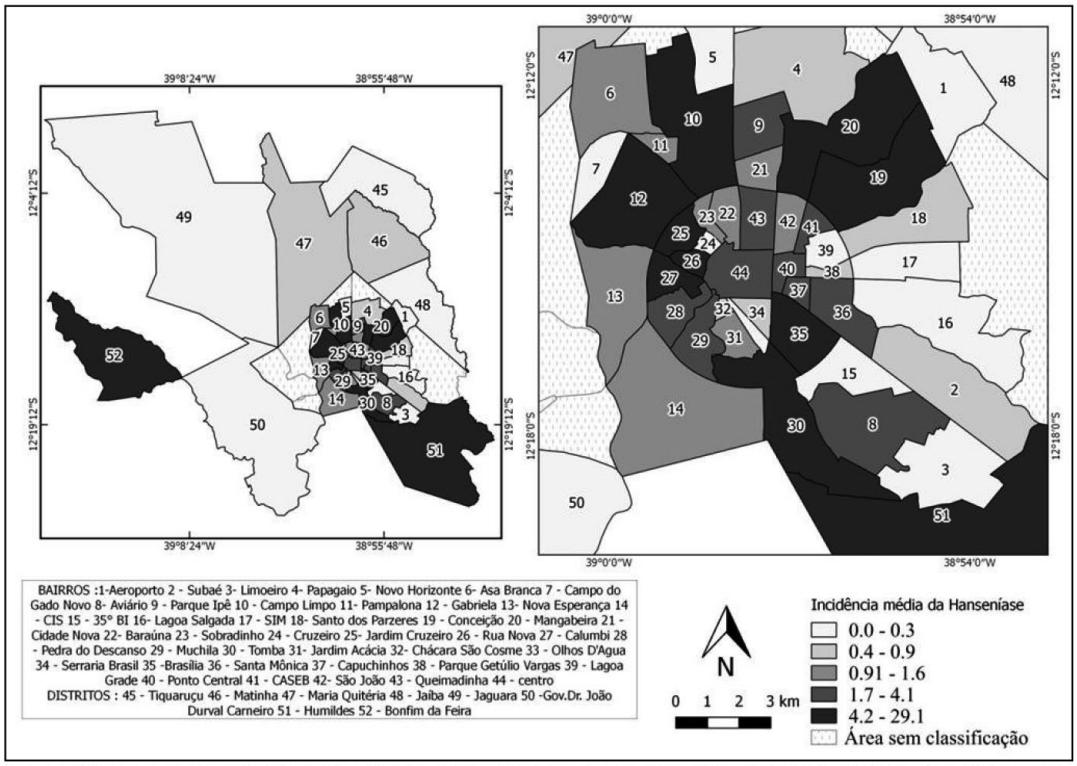
Table 2. Clinical and epidemiological characteristics of leprosy cases in Feira de Santana - BA, 2005 to 2015

Features	N=1239	%
Clinical form		
Ignored/White	45	3,6%
Undetermined	198	16.0%
Tuberculoid	327	26,4%
Dimorph	410	33%
Vichowiana	250	20,1%
Unclassified	9	0,72%
Degree of Disability		
Ignored/White	8	0,64%
Zero Grade	780	63%
Grade 1	243	19,6%
Grade 2	82	6,6%
Not evaluated	126	10,1%

Source: SMS, 2018.
Prepared by the authors, 2018.

Figure 1 shows the spatial distribution of the average incidence of new leprosy cases. In the period studied, the districts with the highest incidence were Tomba, Brasília, Calumbi, Gabriela, Campo Limpo and Mangabeira. Regarding the rural districts, the ones with the highest average incidence were Bonfim da Feira and Humildes.

Figure 1. Spatial distribution of the average incidence of new cases of leprosy in Feira de Santana - Bahia, between the years 2005 -2015



Universal Transverse Mercator Projection /Origin of Kilometry: Equator and Meridian 39 WGr/ Geodesic System Sirgas 2000, Scale 1:100,000,000. Source: IBGE,2010; SMS, 2018. Prepared by Roquenei da Purificação Rodrigues, 2018.

Discussion

The present study allowed us to identify the epidemiological and spatial behavior of leprosy in Feira de Santana, Bahia, which is on the national plan of mobilization and intensification of actions to eliminate leprosy and control of tuberculosis, established by the Ministry of Health.[5] The control of this disease involves health education activities, epidemiological investigation for the timely diagnosis of cases, treatment until cure, prevention and treatment of disabilities, epidemiological surveillance, contact examination, orientation, and application of BCG.[10]

Regarding the cases of leprosy between the sexes, the highest frequency of these occurred among males. In general, men are more susceptible to disease, especially infectious diseases, since they have little or no concern for their health. In this context, Melão et al.[16] highlight that men have greater social contact among men, less concern with the body and aesthetics when compared to women, which have health programs aimed to them. Such factors can delay the diagnosis not only of leprosy but also of other diseases.

In the self-reported race/color question, the highest percentage of individuals was brown. It should be considered that according to the last Demographic Census (2010) conducted by the Brazilian Institute of Geography and Statistics, 55.84% of the population of Feira de Santana declared themselves as brown. Aquino et al. (2003)[17] point out that the Northeast region of Brazil has a proportion of the self-declared brown population due to the miscegenation process.

As for the age range, the study showed that the highest percentage of cases occurred among individuals aged 35 to 49 years, followed by those aged 20 to 34 years. According to Miranzi et al. (2010)[18], the economically active population is the most affected by leprosy, which can harm the municipality's economy since this population group can develop disabilities, injuries, reaction states, withdraw from productive activity and generate a high social cost.

Regarding the level of education, people with incomplete elementary school education presented the highest frequency of the pathology, followed by those who had no level of education. This finding corroborates the study by Araújo et al. (2017)[19], in which 50.93% had incomplete elementary school education and 11.11% were illiterate. It is important to consider that individuals with low levels of education are more susceptible to developing pathologies since there is resistance to health education, not following the course of treatment or difficulty in understanding the prescriptions.[20]

As regards the presentation of the pathology, the dimorphic form predominated. Several studies conducted in the State of Bahia have found the highest predominance in such form.[20-22,24] Costa (2017)[24], when characterizing the epidemiological issues of leprosy in Bahia, highlights that this is the most common form of the disease, and due to late diagnosis and sanitary conditions, it is the one that is most inoculated.

In this study, the largest number of people did not present any disability related to the pathology. Alves et al. (2017)[25] emphasize that evaluating the degree of physical disability helps to estimate the epidemiological situation and is used as an indicator of leprosy control. Its detection indicates the late diagnosis of the disease. The physical disabilities and deformities resulting from leprosy are of great magnitude since most individuals are in the production phase. Thus, the development of disabilities can compromise working activities, causing economic, social, and psychological losses and, consequently, their quality of life.[26]

That is the first study in which the spatialization of data on new cases of leprosy in Feira de Santana - Bahia was carried out. The results pointed out that the distribution of these cases is mainly in the peripheral neighborhoods. In the study by Moura et al. 2012[27], conducted in Juazeiro - Bahia, it was found that there was a higher number of new cases of leprosy in peripheral neighborhoods. This event was also verified by Bastos (2017)[28], in Palmas - Tocantins.

In this context, it is important to emphasize that leprosy and other infectious and contagious diseases tend to spread in the outskirts of large cities since these are areas of high human concentration density, with precarious basic living conditions.[29]

Conclusion

Since this is a study with secondary data, the limitation of the study consisted of the number of unfulfilled data. However, it was evidenced that leprosy in Feira de Santana, in the period studied, was characterized mainly in males and people of productive age and with low education. Regarding the spatial distribution, it was verified that the peripheral districts presented the highest number of cases. Such information becomes important for the intensification of health promotion and protection strategies to reduce the pathology in these regions.

Author contributions

All authors took responsibility for preparing the study design, analysis and interpretation of the results, and writing the manuscript.

Competing interests

No financial, legal, or political conflicts involving third parties (government, private companies, and foundations, etc.) have been declared for any aspect of the submitted work (including but not limited to grants and funding, advisory board participation, study design, manuscript preparation, statistical analysis, etc.).

References

1. Ribeiro MDA, Silva JCA, Oliveira SB. Epidemiologic study of leprosy in Brazil: reflections on elimination goals. Rev Panam Salud Publica. 2018;42:e42. https://doi.org/10.26633/RPSP.2018.42

2. Arantes CK, Garcia MLR, Filipe MS, Nardi SMT, Paschoal VD. Health services assessment of early leprosy diagnosis. Epidemiol Serv Saude [Internet]. 2010;19(2):155-64. Available from: http://scielo.iec.gov.br/pdf/ess/v19n2/v19n2a08.pdf

3. Santos DAS, Spessatto LB, Melo LS, Olinda RA, Lisboa HCF, Silva MS. Prevalence of leprosy cases. Rev enferm UFPE on line [Internet]. 2017;11(Suppl. 10):4045-55. Available from: https://periodicos.ufpe.br/revistas/revistaenfermagem/article/viewFile/231164/25125

4. Santos AS, Castro DS, Falqueto A. Risk factors for leprosy transmission. Rev Bras Enferm. 2008;61(esp):738–43. http://dx.doi.org/10.1590/S0034-71672008000700014

5. Portaria nº 1.943, de 18 outubro de 2001 (Brazil). Define a relação de doenças de notificação compulsória para todo território nacional [Internet]. Diário Oficial da da União. 2001 Oct 24. Available from: http://scielo.iec.gov.br/pdf/iesus/v10n1/v10n1a07.pdf

6. Ministério da Saúde (Brazil), Secretaria de Políticas de Saúde, Departamento de Atenção Básica. Guia para o Controle da Hanseníase [Internet]. Brasília: Ministério da Saúde; 2002. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/guia_de_hanseniase.pdf

7. Beiguelman B. Genetics and leprosy. Ciênc. saúde coletiva [Internet]. 2002;7(1):117-28. Available from: https://scielosp.org/pdf/csc/2002.v7n1/117-128/pt

8. Penna GO, Domingues CMAS, Siqueira Júnior JB, Elkhoury ANSM, Cechine MP, Grossi MAF, et al. Dermatological diseases of compulsory notification in Brazil. An Bras Dermatol. 2011;86(5):865-77. https://doi.org/10.1590/S0365-05962011000500002

9. Ministério da Saúde (Brazil), Secretaria de Vigilância em Saúde, Departamento de Vigilância em Doenças Transmissíveis. Plano integrado de ações estratégicas de eliminação da hanseníase, filariose, esquistossomose e oncocercose como problema de saúde pública, tracoma como causa de cegueira e controle das geohelmintíases: plano de ação 2011-2015 [Internet]. Brasília: Ministério da Saúde; 2013. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/plano_integrado_acoes_estrategicas_hanseniase.pdf

10. Ministério da Saúde (Brazil), Secretaria de Vigilância em Saúde, Departamento de Vigilância das Doenças Transmissíveis. Diretrizes para vigilância, atenção e eliminação da Hanseníase como problema de saúde pública [Internet]. Brasília: Ministério da Saúde, 2016. Available from: https://portalarquivos2.saude.gov.br/images/pdf/2016/fevereiro/04/diretrizes-eliminacao-hanseniase-4fev16-web.pdf

11. Secretaria de Vigilância em Saúde. Caracterização da situação epidemiológica da hanseníase e diferenças por sexo, Brasil, 2012-2016. Boletim Epidemiológico [Internet]. 2018;49(4):1-12. Available from: https://antigo.saude.gov.br/images/pdf/2018/fevereiro/19/2018-004-Hanseniase-publicacao.pdf

12. Governo do Estado da Bahia, Secretaria da Saúde. Boletim epidemiológico hanseníase [Internet]. Bahia: Governo do Estado; 2017. Available from: http://www.saude.ba.gov.br/wp-content/uploads/2017/11/Boletim_epidemiologico_hanseniase_2017.pdf

13. Ministério da Saúde (Brazil), Departamento de Informática do Sistema Único de Saúde. Acompanhamento dos dados de hanseníase - Bahia [Internet]. [cited 2018 aug. 28]. Available from: http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sinannet/cnv/hanswbr.def

14. Ministério da Saúde (Brazil), Secretaria de Vigilância em Saúde. Sistema Nacional de Vigilância em Saúde: relatório de situação: Bahia [Internet]. Brasília: Ministério da Saúde; 2005. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/ba1.pdf

15. IBGE Cidades. Brazil: IBGE; 2017. Available from: https://cidades.ibge.gov.br/

16. Melão S, Blanco LF, Mounzer N, Veronezi CC, Simões PW. Epidemiological profile of leprosy patients in the extreme south of Santa Catarina between 2001 and 2007. Rev Soc Bras Med Trop. 2011;44(1):79-84. https://doi.org/10.1590/S0037-86822011000100018

17. Aquino DMC, Caldas AJM, Silva AAM, Costa JML. Profile of leprosy patients in a hyperendemic area of Amazonian Maranhão, Brazil. Rev Soc Bras Med Trop. 2003;36(1):57-64. https://doi.org/10.1590/S0037-86822003000100009

18. Miranzi SSC, Pereira LHM, Nunes AA. Epidemiological profile of leprosy in a Brazilian municipality between 2000 and 2006. Rev Soc Bras Med Trop. 2010;43(1):62-7. https://doi.org/10.1590/S0037-86822010000100014

19. Araújo AERA, Aquino DMC, Goulart IMB, Pereira SRF, Figueiredo IA, Serra HO, et al. Neural complications and physical disabilities in leprosy in a capital of northeastern Brazil with high endemicity. Rev bras epidemiol. 2014;17(4):899-910. https://doi.org/10.1590/1809-4503201400040009

20. Freitas DV, Xavier SS, Lima MAT. Epidemic Profile of Leprosy in the County of Ilhéus-BA, from 2010 to 2014. J health Sci. 2018;19(4):274-7. https://doi.org/10.17921/2447-8938.2017v19n4p274-277

21. Souza C, Rodrigues M. Magnitude, trend and spatialization of leprosy on minors of fifteen years in the state of Bahia, with focus on risk areas: an ecological study. Hygeia [Internet]. 2015;11(20):201-22. Available from: http://www.seer.ufu.br/index.php/hygeia/article/view/28914

22. Santos AD, Santos MB, Barreto AS, Carvalho DS, Alves AB, Araújo KCGM. Spatial analysis and epidemiological characteristics of cases of leprosy in an endemic area. Rev. enferm UFPE on line [Internet]. 2016;10(5):4188-97. Available from: https://pesquisa.bvsalud.org/portal/resource/pt/bde-29991

23. Santana JC, Santos MC, Lima MATL, Carvalho LR. Epidemiological profile of leprosy in Itabuna – Bahia. J. nurs. health. 2018;8(2): e188206. https://doi.org/10.15210/jonah.v8i2.13143

24. Costa AKAN. Características epidemiológicas da hanseníase no estado da Bahia, 2005 –2015 [dissertação] [Internet]. Goiânia (GO): PUC Goiás; 2017. Available from: http://tede2.pucgoias.edu.br:8080/handle/tede/3724

25. Alves ES, Oliveira LB, Araújo TME, Melo IV, Araújo RPS, Marques LMF. Epidemiological profile of leprosy in a municipality in the Brazilian Northeast: a retrospective analysis. J res fundam care online [Internet]. 2017;9(3):648-52. Available from: https://www.redalyc.org/pdf/5057/505754116007.pdf

26. Amaral EP, Lana FCF. Spacial analysis of Leprosy in the microregion of Almenara, MG, Brazil Rev. Bras. Enferm. 2008;61(esp):701-7. https://doi.org/10.1590/S0034-71672008000700008

27. Moura LTR, Fernandes TRMO, Bastos LDM, Luna ICF, Machado LB. Leprosy in children under 15 years in the city of Juazeiro – BA. Rev. Hansenol int. 2012;37(1):45-50. Available from: http://periodicos.ses.sp.bvs.br/scielo.php?script=sci_arttext&pid=S1982-51612012000100005&lng=pt&nrm=iso&tlng=pt

28. Bastos WM. Características sociodemográficas e epidemiológicas da hanseníase do município de palmas – Tocantins [dissertação] [Internet]. Salvador (BA): Universidade Federal do Estado da Bahia; 2017. Available from: https://repositorio.ufba.br/ri/bitstream/ri/25732/1/DISSERTA%C3%87%C3%83O%20FINAL%20MP.%20Whisllay%20Bastos.%202017.pdf

29. Ministério da Saúde (Brazil), Secretaria de Atenção à Saúde, Departamento de Atenção Básica. Vigilância em Saúde: Dengue, Esquistossomose, Hanseníase, Malária, Tracoma e Tuberculose [Internet]. Brasília: Ministério da Saúde; 2008. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/cab_n21_vigilancia_saude_2ed_p1.pdf