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Disability Level of Leprosy Patients in Ambon City, Maluku: A Retrospective Study from Eastern Indonesia

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ABSTRACT

Background: Leprosy, also known as Hansen's disease, is a chronic endemic disease. The Corona Virus Disease 2019 (COVID-19) pandemic disrupted the implementation of the Neglected Tropical Diseases (NTDs) program such as the leprosy new case detection program. Leprosy is one of the chronic diseases that causes various problems due to the disability it causes. **Purpose:** To know the prevalence of leprosy and disability in 2018-2022 in Ambon City, Maluku, Indonesia. **Methods:** This research is a type of retrospective descriptive research whose aim is to find out the epidemiology of leprosy patients in Ambon City, Maluku, Indonesia with a sample of were 131 people from 2018 to 2022. **Result:** The prevalence of disability levels 0 and 2 has the highest percentage in the 5-year span, occurring in 2019. However, during the COVID -19 pandemic, cases of level 1 disability tend to rise. **Conclusion:** Leprosy patients who had disability were more common than those who had a disability.

Keywords: leprosy, covid-19, prevalence, disabilities, Maluku.

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BACKGROUND

Leprosy, one of many neglected tropical diseases (NTDs), also known as Hansen's disease, is a chronic endemic disease that can be transmitted as a result of infection with an acid-resistant bacilli, namely *Mycobacterium leprae* (*M. leprae*).[1,2] Unlike other infectious diseases, this bacterial infection cannot damage human internal organs, but *M. leprae* prefers to infect cold parts of the body, such as the skin, fingers, toes, peripheral nerves, testicles, upper respiratory tract, and eyes.[1]

The low-virulence nature of this bacterium causes the clinical symptoms that will appear in each leprosy patient to vary depending on the cellular immune system.[1] The low invasiveness of *M. leprae* allows the course of this disease to become chronic for many years, which will result in disabilities such as peripheral nerve damage, loss of limbs, blindness, and skin lesions characterized by general anesthesia..[3]

According to the latest WHO data for 2020, 127 countries reported the registered prevalence of leprosy in the number of cases of treatment at the end of 2019. There were 129,192 patients, with an average of 16.6 per million people.[4] This is due to overlap with the Corona Virus Disease 2019 (COVID-19) pandemic, which has disrupted the implementation of the new leprosy case detection program.[4,5] According to research conducted by Cabral[5] et al. in 2022, the COVID-19 pandemic could to have a major negative impact on the control of leprosy and other diseases. If you look at the trend of the number of cases each year from 2011 to 2020, the countries that have the highest number of cases and the highest disability rates in the world are Brazil, India, and Indonesia.[6] The distribution or spread of this disease in Indonesia is widespread in every province with low income.[1] In April 2018, the Ministry of Health of the Republic of Indonesia reported that Maluku Province was ranked in

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the top 10 for the most new cases seen in 34 provinces in Indonesia.[7]

In the records and reporting of leprosy at the Ambon City Health Office in the span of 5 years from 2018 to 2022 (including all health centers), the highest cases occurred in 2019, namely 82 patients.[8] The trend in the number of new cases of leprosy from 2018 to 2019 has increased and started to fall from 2019 to 2020. From 2020 to 2022, leprosy cases have started to increase, reaching a peak in 2022 of as many as 82 people.[8] The risk factors for transmission of leprosy are multifactorial, namely close contact with leprosy sufferers, especially in the type of *Lepromatous Leprosy* (LL) or *Multibacillary Leprosy* (MB), exposure to armadillo animals, individual age range of 5 to 15 years and more than 30 years at diagnosis, poor condition of certain genetic and immune systems.[9] This research was conducted in Ambon City, which is a representative of the Maluku region from 2018 to 2022 because research has never been conducted in Maluku Province, especially in Ambon City.

METHODS

This research is a type of retrospective descriptive research whose aim is to find out the epidemiology of leprosy patients who have received *Multi Drug Therapy* (MDT) treatment in Ambon City for 3 years, starting from January 2018 to December 2022. The research locations are at Benteng Health Center, Air Health Center Salobar, Air Besar Health Center, Rijali Health Center, Poka Health Center, and Nania Health Center because these 6 health centers had the highest number of cases in that period and represented each sub-district spread across Ambon City.

The research instrument used secondary data, namely the Leprosy Card given by the Health Center, to record and monitor patients during the MDT treatment period. The inclusion criteria were all leprosy patients who were registered on the leprosy patient card and recorded in the Ambon City Health Office's cohort report. The exclusion criteria for this study were patients who died, moved cities, and had incomplete patient records. This research has received ethical approval from the Ethics Commission of the Faculty of Medicine, Pattimura University, Ambon (016/FK-KOM.ETIK/VIII/2023).

RESULT

Table 1 shows that 106 patients (80.9%) at level 0, 21 patients (16%) at level 1, and 4 patients (3.1%) at level 2 represented the number of disability events from 6 health centers. The Poka Health Center had the highest percentage of grade 0 disability cases, namely 100%, while the Rijali Health Center had the lowest percentage of grade 0 disability cases, namely 30%. The highest percentage of cases of disability level 1 was at the Rijali Health Center at 30%, while the lowest percentage was at the Poka Health Center and Air Besar Health Center at 0%. The highest percentage of cases of disability level 2 was at the Rijali Health Center at 10%, while the lowest at Benteng and Poka Health Centers was 0%.

Table 2 shows the distribution of the incidence of disability due to leprosy by year from 2018 to 2022. In 2021, the number of leprosy patient with the highest percentage was 38 patients with a total disability of level 0 of 78.9%, level 1 of 18.4% and level 2 of 2.6%. Meanwhile, 2018 had the lowest number of patients, namely 11 patients with the number of disabilities at level 0 of 81.8%, level 1 of 18.2% and level 2 of 0%.

Figure 1 shows a graph or line chart of the percentage of leprosy cases based on the level of disability (levels 0, 1, and 2) from 2018 to 2022. Disability cases at level 0 show that from 2019 to 2020, the number of cases decreased and then increased in 3 years. The incidence of disability level 1 shows a sharp increase from 2019 to 2020, while for disability level 2, the chart shows a significant decrease in the number of cases from 2019 to 2020, from 8% of cases to 0%.

Table 1. Distribution of disability rates of leprosy cases by community health centers

Health Center	Disability Level						Total (N)
	Disability Level 0		Disability Level 1		Disability Level 2		
	n	%	n	%	n	%	
Air Salobar Health Center	26	76.5	7	20.6	1	2.9	34
Benteng Health Center	22	75.9	7	24.1	0	0	29
Rijali Health Center	3	30	6	60	1	10	10
Poka Health Center	14	100	0	0	0	0	14
Nania Health Center	26	92.9	1	3,6	1	3,6	28
Air Besar Health Center	15	93.8	0	0	1	6,3	16
Total	106	80.9	21	16	4	3.1	131

Table 2. Distribution of levels of disability due to leprosy in Ambon City in 2018-2022

Years	Disability Level						Total (N)
	Disability Level 0		Disability Level 1		Disability Level 1		
	n	%	n	%	n	%	
2018	9	81.8	2	18.2	0	0	11
2019	22	88	1	4	2	8	25
2020	18	75	6	25	0	0	24
2021	30	78.9	7	18.4	1	2.6	38
2022	27	81.8	5	15.2	1	3	33
Total	106	80.9	21	16	4	3.1	131

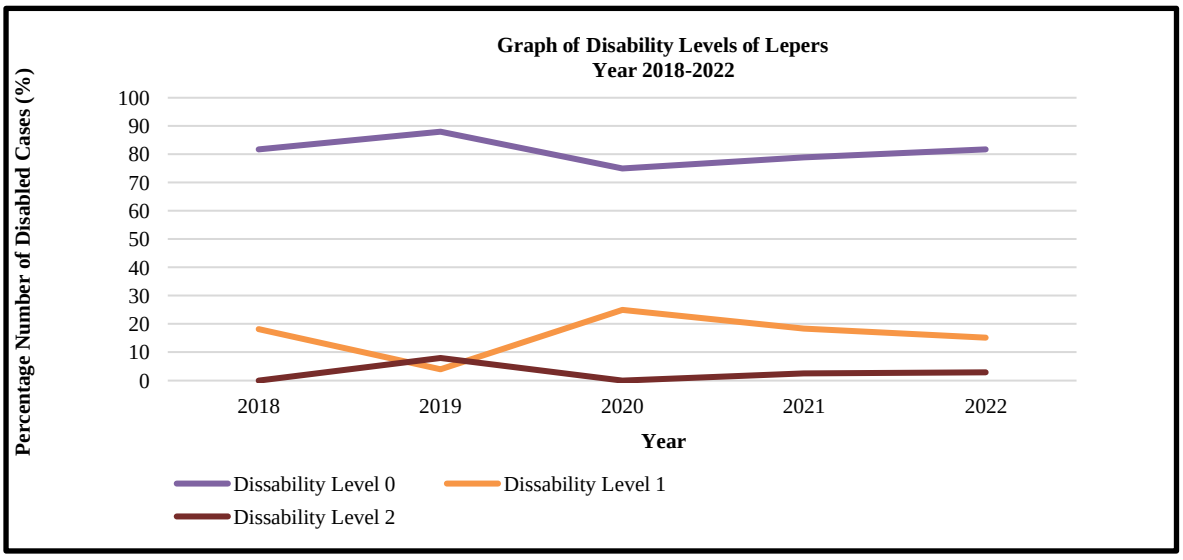

Figure 1. Graph of disability rate cases in Ambon City in 2018-2022.

DISCUSSION

The number of new cases of leprosy globally in 2020 was 121,358 cases.[4] The number of leprosy cases tended to decrease gradually over a span of 3 years, in 2018, there were 199,400 cases; in 2019, there were 193,840 cases; and in 2020, there were 121,396 cases, with a decrease of 31.1% due to the effects and impact of the COVID-19 pandemic, which significantly affected health services in all countries. 11 India was also reported to have a lower number of cases by 43.1%.[4] New cases of leprosy in Indonesia in 2019 were 17,439 which then dropped to 11,173 in 2020.[4] In 2018, the prevalence rate and New Case Detection Rate (NCDR) were 0.7 and increased to 0.74 in 2019. In Indonesia, cases of level 2 disability from

leprosy decreased in 2019 by 1,121 cases and further decreased to 628 cases in 2020.[4,10] Maluku Province is one of the provinces in Indonesia that ranked second in 2019 with a disability rate of 2 new leprosy patients per year. 1 million population of 12.2 and is a province that has not achieved elimination.[10]

Based on the results of this study, the number of new cases of leprosy in Ambon City from 2018 to 2022 was 131, with cases without disabilities being higher than those with disabilities, namely at level 0 of 80.9%, level 1 of 16%, and level 2 of 3.1%. In that 5-year span, the highest cases occurred in 2021, and the lowest cases occurred in 2018. If we look at the trend based on the level of disability, in cases of disability level 0, it shows that from 2019 to 2020, the number of cases decreased and then increased in the following 3 years. The cases of disability level 1 showed a sharp increase from 2019 to 2020. Meanwhile, the level of disability 2 showed a significant decrease in the number of cases from 2019 to 2020.

This is not in line with research conducted by Suparno[11] *et al*. in South Konawe, Southeast Sulawesi in 2017-2019, showing leprosy cases also decreased in 2018 and began to increase again in 2020. The prevalence rate obtained was 0.5 in 2017 and decreased to 0.26 in 2018. It increase again to 0.48 in 2019, 0.47 in 2020 and in 2021 it will be 0.6.

Based on the level of disability, according to a retrospective study by Santos[12] *et al*. from 2001 to 2011 in Brazil, the number of cases based on the level of disability in the span of 10 years was mostly grade 0 disability. Grade 0 disability affected 1,692 patients (71.8%), grade 1 disability affected 492 patients (20.9%), and grade 2 disability affected 172 patients (7.3%). This is in line with research conducted by Widya[13] *et al*. in 2017 in Pemalang Regency, which showed that the most patients were those who did not have a disability or a level 0 of 104 patients (72.2%), while 40 (27.8%) were those who had disabilities.

Based on patients who experience disabilities (disability levels 1 and 2), a study conducted by Geani[14,15] *et al*. in the Department of Dermatology and Venereology at the Dr. Soetomo Surabaya in 2017-2019 showed that in the span of 3 years, more new leprosy patients had grade 2 disability than grade 1, namely 88 patients (32%) had grade 2 disability and 64 patients (23.3%) had grade 1 disability. In this study, the number of new patients was relatively constant over a span of 3 years. Meanwhile, disability level 2 has decreased gradually from year to year.

There have been quite a number of cases of disability levels 0 and 1, which are levels of disability that can be treated immediately or treated with drug programs, in Ambon City over the course of these five years, indicating that the performance of disease control parties, particularly the Ambon City Service, has been very good. Meanwhile, regulations for the control of leprosy, especially cases of disability in Indonesia, are only centralized and recorded at level 2 (final or irreversible) of disability, whereas handling and prevention of disability are more important at level 1 because they include reversible disability. This is because in level 1 disability, there is already impaired sensory, motor, and autonomic nerve function. However, it may not appear as prominent as with level 2 disability where deformities have become apparent. Judging from the number of cases and trends of leprosy in Ambon City, the existence of the COVID-19 pandemic has had a significant impact on the number of cases received. Based on research that was conducted by Silva da Paz[16] *et al.* in 2022 in Brazil regarding the impact of a pandemic related to the diagnosis of leprosy, there was a significant impact on leprosy cases due to several factors, namely one act of social isolation or restrictions on physical interaction from the community causing it to take longer contact with people at home so that it has the potential to increase the risk of transmission of this disease (close contact with the disease). The second factor is the lack of evaluation of household contacts, which are usually diagnosed during clinical investigations and active cases through the act of finding leprosy cases by the relevant primary health services. The third factor is related to the perception of people who are afraid to go to the nearest health service due to stigma and the high number of cases of COVID-19.

The number of leprosy patients in Ambon City from 2018 to 2022 was 131. Leprosy patients who were found not to have a disability were more common than those who had a disability. The COVID-19 pandemic has had an impact on the number or trend new cases of leprosy and the prevalence of disabilities.

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