



The Correlation Between Medication Adherence and Disability among Leprosy Patients in Kunir Public Health Center, Lumajang

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ABSTRACT

Background: Leprosy is a chronic infectious disease that can lead to permanent disability if not properly managed, especially due to non-adherence to the Multi-Drug Therapy (MDT) regimen. Medication adherence plays a crucial role in preventing disease progression and the onset of disability. **Purpose:** This study aimed to examine the relationship between medication adherence and the level of disability among leprosy patients in Kunir Public Health Center, Lumajang. **Methods:** This research employed a quantitative, correlational design to examine the relationship between medication adherence and disability level among leprosy patients. The study population comprised all leprosy patients in Kunir Public Health Center, with a total of 14 respondents selected using total sampling. The research instruments used were the MMAS-8 questionnaire to assess adherence and the POD scale to assess disability. Data were analyzed using the Spearman Rank test with a significance level of $p < 0.05$. **Results:** Most patients had moderate medication adherence (50%), and the majority experienced Grade 1 disability (42.9%). The Spearman test revealed a significant relationship between medication adherence and disability level ($p = 0.000$; $r = 0.930$), indicating that higher adherence is associated with lower levels of disability. **Conclusions:** Regular and timely MDT treatment can suppress disease progression and prevent nerve damage leading to disability. Therefore, improving medication adherence should be a priority in primary healthcare-based leprosy control programs.

KEYWORDS

Medication adherence, Disability, Leprosy.

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1. BACKGROUND

Leprosy is an infectious disease that not only has medical implications but also carries social, economic, and cultural consequences, affecting national security and resilience. To this day, leprosy is still

considered frightening by the community, families, and even some health workers. This fear arises from a lack of understanding and misconceptions about leprosy and the disabilities it causes (Irhama et al., 2021).

The term leprosy comes from the Sanskrit word "kustha," meaning a collection of general skin symptoms. Leprosy, also called Hansen's disease, is named after the bacterium that causes it. Leprosy is caused by infection with *Mycobacterium leprae*. *Mycobacterium leprae* has low pathogenicity and invasiveness. This bacterium usually enters the body through the respiratory tract or skin contact. This low pathogenicity means that only a small percentage of people will be infected and develop symptoms (Jatimi et al., 2023).

According to data released by the World Health Organization (WHO) in 2021, there were 133,781 cases of leprosy globally. Indonesia ranked third worldwide in the number of new cases, with a total of 10,976, after India and Brazil (Fauziani et al., 2024). In 2022, the rate of new leprosy cases in East Java Province reached 5.13 per 100,000 population, indicating that this disease remains a health problem requiring attention. Several districts/cities have higher case rates than others, including Lumajang Regency with a rate of 10.39 per 100,000 population. This rate is relatively high compared to the provincial average, indicating that leprosy remains quite prevalent in the region. Given the significant

number of incidents, further efforts are needed in early detection, appropriate treatment, and community education to reduce the number of disabilities due to leprosy and prevent its wider spread in East Java, especially in Lumajang Regency (BPS Jawa Timur, 2023). Based on data from the Kunir Public Health Center, the number of leprosy patients in the area has fluctuated from year to year, namely 13 people in 2022, 10 people in 2023, increasing to 14 people in 2024, and decreasing drastically to 3 people in 2025, with all cases being MB leprosy.

Disability due to leprosy is a condition resulting from delayed diagnosis and treatment, which can cause nerve damage, muscle weakness, limb deformities, and loss of sensation in the skin. These disabilities generally occur due to chronic inflammation that damages the peripheral nerves, so that patients are unable to feel wounds or injuries, which can ultimately lead to ulceration, contractures, and even amputation. The severity of leprosy disability is classified based on the degree of impairment, ranging from no disability (Grade 0), loss of sensation in the hands, feet, or eyes (Grade 1), to noticeable deformities or damage (Grade 2) (Fauziani et al., 2024; Irham et al., 2021; Maulina et al., 2023).

The risk of disability due to leprosy is influenced by various factors, such as the type of leprosy suffered, the duration of the disease, the presence of leprosy reactions, and individual characteristics such as gender and age. In addition, compliance with treatment also plays an important role, along with socioeconomic factors, education level, ethnicity, and type of work. The method of detecting leprosy cases also determines the level of disability risk, as early detection can help prevent more severe complications (Fauziani et al., 2024; Irham et al., 2021; Maulina et al., 2023). Disabilities that occur in leprosy patients are generally caused by nerve dysfunction, especially in the eyes, hands, and feet. If this disease is not detected and treated immediately, the risk of severe nerve damage will increase. The longer the interval between the onset of initial symptoms and the start of treatment, the greater the likelihood that patients will experience permanent disability due to the progressive nature of the disease (Irham et al., 2021; Wahyudi et al., 2021).

The impact of leprosy-related disabilities is not limited to physical impairments that affect daily activities, but also has an impact on the social and economic aspects of patients' lives. Stigma

and discrimination against people with leprosy often make it difficult for them to interact with society and experience barriers in finding employment. This further worsens the psychological condition of patients, which can lead to low self-esteem and social isolation (Pangestu et al., 2024; Wahyudi et al., 2021).

Treatment for leprosy patients has several main objectives, including stopping the chain of disease transmission, curing patients, and preventing disability or worsening existing disabilities before treatment begins. One of the treatment methods used is combination therapy or Multi-Drug Therapy (MDT). This therapy is highly recommended, especially for patients with multibacillary leprosy, as this type harbors a higher number of bacteria and has a high potential to transmit the disease to others. With this therapy, it is hoped not only that the disease will be cured, but also that the spread of the bacteria that cause leprosy will be stopped, thereby minimizing the risk of transmission to healthy people. In addition, treatment plays a role in preventing new disabilities and in inhibiting the progression of disabilities that patients may have experienced before treatment began. In cases where patients have already suffered permanent disabilities due to

leprosy, treatment is still necessary to avoid further deterioration and ensure that patients can live a better life (Maulina et al., 2023; Wiyarni et al., 2020).

If leprosy patients do not adhere to treatment and do not take medication regularly as recommended by medical personnel, the bacteria that cause leprosy can become active again in the body. This can cause new symptoms to appear, further aggravating the patient's condition and potentially increasing the level of disability experienced. Therefore, every leprosy patient needs to seek treatment early and follow the treatment procedure correctly. Adherence to therapy and regular medication intake are key factors in the success of treatment and the prevention of further disability. With proper and regular treatment, not only do patients benefit, but the surrounding community does as well, as it reduces the risk of disease transmission (Maulina et al., 2023; Wiyarni et al., 2020).

In a study conducted by Wiyarni et al. (2020) on the relationship between drug adherence and family support with disability in leprosy patients in Kudus Regency, it was found that most leprosy patients were not compliant in taking their medication, namely 48 people (62.3%). Furthermore, the analysis showed a relationship between medication

adherence and the level of disability in leprosy patients in Kudus Regency in 2013. The chi-square test yielded a p-value of 0.003 ($\alpha = 0.05$) and an odds ratio (OR) of 5.371. This means that patients who did not adhere to medication were 5.371 times more likely to experience level 2 disability compared to patients who adhered. However, there is still a lack of literature specifically discussing the relationship between medication adherence and disability in leprosy patients.

2. METHODS

This study applies a quantitative approach with a positivist-based strategy to examine a specific sample or population using research instruments during data collection. The data obtained were analyzed using statistical methods to test the hypothesis. This study was conducted in the Working Area of the Kunir Public Health Center, Lumajang in May-June 2025. The population in this study was all leprosy patients in the Working Area of the Kunir Public Health Center, with a sample of 14 respondents selected through a total sampling technique. In this study, medication adherence was the independent variable, and disability was the dependent variable.

The instrument used to measure medication adherence is the Morisky Medication Adherence Scale (MMAS-8) questionnaire. According to Morisky (2008:348), in a study conducted by Armintoyono (2023), the MMAS-8 consists of eight questions with "yes" and "no" answer options. A "yes" answer is given a score of 0, while a "no" answer is given a score of 1. Based on the total score obtained, patient adherence is categorized into three levels, namely high adherence with a score of 8, which indicates that the patient is always disciplined in taking medication as recommended; moderate adherence with a score of 6-7, which means the patient is quite compliant but there is still inconsistency in taking medication; and low adherence with a score ≤ 5 , which indicates that the patient is often undisciplined or does not even take medication regularly. This category is used to assess patient adherence and its relationship to the risk of disability from leprosy.

The instrument used to assess disability is the Prevention of Disability (POD) Questionnaire. This questionnaire assesses the level of impairment caused by leprosy across three main areas: nerve and sensory impairment, eye impairment, and hand and foot impairment. Nerve and

sensory impairment are characterized by symptoms such as tingling, numbness, and nerve pain. Eye impairment includes conditions such as dry eyes, blurred vision, or an inability to blink. Meanwhile, hand and foot impairment includes deformities, open wounds, and difficulty in mobilization. Assessment uses an ordinal scale based on severity, with Grade 0 indicating no sensory or motor impairment; Grade 1, sensory impairment without deformity; and Grade 2, deformities or open wounds in the eyes, hands, or feet. These categories are used to determine the level of disability caused by leprosy and the necessary preventive measures.

The validity test of the medication adherence instrument was conducted by Armintoyono (2023) for all questions in the TB Medication Adherence instrument using SPSS version 26. Although using the Guttman scale, SPSS still displays output in the form of Pearson correlations, because, mathematically, the Pearson and Point Biserial formulas have the same calculation principles. The results of the validity test show that all items have calculated r-values above the validity limit, ranging from 0.526 to 0.787, indicating that the questionnaire is valid and suitable for research. The reliability test was conducted by Armintoyono (2023)

using Cronbach's alpha. After obtaining the calculated r-value, the instrument is declared reliable if the r-value exceeds the r-table value. The calculation results indicate a reliability coefficient of 0.773, suggesting the instrument has a high level of reliability. Meanwhile, validity testing was conducted using the Kuder Richardson method, which in SPSS version 26 is displayed as Cronbach's Alpha because the manual formula is similar, yielding the same SPSS output. An instrument is considered reliable if the resulting alpha value is greater than 0.70, indicating good validity and reliability. The disability instrument, the Prevention of Disability (POD) questionnaire, is validated and reliable because it was developed by the Ministry of Health of the Republic of Indonesia, so no additional validity or reliability tests were conducted in this study.

The data collection technique in this study was based on primary data, namely by collecting data directly at the research location through a questionnaire administered to respondents, and the researcher conducted an examination using a POD sheet. The collected data were then processed and analyzed in accordance with the research objectives. Data analysis was carried out using univariate and bivariate

analysis. Univariate analysis aims to explain and describe the characteristics of each variable in the study. This process involves presenting data as frequency distributions, percentages, averages, or other statistical measures to provide a clearer picture of the variables under study (Sukma et al., 2022). The variables to be analyzed using univariate analysis include general data such as gender, age, education, occupation, and type of leprosy.

Meanwhile, the specific data collected in the study will be presented in tabular form for easier, more systematic analysis. Bivariate analysis aims to determine the relationship between the two variables studied (Sukma et al., 2022). In this study, the data analysis technique used was Spearman's Rank correlation test, which analyzes the relationship between ordinal variables, even when the data sources are different (Sugiyono, 2016).

3. RESULTS

The presentation of variable data analyzed using univariate analysis includes general and specific data. General data include gender, age, education level, occupation, and type of leprosy, as presented in [Table 1](#).

Table 1. Respondent Characteristics

Demographic Data	Frequency (f)	Percentage (%)
Age		
36-45	4	28,6
46-55	7	50
56-65	3	21,4
Gender		
Male	7	50
Female	7	50
Education		
Uneducated	2	14,3
Elementary school	3	21,4
Junior high school	9	64,3
Work		
Housewife	3	21,4
Farmer	6	42,9
Trader	2	14,3
Builder	3	21,4
Types of Stroke		
PB (Pausibasiler)	0	0
MB (Multibasiler)	14	100

Based on the frequency distribution data in Table 1, the majority of respondents were in the 46–55 years age range, representing 7 respondents (50%). By gender, the number of male and female respondents was equal, with 7 respondents each (50%). Most respondents had a junior high school education, representing 9 respondents (64.3%). The majority of

respondents worked as farmers, representing 6 people (42.9%). Based on the frequency distribution of leprosy types, all respondents (100%) were diagnosed with MB (Multibacillary) leprosy. Furthermore, specific data covering medication adherence and the level of disability of leprosy patients are presented in [Table 2](#).

Table 2. Frequency Distribution of Medication Compliance and Disability in Leprosy Patients

Data	Frequency (f)	Percentage (%)
Medication Compliance		
High Compliance	4	28,6
Moderate Compliance	7	50
Low Compliance	3	21,4
Disability		
Grade 0	5	35,7
Grade 1	6	42,9
Grade 2	3	21,4

Based on the frequency distribution in Table 2, the majority of respondents (7, 50%) reported a moderate level of medication adherence. Meanwhile, based on the frequency distribution of disability levels, the majority of respondents experienced Grade 1 disability, namely 6 people (42.9%). This finding indicates that more than half of the patients have experienced disability

(Grades 1 and 2), indicating the importance of early detection and appropriate treatment to prevent the progression of disability in leprosy patients. Next, a bivariate analysis was conducted to determine the relationship between medication adherence and disability level in leprosy patients, as presented in Table 3.

Table 3. Cross-tabulation of medication adherence to leprosy patient disabilities in the Kunir Public Health Center, Lumajang

		Disability			Total
		Grade 0	Grade 1	Grade 2	
Medication Compliance	High Compliance	4 (28,6%)	0	0	4 (28,6%)
	Moderate Compliance	1 (7,1%)	6 (42,9%)	0	7 (50%)
	Low Compliance	0	0	3 (21,4%)	3 (21,4%)
Total		5 (35,7%)	6 (42,9%)	3 (21,4%)	14 (100%)

Based on cross-tabulation data, it is known that all patients with high compliance (28.6%) are at the Grade 0 disability level. Furthermore, a Spearman correlation test

was conducted to analyze the relationship between medication adherence and disability level, as listed in Table 4.

Table 4. Results of the Spearman's rho Test on the Relationship between Medication Compliance and Disability in Leprosy Patients in Kunir Public Health Center, Lumajang

		Correlations		
			Medication Compliance	Disability
Spearman's rho	Medication Compliance	Correlation Coefficient	1,000	,930**
		Sig. (2-tailed)	.	,000
		N	14	14
Disability	Disability	Correlation Coefficient	,930**	1,000
		Sig. (2-tailed)	,000	.
		N	14	14

** . Correlation is significant at the 0.01 level (2-tailed).

Based on the Spearman correlation test, there is a very strong and significant relationship between medication adherence and disability level in leprosy patients, with a

correlation coefficient of 0.930 and a significance value of $p = 0.000$ ($p < 0.01$).

4. DISCUSSION

Based on the research results, it was found that among the 14 leprosy patients in the working area of the Kunir Public Health Center, the majority, 7 people (50%), showed moderate medication adherence. Meanwhile, only 4 respondents (28.6%) had high adherence, while the remaining 3 (21.4%) were in the low-adherence category. These data indicate that the majority of patients have not achieved optimal adherence in undergoing leprosy treatment, which requires long-term adherence and consistent, routine medication use.

Individual perceptions of disease severity strongly influence treatment adherence, perceived treatment benefits, and obstacles encountered during therapy (Wiyarni et al., 2020). Sociodemographic factors such as age, gender, education, occupation, and disease type play a significant role in determining patient adherence to treatment (Panjaitan & Hutagalung, 2025). In this study, the majority of respondents were aged 46–55 years (50%), a productive age group that is beginning to experience declines in body function, so adherence can be affected by physical factors such as fatigue or forgetting to take medication. In terms of education, the majority of respondents were junior high

school graduates (64.3%), suggesting that their health literacy may be sufficient to understand treatment instructions but not necessarily to instill long-term awareness of the importance of full adherence to leprosy therapy. Occupation was also an important factor, with the majority of respondents working as farmers (42.9%), who have irregular work patterns and spend a lot of time in the fields, putting them at high risk of forgetting or being late in taking medication. Furthermore, all respondents suffered from MB (Multibacillary) leprosy, which clinically requires longer and more stringent treatment than PB leprosy, making adherence a greater challenge. Thus, the characteristics of the respondents in this study indicate that, although they were generally of a functional age and educational level, fieldwork and the complexity of MB disease remain barriers to achieving high adherence.

Researchers assume that low patient compliance is due to a lack of intensive, ongoing education from healthcare workers for patients and their families. Furthermore, suboptimal implementation of the Directly Observed Therapy (DOT) program also hinders patient compliance. Social factors such as economic constraints, shame due to leprosy stigma, and distance to healthcare

facilities further reinforce the assumption that non-compliance is not solely caused by individual factors, but also by environmental and service system factors. Therefore, a comprehensive approach is needed to increase patient motivation and active participation in treatment.

Identification of Disabilities in Leprosy Patients in Kunir Public Health Center, Lumajang

Based on data on the distribution of disability levels of leprosy patients in the Kunir Public Health Center, it was found that the majority of respondents experienced Grade 1 disability, with 6 (42.9%). Meanwhile, 5 (35.7%) patients experienced Grade 0 disability, and 3 (21.4%) experienced Grade 2 disability. This indicates that most patients experienced peripheral nerve dysfunction, manifested as loss of sensation, although no severe physical deformities had yet developed. However, the presence of Grade 2 indicates cases that were treated too late or patients who did not receive optimal treatment.

Disability due to leprosy is divided into three levels: Grade 0 indicates no nerve damage or physical abnormalities, Grade 1 indicates loss of sensitivity in the eyes, hands, or feet, and Grade 2 is characterized

by visible deformity or physical damage. The high rate of Grade 1 disability in this study suggests that early detection of sensory neuropathy is not yet optimal (Fauziani et al., 2024; Mukin et al., 2022). Furthermore, the presence of Grade 2 disability in 21.4% of patients suggests that some patients may have experienced delayed diagnosis, not regularly performing self-care, or being non-compliant with treatment. This is supported by various theories stating that disability in leprosy is significantly influenced by several factors, including the type of leprosy, the patient's level of compliance, the length of the delay in diagnosis, knowledge of self-care, and support from health workers and family (Fauziani et al., 2024; Maulina et al., 2023; Pangestu et al., 2024). In this study, all patients were diagnosed with MB (Multibacillary) leprosy, which has a higher bacterial load and a greater risk of nerve damage.

Furthermore, the majority of patients had a junior high school education. It worked as farmers, which put them at greater risk of developing wounds or injuries without realizing it due to reduced sensitivity. Therefore, efforts to prevent leprosy disability need to focus on early detection, health education, and ongoing rehabilitation

that takes into account the patients' sociodemographic characteristics.

Researchers assume that disability in leprosy patients is caused by poor patient knowledge, suboptimal medication adherence, and delayed diagnosis. Other factors, such as MB leprosy type, farming occupation, and low education, also exacerbate the risk of disability. Furthermore, health education and treatment supervision are suspected to have been inadequately implemented.

Analysis of the Relationship between Medication Compliance and Disability of Leprosy Patients in Kunir Public Health Center, Lumajang

Based on the cross-tabulation results, a clear pattern is seen between medication adherence and the level of disability in leprosy patients. Among patients with high adherence (28.6%), none experienced disability (Grade 0). Meanwhile, the majority of patients with moderate adherence (50%) experienced Grade 1 disability (42.9%), and all patients with low adherence (21.4%) experienced Grade 2 disability. This indicates a tendency that the lower the patient's adherence, the more severe the level of disability they experience.

The Spearman correlation test showed a very strong, significant relationship between medication adherence and disability levels ($r = 0.930$, $p = 0.000$; $p < 0.01$). This value indicates that the relationship is positive and significant at the 99% confidence level, meaning that greater treatment adherence is associated with a lower risk of disability. Thus, it can be concluded that medication adherence is a very important factor in preventing and reducing disability levels in leprosy patients.

Medication adherence is a key factor in preventing complications and disability from leprosy. Patients who do not take their medications regularly are at high risk of disease progression and permanent nerve damage (Maulina et al., 2023). Furthermore, the Health Belief Model posits that patients' perceptions of treatment benefits, barriers, and social support also significantly influence adherence levels (Fauzia & Istiqomah, 2022). In this study, the majority of patients had a junior high school education (64.3%). It worked as farmers (42.9%), who likely had limited time, access, and knowledge to understand the importance of completing treatment.

Researchers assume that the high disability rate in patients with low compliance occurs due to a combination of a

lack of health education, weak therapy supervision, and low patient awareness of the long-term impacts of leprosy. Furthermore, the MB leprosy type suffered by all respondents (100%) is more severe and carries a high risk of causing disability if treatment is not carried out diligently. Therefore, researchers conclude that increasing medication adherence through education, direct supervision, and family support is a crucial strategy to reduce the disability rate of leprosy in the work area of Kunir Public Health Center, Lumajang.

5. CONCLUSION

The compliance of leprosy patients taking medication in the working area of Kunir Public Health Center, is mostly in the moderate category, with 7 people (50%), followed by the high category (4 people, 28.6%) and the low category (3 people, 21.4%) the disability of leprosy patients in Kunir Public Health Center, has mostly Grade 1 disability (6 people, 42.9%), followed by Grade 0 (5 people, 35.7%) and Grade 2 (3 people, 21.4%). There is a significant relationship between compliance with medication and the level of disability of leprosy patients in Kunir Public Health Center, with Spearman's correlation test showing $p = 0.000 < \alpha = 0.01$ and $r = 0.930$,

indicating that higher patient compliance is associated with lower disability. Nurses, as frontline healthcare workers, are expected to be more active in providing education, monitoring medication adherence, and early detection of disability in leprosy patients. Therapeutic communication approaches and empowerment of patients' families need to be strengthened to improve treatment success and reduce the risk of disability. Future researchers are advised to expand the number of respondents and the coverage area to ensure more representative results. Furthermore, it is recommended to explore other factors influencing adherence, such as family support, access to healthcare, and perceptions of the disease, as well as to implement educational interventions whose effectiveness can be measured.

Declaration of Interest

The author declares no conflict of interest.

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Data Availability

The data are not publicly available due to ethical restrictions and the protection of participants' privacy.

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