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Epidemiological profile of leprosy in the elderly in a microregion, state and northeast region from 2012-2021

Perfil epidemiológico de hanseníase em idosos em uma microrregião, estado e região nordeste de 2012-2021

Perfil epidemiológico de la lepra en las personas mayores en una microrregión, estado y región noreste de 2012 a 2021

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Abstract
This researh aims to identify the rate of reported cases of leprosy in the elderly in a micro-region of the interior of Paraíba, as well as the state itself and the Northeast region in Brazil, in the years 2012 to 2021. Ecological study with a quantitative approach that aimed to identify the rate of reported cases of leprosy in the elderly in a micro-region of the interior of Paraíba, as well as the state and the Northeast region, in the years 2012 to 2021. The information was collected through secondary data made available by the Department of Informatics of SUS (DATASUS), on the website of the Ministry of Health. The data were obtained from the Information System of Notifiable Diseases (SINAN) and the variables chosen for analysis were: year, gender, age group, type of leprosy diagnosed, type of treatment diagnosed and type of treatment updated/performed. It was found that the main information found show a higher rate of cases in males, 60-79 years old and multibacillary, pointing to the need for training of professionals in order to facilitate the diagnosis; as well as home visits by the health team, as an important tool in maintaining control of new or existing cases, in addition to the development of educational activities in order to use the exchange of information as an aid to possible diagnosis of cases, as well as to demystify the disease for the general population.
Keywords: Leprosy; Aged; Heath information systems.

Resumo
Este estudo visa identificar a taxa de casos de hanseníase notificados em idosos numa microrregião do interior da Paraíba, bem como o próprio Estado e a região Nordeste, do Brasil, nos anos de 2012 a 2021. Estudo ecológico, de abordagem quantitativa que objetivou identificar o índice de casos notificados de hanseníase em idosos em uma microrregião do interior do estado da Paraíba, localizado na região Nordeste do Brasil, assim como em âmbito estadual e regional, nos anos 2012 a 2021. A coleta das informações ocorreu através de dados secundários dispostos pelo Departamento de Informática do SUS (DATASUS), no site do Ministério da Saúde. Os dados foram coletados do Sistema de Informação de Agravos e Notificação (SINAN) e as variáveis escolhidas para serem analisadas foram: ano, sexo, faixa etária, tipo de hanseníase diagnosticado, tipo de tratamento diagnosticado e tipo de tratamento atualizado/realizado. Constata-se que os principais achados mostram um maior predomínio de casos em indivíduos do sexo masculino, com faixa etária de 60-79 anos e multibacilar, o que torna primordiais as capacitações dos

profissionais, com o intuito de descomplicar os diagnósticos, tal as visitas domiciliares da equipe de saúde, como importante mecanismo para a manutenção do manejo de casos incidentes e prevalente, além da promoção de ações educativas com intuito de utilizar a troca de conhecimentos como ferramenta para o diagnóstico de novos casos, como também para desmistificar a doença para o público em geral.
Palavras-chave: Hanseníase; Idoso; Sistemas de informação em saúde.

Resumen

Esta investigación tiene como objetivo identificar la tasa de casos reportados de lepra en los ancianos en una microrregión del interior de Paraíba, así como el propio estado y la región Nordeste en Brasil, en los años 2012 a 2021. Estudio ecológico con enfoque cuantitativo que tuvo como objetivo identificar la tasa de casos notificados de lepra en los ancianos en una microrregión del interior de Paraíba, así como el estado y la región Noreste, en los años 2012 a 2021. La información se recogió a través de datos secundarios puestos a disposición por el Departamento de Informática del SUS (DATASUS), en el sitio web del Ministerio de Salud. Los datos se obtuvieron del Sistema de Información de Agravios y Notificaciones (SINAN) y las variables elegidas para el análisis fueron: año, sexo, grupo de edad, tipo de lepra diagnosticada, tipo de tratamiento diagnosticado y tipo de tratamiento actualizado/realizado. Se constata que los principales datos encontrados muestran un mayor índice de casos en individuos de sexo masculino, con una edad de 60-79 años y multibacilar, lo que hace necesaria la capacitación de los profesionales para facilitar los diagnósticos; así como las visitas domiciliarias del equipo de salud, como importante herramienta para el control de casos nuevos o ya existentes, además del desarrollo de acciones educativas para utilizar la búsqueda de información como ayuda para posibles diagnósticos de casos, así como para desmitificar la enfermedad para la población en general.
Palabras clave: Lepra; Personas mayores; Sistemas de información en salud.

1. Introduction

Leprosy is a chronic disease that has persisted since ancient times and is still socially stigmatized for multiple reasons in different cultures, even with the existence of treatment and cure, which often causes individuals to stay away from people or omitting the disease, thus affecting its treatment and cure (Farias et al., 2020).

It is an infectious-contagious disease, whose main etiological agent is Mycobacterium leprae (M. leprae), capable of infecting a large number of individuals, with man being the only recognized source of infection, but with low pathogenicity, since few individuals become ill. These properties are not only a function of intrinsic characteristics, but also depend on aspects such as the relationship with the host and the degree of locality of the environment (Costa et al., 2019).

Leprosy can cause several vulnerabilities to those affected by it, especially when no treatment is done, a fact that worsens when it comes to the elderly, who themselves manifest biological, morphological, functional, and biochemical changes, typical of human aging, such as the existence of other comorbidities that contribute to the worsening of their health status, thus reducing their quality of life (Silva et al., 2020; Pelarigo et al., 2014).

Its diagnosis is essentially clinical, classified as paucibacillary and multibacillary, and is made through physical examination of the skin and peripheral nerves, eventually with the aid of laboratory tests, such as bacilloscopy and skin biopsy. As therapy, Brazil uses multidrug therapy (MDT), a specific chemotherapy treatment suggested in the 1970s by the World Health Organization (WHO) and since 1985 by the Ministry of Health (Veloso et al., 2018).

Since there are specific treatment schemes for each type of leprosy, the classification of its clinical form is fundamental to proceed with the treatment, in order to break the chain of transmission, treat infected people, and avoid cases of physical disability (Veloso et al., 2018).

It is a disease of compulsory notification and investigation throughout the national territory. Diagnosed cases must be notified through the Notification and Investigation Form of the Information System of Notifiable Diseases (SINAN) (Brasil, 2002).

Given the importance of the topic, a survey was conducted in the SINAN database, this researh aims to identify the rate of reported cases of leprosy in the elderly in a micro-region of the interior of Paraíba, as well as the state itself and the Northeast region in Brazil, in the years 2012 to 2021.

2. Methodology

This is an ecological study, with a quantitative approach conducted in July 2022, built on a survey of data in the Information System of Notifiable Diseases (SINAN), relative to the years 2012 to 2021, with collection referring to a microregion of the state of Paraíba, as well as the state itself and the Northeast region.

Ecological studies aim to assess how social and environmental scenarios can affect the health of population groups and their unit of analysis is a population or a group of people belonging to a defined geographical area. In this type of study, information is obtained and analyzed jointly, with attention to the population group as a collectivity but not individually (Medronho et al., 2011).

The target audience was composed of the population aged 60 years or more, living in the micro-region of Cajazeiras-PB, which covers 15 municipalities, besides the state of Paraíba and the Northeast region that were notified in SINAN as having leprosy in the period from 2012 to 2021. The locations studied were chosen because of the interest in making a comparison regarding the evolution of the disease in the elderly during the period of time determined, considering also the high rates found in these locations, especially at the regional scenario.

To achieve the proposed objective, information was collected through secondary data that is made available by the Department of Informatics of the SUS (DATASUS), on the website of the Ministry of Health. The data was obtained from SINAN/SUS and the variables chosen for analysis were: year, gender, age group, type of leprosy diagnosed, type of treatment reported and type of treatment updated/performed. The study was directed from the following guiding question: What information can be found in SINAN regarding the presence of leprosy in the elderly at micro-regional, state and regional scenarios in the last 10 years?

The results were analyzed using the method of descriptive statistics, comparing the cases reported in the given time period, and were arranged in tables and discussed based on the pertinent literature.

3. Results

During data analysis it was certified predominance in the male gender that occupied about 59% of the total cases in most years, except only in 2019 in which the female gender prevailed in about 5 cases (55.5%) and in the years 2018 and 2021 in which there was a tie, with 10 and 5 cases for both genders, respectively. The age group predominated in seniors aged 60-69 and 70-79, making up a total of 89.7% of cases.

The data in Table 1 show the rate of leprosy cases reported in the elderly in the micro-region of Cajazeiras-PB, by diagnosed type, notified scheme, and updated scheme that was performed.

The data found for the micro-region in question show that there has always been a greater number of cases of the multibacillary type (49%), except for the year 2014, in which the paucibacillary type was greater, occupying 50% of the cases in that year. Of the treatment schemes diagnosed, there were four years (2014, 2017, 2018 and 2020) with a diagnosis of MDT/PB treatment, but that in the end were treated as MDT/MB, as well as in the year 2015, which had 2 cases at first ignored/unclassified treated with MDT/MB at the end.

Such data may be related to failure in the initial diagnosis, considering also the initial quantity of ignored/unclassified cases or delay to start treatment to the point of having generated a worsening of the disease. One notices 7 ignored treatments in all, with emphasis on 2014 and 2021. It can be seen that 94.4% of cases were treated, with approximately 5.5% of cases ignored.

Table 1. Rate of reported leprosy cases in the elderly in the micro-region of Cajazeiras-PB, by type of leprosy diagnosed, type of treatment reported and type of treatment uptaded/performed.

Year	Type of leprosy diagnosed			Type of treatment reported				Type of treatment updated/performed				Total
	Unknown/ unclassified	PB	MB	PQT/ PB	PQT/ MB	Alt.	Ign.	PQT/ PB	PQT/MB	Alt.	Ign.	
2012	-	6	11	4	13	-	-	4	13	-	-	17
2013	2	5	5	4	7	-	1	4	7	-	1	12
2014	3	**7**	4	**6**	**6**	1	1	**7**	**5**	-	**2**	14
2015	**2**	**7**	**5**	**5**	**9**	-	-	**5**	**9**	-	-	14
2016	2	2	3	-	6	-	1	-	6	-	1	7
2017	5	2	7	**2**	**12**	-	-	**1**	**13**	-	-	14
2018	4	5	11	**5**	**15**	-	-	**4**	**16**	-	-	20
2019	2	2	5	3	6	-	-	3	6	-	-	9
2020	4	1	5	**2**	**7**	-	1	**1**	**8**	-	1	10
2021	-	3	7	1	9	-	-	1	7	-	2	10
Total	24	40	**63**	32	90	1	4	30	90	-	**7**	127

PB: paucibacillary; MB: multibacillary; MDT/PB: paucibacillary multidrug therapy; MDT/MB: multibacillary multidrug therapy; Ign: ignored; Alt: alternative squemes. Source: Ministry of Health/SVS - Information System of Notifiable Diseases - Sinan Net (2022).

The number of male patients was also predominant in all years, although in relatively smaller difference numbers compared to the microregion, occupying approximately 6% more than females. The 60-69 year old age group was also prevalent statewide, as was the 70-79 year old age group, both occupying 88% of the cases.

In the state of Paraíba, it is noticeable that the number of cases of the multibacillary type was also higher, occupying about 54% of the total number of those notified, and 352 cases were unknown/unclassified, around 20% of the total, a very high number, suggesting possible difficulty in diagnosis. The total number of alternative regimens diagnosed, in turn, was 14 cases (about 0.8%), later rising to 89 (5.2%), a number almost 9 times higher than the initial one, which were treated with this type of scheme. In all, 98% of the cases were treated, and 2% were ignored (Table 2).

Table 2. Rate of notified leprosy cases in the elderly in the state of Paraíba, by type of leprosy diagnosed, type of treatment reported and type of treatment uptaded/performed.

Year	Type of leprosy diagnosed			Type of treatment reported				Type of treatment updated/performed				Total
	Unknown/ unclassified	PB	MB	PQT/ PB	PQT/ MB	Alt.	Ign.	PQT/ PB	PQT/ MB	Alt.	Ign.	
2012	25	66	105	63	132	-	1	61	130	4	1	196
2013	29	52	106	51	134	1	1	48	125	11	3	187
2014	41	46	89	43	130	2	1	44	121	9	2	176
2015	34	49	84	56	109	-	2	53	103	6	5	167
2016	37	28	68	31	99	1	2	30	92	6	5	133
2017	44	40	84	54	111	2	1	52	104	9	3	168
2018	46	40	83	39	128	1	1	35	121	12	1	169
2019	36	51	123	45	161	2	2	43	150	15	2	210
2020	33	27	79	26	109	1	3	25	102	9	3	139
2021	27	34	104	31	128	4	2	28	120	8	9	165
Total	**352**	433	**925**	439	1241	**14**	16	419	1168	**89**	**34**	1710

PB: paucibacillary; MB: multibacillary; MDT/PB: paucibacillary multidrug therapy; MDT/MB: multibacillary multidrug therapy; Ign: ignored; Alt: alternative squemes. Source: Ministry of Health/SVS - Information System of Notifiable Diseases - Sinan Net (2022).

As in the state and micro-regional scenarios, the variables of sex and age group were equivalent, if compared in their given locations. The male gender, as before, was predominant with 8.8% more than the female gender, with 4 cases with the gender ignored. There was, however, no year in which the female sex prevailed in greater numbers. As for the age range, once again the elderly aged 60-69 and 70-79 years were prevalent, occupying 88.4% of the total number of cases.

At the regional scenario, the data found remain similar to those at the state and micro-regional scenarios. The largest amount of notified cases occurred in the years 2017, 2018 and 2019, respectively. The diagnosed type variable remains with multibacillary in the largest number of cases, occupying 62.9%, having greater emphasis in 2019 (Table 3).

As for the number of schemes diagnosed as alternative, these were smaller than the quantity performed at the end, as at the state scenario, occupying 645 more cases than diagnosed, about 2.7% of the total number of treatments performed (Table 3). Considering that the Northeast region has 9 states, this number is not of great contrast if compared individually.

The number of treatments that were ignored, in turn, occupied 305 cases, 0.8% of the total. The years 2020 and 2021 had the lowest number of reported cases and the highest number of ignored treatments, with 1.4% and 2.8%, respectively, in relation to the total number of the respective years (Table 3), data that may be related to the beginning of the pandemic of COVID-19 in Brazil, which caused and still is causing changes in the health scenario and, although it was a time of increased demands for care, it was also a difficult time for leprosy evaluations as well as other diseases (Mendonça et al., 2022). The number of treatments performed was about 99.1% of the total cases, which shows good efficacy in the overall uptake.

Table 3. Rate of reported leprosy cases in the elderly in the Northeast region, by type of leprosy diagnosed, type of treatment reported and type of treatment uptaded/performed.

Ano	Type of leprosy diagnosed			Type of treatment reported				Type of treatment updated/performed				Total
	Unknown/ unclassified	PB	MB	PQT/ PB	PQT/ MB	Alt.	Ign.	PQT/ PB	PQT/ MB	Alt.	Ign.	
2012	488	1053	2163	1008	2671	18	7	990	2621	75	18	3704
2013	521	969	2214	972	2707	18	7	941	2670	77	16	3704
2014	548	954	2286	941	2818	20	9	907	2767	92	22	3788
2015	474	870	2292	854	2755	18	9	828	2697	91	20	3636
2016	444	742	2089	698	2548	23	6	670	2498	92	15	3275
2017	558	837	**2444**	797	2992	35	15	759	2936	112	32	3839
2018	521	801	**2483**	703	3042	49	11	681	2941	143	32	3805
2019	515	783	**2605**	706	3113	71	13	676	3062	139	26	3903
2020	436	537	**1768**	446	2244	36	15	434	2179	87	**41**	2741
2021	492	559	**1888**	499	2382	38	20	477	2316	63	**83**	2939
Total	4997	8105	**22232**	7624	27272	**326**	112	7363	26695	**971**	**305**	35334

PB: paucibacillary; MB: multibacillary; MDT/PB: paucibacillary multidrug therapy; MDT/MB: multibacillary multidrug therapy; Ign: ignored; Alt: alternative squemes. Source: Ministry of Health/SVS - Information System of Notifiable Diseases - Sinan Net (2022).

As for the clinical form diagnosed, the dimorphic and virchowian types prevailed, with the dimorphic form having a higher number of cases in all three scenarios analyzed. The change in treatment, for those with divergent schemes diagnosed and updated/performed, is of great importance because it shows the possibility of failure in the diagnosis of the type of leprosy or even in the treatment itself, which can occur if the health professional is not trained to perform the clinical examination.

4. Discussion

Leprosy is considered a public health problem in Brazil, given the consequences that the disease brings, mainly in terms of morbidity and economic situation, since it is a disease that usually affects the poorer, marginalized, and less financially favored populations (Leite & Caldeira, 2015).

Brazil remains second in the world in new leprosy cases, second only to India, and although there is a decrease in cases annually, the country has not yet managed to eliminate the disease (Freitas et al., 2019).

In the past, patients diagnosed with leprosy were isolated from society and their families, mainly due to the existing stigma, resulting from beliefs that considered them impure, besides the lack of adequate treatment and wide social discrimination, which also resulted in great psychological suffering to the pacients (Monte & Pereira, 2015; Barros et al., 2019; Eidt, 2004).

However, even with the end of isolation in the country and the emergence of adequate treatment, many patients preferred to continue living where they were because they no longer had family ties, which were lost over time, or because of the difficulty of social reinsertion triggered by the disease or its after-effects (Leite & Caldeira, 2015).

Such factors are more prominent in elderly patients, who are considered more fragile than adults, mainly due to the natural course of the health-disease process, when there is already some impairment of functional capacity (Silva et al, 2018).

Being a socially and culturally older population, it is common that the stigma that has accompanied the disease since ancient times persists even more in the affected elderly, even today, which can cause strong feelings of rejection and inferiority in the face of the kind of hostile view that is still held of the disease (Freitas et al., 2019; Camalionte, Gascón, Trindade, 2022).

The multibacillary type was prevalent in the micro-regional, state and regional scenarios. Considering the changes that the elderly already suffer in their aging process, an elderly person with leprosy without the appropriate treatment can easily become a source of active transmission of the disease.

Leprosy, in turn, may leave sequels in the body of the affected individual, which is not an immediate consequence of the disease, but may last for years until it is no longer possible to reverse it. However, if the individuals in question are the elderly, this disease can influence the functional decline, being incapacitating and causing physical deformities when not treated properly (Monteiro et al., 2018).

It is assumed that the constant increase in the multibacillary type diagnosed each year compared to the paucibacillary type is due to a possible late diagnosis of the disease, because they are more severe and advanced forms that increase the chances of developing physical disabilities (Viana, Aguiar, & Aquino, 2016; Basso & Silva, 2017), or because the clinical form has not been correctly diagnosed, which may lead to inadequate treatment (Silva et al., 2020).

With this in mind, it is important that health professionals pay more attention to the active search for the disease, so that they are always alert to its possible signs, especially in relation to the neural part, and can thus ensure the chance of early diagnosis, even before the patient evolves from one type to another, in order to prevent disabilities and physical deformities (Brasil, 2016; Almeida, 2018).

The high rates of leprosy, both paucibacillary and multibacillary, were more present in males, and the disease can become much more harmful in this population, since it is a population that does not usually seek health services even in the face of disease manifestations, which is the opposite in females, that is more present in health services (Gomes, Nascimento, & Araújo, 2007; Silva et al., 2020).

In leprosy cases, it was found that the elderly males reached a higher number of reported cases, which may indicate that the search for the health service was motivated by the larger and more frequent clinical manifestations.

Therefore, it is convenient the more active participation of health professionals towards this population so that there is more encouragement about the importance of health maintenance. Moreover, the active search is projected as a great tool before these professionals, especially nurses in partnership with community health agents who are a source of support in detecting cases.

The reality of the identified data suggests other factors that may influence the divergence of information, such as changes of professionals in the health team and management changes in the cities, considering that the numbers of leprosy cases found suffered changes in the years that preceded and/or succeeded the election years.

In a certain way, these factors are interconnected due to the frequent exchange of professionals in health services, especially in municipalities, from the beginning of a new political administration or even when there are public contests. This exchange of professionals, however, can be harmful to the population, besides often being difficult for the newly arrived professional.

Because of this, under the eyes of another professional, one type of leprosy or a multidrug therapy scheme may be diagnosed as another, and the treatment of the patient may differ. Therefore, careful and detailed clinical study of leprosy cases is necessary to ensure reliable diagnosis and treatment.

The predominance of leprosy in the sixth and seventh stages of life suggests that age is of great influence regarding the diagnosis of the disease, and this may be an indicator that they usually attend health services more frequently.

Considering that this is an age group in which the onset of chronic non-communicable diseases is common, it makes

the flow of this population in health services greater, enabling professionals to have closer contact with the elderly, facilitating the diagnosis of other diseases such as leprosy.

As for the elderly aged 80 and over, it is understandable that age is a compromising factor for both diagnosis and treatment, since elderly people at older ages often avoid leaving their homes because they are physically unable, afraid, or simply unwilling (Lage et al., 2014).

Thus, the need for and importance of home visits to this long-lived population is perceptible, given the benefits that this joint work can bring, assisting in the process not only of diagnosis but also of treatment, contributing to the process of health education for family members and/or caregivers.

As a limitation of this study, we highlight those inherent to the use of secondary data by SINAN, which present divergences in coverage and quality in the different scenarios included in this research, a factor minimized by the large number of cases included in this study.

The need for better control of the notification of cases is also emphasized, since it was noticeable that there was a different course from diagnosis to the end of treatment, and it is not clear why, which may lead to underreporting, thus affecting the quality of the data.

5. Final Considerations

Leprosy is certainly a disease of great rate in the Brazilian social scenario, therefore being considered a public health problem and its notification is essential for the control of existing cases, especially in the elderly, due to the greater risks that this population faces due to the particularities of the human aging process.

Given this, it is advisable to use health education actions for the elderly population and their families and/or caregivers, in order to use the exchange of information as an aid for possible diagnosis of cases, as well as to demystify the disease for the general population.

We highlight the need for further studies, since this study aimed only to make a comparison of the leprosy rates in the elderly in three different scenarios. Considering the data found, it is notorious the importance of even more updated and in-depth studies that can contribute to the assistance of health professionals.

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