

Conference Paper

## Relationship Stress Level and Leprosy Reactions in Leprosy Patients at Pondoh Indramayu Health Center

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### ABSTRACT

Leprosy is defined as a chronic progressive granuloma disease caused by *Mycobacterium leprae* (M. Leprae) that affects the peripheral nerves and skin. Leprosy reactions occur in leprosy patients before, during, and after leprosy treatment. One of the causes is stress. Stress can cause changes in immune responses that lead to leprosy reactions. The purpose of this research was to find out the relationship stress level and leprosy reactions in leprosy patients at Pondoh Indramayu Health Center. This research used an observational quantitative with cross sectional method. The sample in this research includes 49 leprosy reaction patients at the Pondoh Indramayu Health Center. Samples were taken by consecutive sampling methods based on inclusion criteria. The research period was November-December 2023 and the data were processed with the gamma correlation test. From the results of the gamma correlation test, there is a significant relationship between stress levels and leprosy reactions in leprosy patients at the Pondoh Indramayu Health Center.

*Keywords: Leprosy, leprosy reaction, stress*

### Introduction

Leprosy is defined as chronic progressive granuloma disease caused by *Mycobacterium leprae* (M. Leprae) that affects the peripheral nerves and skin (Noviastuti et al., 2017). Leprosy has a clinical course depending on the interaction between the host's immune response and the pathogen (Queiroz et al., 2015). One of the characteristics that cause disability is inflammation of the nerves (Siswanto et al., 2020). In 2017, Indonesia ranked third globally in leprosy after India and Brazil with a number reaching 15,910 (PERMENKES RI, 2019). In 2018 there was an increase of 6,5% leprosy cases in Indonesia. (Marsanti et al., 2020). In 2021, there were 10,983 with a Paucibacillary (PB) leprosy incidence of 11.15% and a Multibacillary (MB) leprosy incidence of 88.85%. Meanwhile, leprosy cases in West Java totaled 1,328 with 85 PB type cases and 1,243 MB type cases. In Indramayu, incidence of leprosy was 193 with 9 cases of PB and 184 cases of MB (KEMENKES RI, 2022).

There are two types of leprosy reactions, one is Reversal Reaction (RR) or type I and the other is Erythema Nodosum Leprosum (ENL) reaction (Gunawan, 2019). A leprosy reaction is an acute episode of hypersensitivity presenting as an exacerbation of a previous lesion or a new lesion and the reaction occurs before, during, or after treatment (Froes et al., 2020). Type 1 may present as old or new lesions with a dark purple color and erythematous appearance, may be single or multiple lesions, and may be associated with sensory disturbances such as gloves and motor weakness. Type II leprosy may present with pink pustules and pain. It may also be accompanied by fever, malaise, and anorexia. In half of the patients, it usually appears on the extremities and face (Hidayati et al., 2018). Ramadhona A's research

#### How to cite:

Purnamasari, R., Yasmin, I., & Rahmah, P. D. S. L. (2024). Relationship stress level and leprosy reactions in leprosy patients at Pondoh Indramayu Health Center. *The 4<sup>th</sup> International Conference on Community Medicine and Medical Sciences*. NST Proceedings. pages 1-5. doi: 10.11594/nstp.2024.4401

findings from 2018 show that leprosy patients who experience stress can trigger type I and II leprosy reactions. This is because when a person experiences stress, his immune system will decrease by 50% (Ramadhona, 2018).

Although there are previous studies on the relationship between stress levels and the incidence of leprosy reactions, there is no similar research in the Indramayu area. So researchers are interested in exploring whether there is a correlation between stress levels and leprosy reactions in individuals suffering from leprosy at Pondoh Indramayu Health Center.

## Material and Methods

This research applied a quantitative analytical observational approach with a cross sectional design by distributing Perceived Stress Scale (PSS) questionnaires to respondents to measure stress levels and Leprosy reaction questionnaires to measure leprosy reactions experienced. In this research there were 49 samples of people with leprosy reactions at the pondoh Indramayu health center. Using consecutive sampling technique, where each participant if they meet the inclusion and exclusion criteria will be successively included (Baltazar et al., 2021). As for the inclusion criteria in this research are Patients who received a diagnosis of leprosy reaction at the Pondoh Indramayu Health Center during the period 2022-2023 and Patients who gave consent to become respondents.

This research was conducted from November to December 2023 at Pondoh Indramayu Health Center. The collected data were then processed with the gamma correlation test using the SPSS 23 program.

## Results and Discussion

### *Characteristics of respondents*

The characteristics of the participants in this research were gender, age, occupation, education level, duration of leprosy, stress level, and incidence of leprosy reactions.

Table 1 Characteristics of respondent

Characteristics	N	%
Gender		
a. Male	34	69,4
b. Female	15	30,6
Age		
a. < 25	9	18,4
b. 26-45	16	32,7
c. 46-65	19	38,8
d. > 65	5	10,2
Work		
a. Unemployed	8	16,3
b. Student	2	4,1
c. Farmer	19	38,8
d. Self-employed	20	40,8
Education		
a. Not school	3	6,1
b. Elementary school	17	34,7
c. Junior high school	15	30,6
d. Senior high school	14	28,6

*To be continued...*

Experienced leprosy		
a. < 6 months	14	28,6
b. >6 months	35	71,4
Stress level		
a. Mild stress	29	59,2
b. Moderate to severe stress	20	40,8
Leprosy reaction		
a. Mild reaction	33	67,3
b. Severe reaction	16	32,7

Based on Table 1, it was found that the majority of respondents were male with 34 respondents (69.4%) with the highest age of 46-65 years 19 respondents (38.8%). Most respondents worked as self-employed 20 respondents (40.8%) with the most elementary education 17 respondents (34.7%). The majority of respondents experienced leprosy for > 6 months 35 respondents (71.4%). Respondents in this research experienced mild stress 29 respondents (59.2%). The majority of respondents experienced mild leprosy reactions as many as 33 respondents (67.3%).

### **Relationship between stress levels and leprosy reactions**

The analysis used to determine the relationship between stress levels and leprosy reactions in this research was the gamma correlation test using the SPSS 23 statistical application.

Table 2. Relationship between stress levels and leprosy reactions

Stress level	Leprosy reaction				Total	P-value	OR CI 95%
	Mild		Severe				
	n	%	n	%			
Mild	24	49	5	10,2	29	59,2	0,005
Moderate to Severe	9	18,4	11	22,4	20	40,8	
total	33	67,3	16	32,7	49	100	

In Table 2, participants who experienced mild stress levels and experienced mild leprosy reactions totaled 24 individuals (49%), while those who experienced severe leprosy reactions totaled 5 people (10.2%). Respondents who experienced moderate to severe stress and mild leprosy reactions were 9 people (18.4%) while those who experienced severe leprosy reactions were 11 people (22.4%). From gamma correlation test between stress levels and leprosy reactions showed a p-value (0,005) because the p-value <0,05 means that there is a significant relationship between stress levels and leprosy reactions in individuals suffering from leprosy at the pondoh Indramayu health center. The OR value (5.867) with an interval of 1.590-21.646, means that respondents with moderate to severe stress levels have a 5.687 times greater risk of experiencing a leprosy reaction when compared to respondents who have mild stress levels.

This finding is in line with Julia's research (p 0,000), indicating that stress levels have a significant association with the incidence of leprosy reactions. Stress can disrupt immune system function by affecting processes in the central nervous system and neuroendocrine system (Yaribeygi et al., 2017) the effect can reduce immunity by up to 50% and can cause immune changes that trigger leprosy reactions (Romadhona, 2018). Physical fatigue that may be caused by strenuous work can increase a person's susceptibility to disease because it can affect immune responses, which in turn can trigger reactions (Vionni et al., 2016).

A risk factor that can cause reactions in leprosy is stress. Stress experienced in leprosy patients can be triggered by rejection, stigma, and discrimination, which affect the immune system through the Hypothalamus Pituitary Adrenocortical (HPA) axis and the limbic system that controls emotions and

learning. Stressful conditions stimulate the hypothalamus to release neuropeptides that activate the Autonomic Nervous System (ANS) and cause the pituitary gland to secrete corticosteroids and catecholamines, which are hormones that respond to stress. This increase in glucocorticoid levels can compromise the immune system (Lamak et al., 2014). Immunocompromised will lead to recurrent and frequent leprosy reactions (Widiatama et al., 2019).

The leprosy reactions found in respondents were mostly mild reactions with 67.3% of respondents experiencing symptoms such as a red rash that felt hot accompanied by mild fever. While 32.7% of respondents experienced joint pain accompanied by severe fever, visual impairment, and muscle weakness, which are symptoms of severe leprosy reactions.

Mild leprosy reactions in this research were mostly caused by mild stress with 24 respondents (49%) while severe leprosy reactions were mostly caused by moderate severe stress with 11 respondents (22.4%). This is consistent with a study by Julia in 2013, which indicated that the lower the stress level, the less likely the reaction. Conversely, the higher the stress level, the more significant the reaction is likely to be.

Stress experienced by respondents in this research was assessed using the PSS questionnaire where which questionnaire can measure global perceptions and provide information about conditions that can cause stress and affect a person's physical condition. In this research, stress is categorized into two, namely mild stress and moderate severe stress where the indicators used include self-confidence and emotions such as anger, disappointment, and anxiety experienced by respondents and their control (Indira, 2016). If not handled properly, stress can cause physical problems, unhealthy behaviors, and mental problems (Wicaksono, 2016). So stress management in leprosy patients aims to reduce the incidence of leprosy reactions, which can occur before, during, or after treatment, characterized by lesions that suddenly become more active, skin redness, swelling, pain, and heat, as well as neuritis and impaired nerve function (Purnamasari et al., 2023).

## Conclusion

There is a significant correlation between stress levels and leprosy reactions in leprosy patients at Pondok Indramayu Health Center.

## Acknowledgment

Thank you to Universitas Muhammadiyah Semarang for the opportunity and support that has been given to this research.

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