Characteristics Of Leper Disease: Literature Review

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Article Info	ABSTRACT
	According to the World Health Organization (WHO), leprosy is a chronic infectious disease that attacks the skin and peripheral nerves caused by Mycobacterium Leprae. Leprosy or what is known as Morbus Hansen can occur in all age groups, several other factors are thought to contribute to the increase in leprosy cases, one of which is age, gender, type of leprosy, education, employment and socio-economic factors. The aim of this literature is to determine the characteristics of leprosy. The research method used in the results of this research is Literature Review or literature review. Related keywords are "characteristics, leprosy". Search the Internet for this research article via accesses such as Google Scholar, Pubmed, and ScienceDirect. The research results show that from 10 journals, leprosy can occur at any age. However, in the economically active age, the most incidents are found in the age category, namely 30-60 years. Where the incidence rate in men is higher than in women. Other research shows that leprosy is a multibasilar type, which indicates that it is due to late diagnosis and the connection between poverty and lack of knowledge which causes leprosy to continue to spread.
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INTRODUCTION

Leprosy is a chronic granulomatous infection, the main cause of which is Mycobacterium Leprae, and infects the mucosal tissue of the skin to the peripheral nerves, causing loss of sensation in the skin with or without disability during the development of the disease. WHO states that anyone in endemic countries who experiences skin lesions with definite sensory loss or positive skin spots can be diagnosed with leprosy.

Leprosy is a chronic infectious disease that attacks the skin and peripheral nervous system and is caused by the intracellular pathogen Mycobacterium Leprae. This peripheral nerve damage results in various skin lesions with anesthesia, peripheral neuropathy through nerve damage, and muscle weakness and atrophy leading to bone loss due to resorption.

A number of factors are thought to contribute to the increase in leprosy. One of them is various other factors such as age, gender, type of leprosy, occupation, level of education, socio-economics. Although the causes vary, most cases of leprosy are found to cause disability before treatment.[4]

The Ministry of Health of the Republic of Indonesia stated that the prevalence rate of

leprosy in Indonesia has decreased, however, from 2001 to 2019 there has been an increase in leprosy cases with grade 2 disabilities with a portion above 10%. The incidence rate reaches its peak at the age of 10 to 20 years, the prevalence reaches its peak at the age of 30 to 50 years. More common in men than women. Inverse relationship between skin color and disease severity in blacks, susceptibility is high but there remains a predominance of milder disease.5

Leprosy is an important public health problem because it has the potential to cause long-term physical disorders and detrimental socio-economic impacts if undiagnosed. Mycobacterium Leprae is a pathogen whose transmission rate is quite high and the infection can become chronic. Infected contacts can remain asymptomatic for up to 20 years therefore carrying out regular contact tracing and testing, as well as providing prophylactic treatment is essential to stop the cycle of transmission.4

Based on the description above, it is very important to know and be aware of things related to leprosy. So a special comprehensive evaluation is needed to assess and prevent transmission of this leprosy problem. The aim of the results of this literature review research is to describe the characteristics of the incidence of leprosy.

METHOD

The method in this research uses Literature Review research or literature review. Other studies in literature reviews show the methods used such as collecting data or sources of information related to a particular topic. The data or sources come from journals, books and other libraries.

The keywords used are "characteristics, "leprosy". The selected articles are those that meet the inclusion criteria: journal publication period up to 10 years (2014-2024), using Indonesian and English, original articles (research articles). Search the Internet for research articles conducted through accesses such as Google Scholar, Pubmed, and ScienceDirect.

RESULT AND DISCUSSION

After searching for scientific articles via Google Scholar, PubMed and Science Direct, 10 articles were found that met the inclusion criteria from the review of clinical and research articles published between 2020 and 2024, as follows:

Tabel 1. Article Review Results

No.	Writer's name	Years	Article Title	Location	Research design	Result	Conclussion
1.	Xiangli, Guangjie Jin., dkk	2023	Epidemiological characteristics of leprosy during the period 2005-2020: A retrospective study based on the Chinese surveillance system	Jiangsu Province in the Yangtze River Delta region (China)	Retrospective with cross sectional design	Over 17 years, 363 new cases of leprosy were discovered during the year (2005-2021). 232 people are men and 131 people are women (1.77:1). 2017 case ratio (6.50:1). Meanwhile, the annual detection rate of leprosy decreased from 36/100,000,000 to 7/100,000,000 in 2005 and 2020. This shows that the risk factor for old age is an average of 60.56 years, in addition to the farmer's job factor (272.74.93%) , workers (47,12,95%), households and unemployed (15,4,13%), retirees (6,1,65%), students (4,1,10%), and others (11, 3.03%).	The NCDR of leprosy is decreasing, but some new cases show defects that are a sign of late diagnosis. There is a need to increase leprosy control in areas, especially those closest to leprosy endemic areas, for example by providing health education for farmers to increase awareness and reduce causal factors.
2.	Paulo Cezar de Moraes, Leticia Maria Eidt, dkk	2022	Epidemiological characteristics of leprosy from 2000 to 2019 in a state with low endemicity in		Study		Based on the clinical profile of the epidemiology of leprosy for the period 2000 to 2019, Rio Grande do Sul is a state with low endemicity,

No.	Writer's name	Years	Article Title	Location	Research design	Result	Conclussion
			southern brazil				making the spread of leprosy more widespread with most delays in diagnosis. It was observed in this study that a large number of multibacillary cases with diagnosed levels of physical impairment were present.
3.	R.D. Bagnall, R.G.Weintraub, dkk	2023	Leprosy in north india in post-elimination era: A retrospective study	Southern Brazil Region	Retrospective		New cases of leprosy were detected in the elderly population and cases were found to be multibacillary disease. The spread of leprosy is still growing slowly and continues to grow.
4.	Luh Made Mas Rusyati, Cita Rosita Sigit, dkk	2023	Characteristics of the leprosy reaction: A multicenter research of 13 teaching hospitals in indonesia from 2018 to 2020		Retrospective	For 19 years (2000-2019) 212 cases were found per year, with 81.6% (n=3,442) being new cases. The average discovery of new cases is 1.61 cases per 100,000 population/year. The leprosy prevalence rate in research is always less than one case per 10,000 population (0.16 cases). Male gender was predominant (51.9%) and the	Berdasarkan penelitian ini, penyakit kusta lebih banyak terjadi pada remaja dan dewasa serta laki-laki, jenis kusta terbanyak ditemukan di indonesia adalah kusta tipe multibasiler. Secara keseluruhan, reaksi kusta tipe 2 di Indonesia lebih banyak terjadi dibandingkan reaksi kusta tipe 1.

No.	Writer's name	Years	Article Title	Location	Research design	Result	Conclussion
						average age was 50.4 years. There were 131.2 MB cases (76.2%) diagnosed per year and the rate of class 2 disability that was visible at diagnosis ranged between 0.09 and 0.50 cases per 100,000 population. From 2000 to 2006, there was an increase in the number of leprosy cases, an average of 226 cases per year. In 2007 there was a decrease to under 200 new cases per year, an average of 162.6%, until 2014 there was a decrease of 38.4%, and from 2015 to 2019 there was an increase to 50.5%.	
5.	Yu Ye Li, Sunaula Shakya, dkk	2021	Factors influencing leprosy incidence: A compherensive analysis of observations in Wenshan of china, Nepal, and other global epidemic	North India	Retrospective cohort	From 1986 to 2015 a total of 3,376 leprosy cases were detected in Wenshan. In 1986, the peak increase in leprosy was 4.90/10,000 and the number decreased in 1989 to 1.2/10,000 with the implementation of MDT with	The results of leprosy control and management over the last 30 years in Wenshan have experienced a gradual decline, however the number of disabilities in the community and children as well as the number of MB

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			areas			a fixed duration. And the figures were determined until 1997. A sharp decline occurred from 1999 to 2002 and the decline remained below 1/10,000 from 2001 to 2015, 0.13/10,000. the number of MB subtypes (56%) compared to PB subtypes (44%) over the last 30 years. For men (MB 40% and PB 31%) women (MB 16% and PB 13%. This study shows that there is a delay in diagnosis of MB leprosy compared to PB causing the main cause of transmission. In this study to determine the factors associated with leprosy and its transmission compares the geographical and socio-economic situation among the top five regions or countries in the world with the highest leprosy. The study shows that ethnic minorities from the Zhuang and Miao	continues to increase in areas with a higher risk of contact transmission. Based on several literatures, leprosy endemic areas require a strong commitment both at the national and international levels for national development which leads to an appropriate and easily accessible health service system, improved sanitation and hygiene, well-maintained contact monitoring, and appropriate contact monitoring.

No.	Writer's name	Years	Article Title	Location	Research design	Result	Conclussion
						tribes in Wenshan are the most affected groups, those living in tropical and subtropical areas, respectively. while most leprosy sufferers live in the Terai tropical region of Nepal. Likewise, Nepal's socio-economics are also poor with a GDP per capita of USD 688.	
6.	Caroline A. Bulstra, David J. Blok, dkk	2021	Geospatial epidemiology of leprosy in northwest Bangladesh: a 20 year Retrospective observational study			From January 2000 to April 2019, a total of 20,623 cases were diagnosed with leprosy in the study area in northwest Bangladesh. The detection rate of new cases fell from 44/100,000 in 2000 to 10/100,000 in 2019. Most cases were diagnosed in Nilphamari (38.4%) and Rangpur 37.9% respectively, respectively 25% and 42% of the population lived. . Of all the cases, the majority were women. 2,589 cases (12.6%) were under 15 years old. Overall, 74.3% of PB cases	Despite the epidemiology of leprosy, strong hotspots still exist in the northwestern region of Bangladesh and are representative of areas with higher transmission activity and more frequent occurrence in those under 15 years of age.

No.	Writer's name	Years	Article Title	Location	Research design	Result	Conclussion
						and 25.7% of MB cases, approximately 38.3% had positive skin smear results at the time of diagnosis (9.9% of all cases).	
7.	Anna Beltrame, Gianfranco Barabino, dkk	2020	Leprosy in refugees and migrants in italy and a literature review of cases reported in europe between 2009 and 2018	Indonesia	Retrospective	There were 65 patients (57 migrants and 8 Italians) diagnosed with leprosy who were examined from January 2009 to December 2018. 2/3 were men with an average age of 33 years. The continents of origin are Africa (42%), Asia (40%), and South and Central America (18%). The most reported countries were Sri Lanka (9 patients), Senegal (8 patients), Brazil (7 patients), Nigeria (6 patients), Philippines (5 patients), followed by Bangladesh, Cuba, Egypt, India (3 each patients), Pakistan (2), Ivory Coast, Gambia, Ghana, Guinea, Morocco, and Togo (1 patient each).	Leprosy is a chronic, neglected infectious disease that attacks more than 200,000 people each year and causes disability in more than four million people in Asia, Africa and Latin America. This disease appears in a wide spectrum of clinical forms, making it difficult to establish clinical suspicion.
8.	Aline Menezes Rossi	2020	Epidemiological		Retrospective	During the study period a	

No.	Writer's name	Years	Article Title	Location	Research design	Result	Conclussion
	Tavares		profile of leprosy in the state of Mato Grosso : descriptive study		Observations	total of 11,388 cases of leprosy were reported. In 2014 there was a significant improvement of 3,639 with a prevalence of 11.14% per 10,000 population, in 2016 it became 3,470 cases equivalent to 10.49% per 10,000. Generally, this case is found in males (52.6%) aged 15 years and over (94.6%). Of the 11,388 cases, 47% had five or fewer nerves affected. With respect to five or more affected nerves, in 2015 this was equivalent to 1.3% and in 2017 it was 2.3%.	Of the individuals reported to have had leprosy from 2014 to 2017, most had suffered for 15 years or more and showed a distinct male predominance with the most pronounced dimorphic clinical form. The endemic situation of this disease is supported by the persistent morbidity rate of transmission, and delays in diagnosis, facts that broaden the relevance of leprosy as a public health problem.
9.	Hema Weerakoon, Hasantha Banduwardana, dkk.	2022	Socio-demographic factors, treatment-seeking behaviours and common clinical presentations of leprosy patients in anuradhapura, sri lanka	Wenshan China, Nepal.	Retrospective		The high rate of leprosy in children shows that leprosy transmission was still high in Anuradhapura during this period. In this study, it was found that a quarter of family members had a history of contact that indicated the spread of the virus was still present. And the importance

No.	Writer's name	Years	Article Title	Location	Research design	Result	Conclussion
							of tracing contacts of sufferers to stop the spread and control leprosy cases.
10.	Diana N. Lockwood, Amy Mcintosh, dkk	2022	Diagnosing and treating leprosy in a non-endemic setting in a national centre, London United Kingdom 1995-2018	Northwest Bangladesh	Descriptive	Based on the results of this study involving 66 leprosy patients. The majority (56%) of patients were male, and 50% were aged 30-50 years (average age 41 years), and 7 (10.6%) patients were less than 14 years old. Most of the patients 26% are housewives, followed by farmers (19%)	Leprosy is not a traveler's disease but develops after living in a leprosy endemic area. The number of people from leprosy-endemic countries reflects the prevalence of leprosy and the level of migration to the UK. There are challenges in diagnosing leprosy in non-endemic areas and the need to recognize the signs and symptoms of leprosy.

Discussion

Leprosy is a chronic infectious disease that causes Mycobacterium Leprae. Mycobacterium leprae was the first bacterium identified as a cause of disease in humans. 1,6 This disease has been known since 3000 years ago, and its origin is thought to be Asia or Africa. The term leprosy was coined as a tribute to a Norwegian doctor, Gerhard Armauer Hansen, who first discovered that Mycobacterium leprae was the bacteria that causes leprosy.7 Leprosy is a disease that tends to attack the peripheral nerves and skin, although it is not fatal, leprosy is one of the causes of peripheral neuropathy The most common non-traumatic disease worldwide. The diagnosis of leprosy is based on the presence of one of three cardinal signs. Early diagnosis of leprosy is very important and is carried out through clinical examination and supporting examinations. Lack of knowledge about its treatment facilitated the spread of leprosy throughout the world.[7,8]

Global Statistics

Leprosy in tropical countries is an endemic disease, especially in underdeveloped and developing countries throughout the world. The prevalence has decreased drastically since the start of multi-drug therapy in early 1980. 9 In research conducted by Xiangli, et al in 2023 with the title Epidemiological characteristics of leprosy during the period 2005-2020, results were found in several leprosy patients spread across the northwestern province. Jiansu and Suqian are the biggest contributors to leprosy cases. The detection rate was 8.69 per 100,000 in 1955-1959, while the highest 5-year average prevalence rate was 60.36 per 100,000 in 1970-1975. Where early diagnosis and multi-drug therapy (MDT) has been implemented as the main strategy for controlling leprosy, the 2005-2020 city preference saw a long-term decline in leprosy cases in Jiangsu province ranging from 26 to 6 with the number of cases in 2009 (34 cases), however, there was an increase from 2005 to 2009 (27 cases to 39 cases). This control remains under supervision where the highest incidence occurred in 2006-2010 and the lowest incidence from 2016 to 2020.10

This is in line with research conducted by Yu Ye Li, et al in 2021 in Wenshan. In this study, it was found that therapy was provided according to WHO guidelines, namely multidrug therapy (MDT) which recommended a 3-drug regimen, namely rifampicin, dapsone and clofazimine for Multibacillary leprosy patients (MB) and a 2-drug regimen of rifampicin and dapsone for Paucibacillary (PB) leprosy patients. Where the peak was in 1986 (4.90/10,000) after that there was a sharp decline from 1999 to 2002, and remained below 1/10,000 from 2001 to 2015 (0.13/10,000) in 2015.[11]

Spread Of Leper Disease

A large number of cases still appear in various countries in Southeast Asia, America, Africa, the East Pacific and the West Mediterranean. At the beginning of 2012, the prevalence of this disease was 0.34 per 10,000 population. There is a long-term trend in the epidemiology of leprosy which is quite difficult due to continuous changes in its definition, long incubation periods, and changes in its control. 9 In research by Xiangli, et al in 2023, it was explained that there were 208,641 new cases worldwide in 2018, with 192,713 newly admitted patients. This research shows that leprosy is common in tropical countries, especially in developing countries, such as India, Brazil, Indonesia. In the last ten years, molecular investigations into the distribution of strains have been carried out at the national

level, especially in India, Brazil and China. India and Brazil reported the highest number of new leprosy cases in 2018. Although India achieved the WHO elimination goal at the national level in early 2005, high endemicity remains and the detection rate of new cases in India remains more than 127,000 annually.

This is in line with research by Paulo Cezar de Moraes, et al. In 2022 in Brazil, results were obtained from 2000 to 2019. The state of Rio Grande do Sul reported an average of 212 cases per year (81.6%). The average discovery of new cases is 1.61 cases per 100,000 population/year. Brazil is a tropical country, based on the last census 2010 the state of Rio Grande do Sul has a population of 10,693,929 people spread across 497 cities, with 15% of the population living in rural areas and remains a state with low endemicity, with an average of 1.16 cases per 100,000 resident. Brazil ranks second due to its high endemism, there were 301,638 new cases in the country from 2010 to 2019. The detection rate decreased by 37% over time and in 2019 it was 13.23 cases per 100,000 inhabitants in the northern, northeastern regions , and the Midwest, the disease has a high level of endemicity, while the southern and southeastern regions have moderate endemicity, with Rio Grande de Sul and Santa Catarina classified as states with low endemicity.13

In research conducted by R.D. Bagnall, et al in 2023 in India, India continues to report the majority of new leprosy cases globally (74%) in 2021. India occupies first place for the most leprosy cases in the world. After the introduction of multi-drug therapy in 1982, India experienced a decline in the leprosy prevalence rate from around 57.8/10,000 in 1983 to <1/10,000 in December 2005 and was declared to have achieved the target of eliminating leprosy that was set, however, the resurgence of this disease is increasing. it's still slowly going on. India reported 65,147 new cases in 2020 and 75,349 in 2021. In addition, around 118 districts in the country are still highly endemic. 14 In research conducted by Luh Made Mas Rusyanti, et al. in 2023 it will occupy the third position with the highest number of leprosy cases in the world. after India and Brazil, in research conducted in 13 teaching hospitals in Indonesia for 3 years, from 2018 to 2020, the highest proportion was in the group over 14 years of age (95.33%) while children under 14 years of age were around (4.6 %) of total cases.[15]

Age

Leprosy is not a hereditary disease. Germs are found on the skin, hair follicles, sweat glands, and breast milk, and are rarely found in urine. Some implantation sites are not a benchmark as the location of the first lesion and this leprosy can attack various ages, such as children and children are more susceptible than adults.[1] In several studies, the results of various studies conducted by Paulo Cezar de Moraes, et al in 2022 in southern Brazil, entitled Epidemiological characteristics of leprosy from 2000 to 2019 in a state with low endemicity in southern Brazil, showed results of patients affected by leprosy based on age groups. , there is a prevalence of cases between 30 and 60 years (59.2%) which is an economically active age group. 13 Another study conducted by Aline Menezes, et al in 2020 entitled Epidemiological profile of leprosy in the state of Mato Grosso found Based on age results, most leprosy cases in Moto Grosso occur in people aged over 15 years, around 94.6%, while for people aged 0-14 years, around 2.9%. 16 Another research conducted by Caroline A. Bulstra, et al in 2021 entitled Geospatial epidemiology of leprosy in Northwest

Bangladesh, it was found that there were many cases of leprosy in children, namely under 15 years of age, using more specific age categories according to WHO, around 2,589 cases (12.6%) were under 15 years of age.[17]

Gender

In research conducted by Xiangli, et al in 2023 in China, it was found that there were 363 new cases of leprosy reported during 2005-2021, of this number, 232 people were men, and 131 people were women (1.77:1). Similar results were also found in other countries India, Bangladesh, Brazil. Some opinions explained in this research are because men have more opportunities to be exposed to more intensive social networks. Men are less sensitive to leprosy than women. Another research conducted by R.D. Bagnall, et al in 2023 entitled Leprosy in North India in Post-Elimination explained that the study population consisted mostly of men, 68% (N=79/115). Where male dominance is in accordance with Uttrakhand state data.14

This is in line with research conducted by Luh Made Mas Rusyati, et al in 2023 entitled Characteristics of the leprosy reaction: A multicenter research of 13 teaching hospitals in Indonesia from 2018 to 2020. The results were obtained according to data from the Ministry of the Republic of Indonesia in 2018, leprosy cases in men had 9,872 cases and occurred more frequently than women, with 6,048 cases. This was also found in research by Paulo Cezar de Moraes, et al in 2022 entitled Epidemiological characteristics of leprosy from 2000 to 2019 in a state with low endemicity in southern Brazil, leprosy cases in men are more dominant (51.9%) than women. In another study conducted by Anna Beltrame, et al in 2020 entitled Leprosy in refugees and migrants in Italy and a literature review of cases reported in Europe between 2009 and 2018, results from 65 patients (57 migrants and 8 Italian citizens) who were diagnosed with leprosy from January 2009 to December 2018 found that two-thirds of leprosy cases were men. Other research was also obtained by Diana N. Lockwood, et al in 2022 in London entitled Diagnosing and treating leprosy in a non-endemic setting in a national center, London United Kingdom 1995-2018 explained that leprosy is not a traveler's disease but develops after living in a leprosy endemic area, there were 157 patients. About 67.5% of leprosy are men. The patients came from 34 different countries and contracted leprosy before migrating.[19]

Types Of Leper

According to WHO in 1981, leprosy is divided into multibasilar and paucibacillary. Most of the cases that occur are leprosy patients suffering from multibasilar (MB). Included in multibasilar are types LL, BL and BB in the Ridley-Jopling classification with a Bacterial Index (IB) of more than 2+, while paucibacillary are types I, TT and BT with IB less than 2+. 5,20 This is in line with research Caroline A. Bulstra, et al in 2021 entitled Geospatial epidemiology of leprosy in Northwest Bangladesh: a 20 year results showed that overall leprosy cases were 74.3% of cases, diagnosed with PB leprosy (25.7%) cases and MB leprosy cases (25.7%) cases. 38.3%) had positive skin smear results at diagnosis.[17]

Work

Another study conducted by Xiangli et al in 2023 explained that work with high environmental exposure (for example agriculture), low education level, and poverty are risk factors for leprosy. In this study, it was found that farmers contributed 74.9%, consistent

with previous research. This indirectly proves the low level of education of cases in Jiangsu province and their ignorance regarding the status of the disease and how it is transmitted. Another research conducted by Hema Weerakoon, et al in 2022 entitled Socio-demographic factors, treatment seeking behaviors and common clinical presentations of leprosy patients in Anuradhapura, Sri Lanka found that most of the patients were housewives 26% and followed by farmers 19%.[21]

Social Economy

Several other factors apart from pathogenesis due to the causative germ, method of transmission, the need to consider socio-economic and environmental conditions.[1] This is in line with research conducted by Yu Ye Li, et al in 2021 entitled Factors influencing leprosy incidence: A comprehensive analysis of observations in Wenshan of China, Nepal, and other global epidemic areas explain that leprosy was very common in this prefecture until the 1950s due to its complex geographic location and low socioeconomic development. There was a comparison of the geographical and socio-economic situation between the top five regions or countries in the world with the highest leprosy disease. Studies show that the ethnic minorities and Zhuang and Miao tribes in Wenshan have slower economic development than other regions in the country (Wenshan's GDP/capita is USD 2,426, lower than the national GDP/capita of USD 6,097). Likewise, Nepal's economic status is also poor, with a GDP per capita of USD 688.[11]

CONCLUSION

Based on the results of 10 journals, it shows that leprosy can occur at any age. However, at the age where this occurs most often, namely in the 30-60 age category who are economically active. Where men have a higher incidence of leprosy than the female population. And most studies show that most leprosy is a multibacillary type of leprosy, which indicates that this incident occurs due to late diagnosis, and is related to poverty and lack of knowledge, for example low socioeconomic status.

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