Conference Paper

Prevention Effort of Leprosy Reactions Based on Risk Factor Analysis at Sumberglagah Leprosy Hospital Mojokerto

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Abstract

The background of this study is the increasing number of leprosy reaction incidence treated at Sumberglagah Leprosy Hospital from 6.76% to 10.3% in September 2016. The purpose of this study is to generate recommendations for leprosy reaction prevention efforts based on risk factor analysis at Sumberglagah Leprosy Hospital of Mojokerto. The method of research was an observational analytic study with cross-sectional design. The sampling technique applied in this study was total sampling, meaning that all the sample cases became respondent consisting of patients coming to Sumberglagah Leprosy Hospital Mojokerto from February 13, 2017 to April 12, 2017, not new patients, not yet released from control, and willing to became respondent. Based on these criteria, we got 43 respondents. Data collection techniques applied in this study were interviews with questionnaires, medical record review, and focal group discussions. The results show four variables of individual factors that influence the incidence of leprosy reaction, namely, leprosy type (p = 0.022 and beta = −0.997), comorbid infections (p = 0.023 and beta = 0.319), physical stress (p = 0.001 and beta = −0.431), and behavioral stress (p = 0.016 and beta = 0.393). The environmental factor influencing the incidence of leprosy reaction constitutes one variable of self-stigma (p = 0.025 and beta = −0.226). While for health service factor, there are two variables that influenced the incidence of leprosy reaction, that is, compliance in treatment of MDT (multidrug therapy) (p = 0.021 and beta = −0.349) and counseling by officer (p = 0.011 and beta = −0.247). Recommendations of preventions effort of leprosy reactions based on risk factor analysis can be carried out through primary prevention efforts (health promotion and counseling) and secondary prevention efforts (early diagnosis and prompt treatment and disability limitation). The tertiary prevention effort (rehabilitation) may include group therapy and occupational therapy.

Keywords: prevention effort, leprosy reaction, risk factor, leprosy hospital

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Received: 17 October 2018
Accepted: 5 November 2018
Published: 5 December 2018

Publishing services provided by Knowledge E

Selection and Peer-review under the responsibility of the 2nd ICHA Conference Committee.

1. Introduction

Leprosy is an contagious diseases that been a public health problem in Indonesia and some countries in the world [1]. The leprosy reaction is an abnormal immune response

(cellular immune response and humoral immune response), with consequences that could harm the patient. Leprosy reaction can be divided into two types of reactions which are type I reactions (*reversal* reaction) and type II reactions (ENL/*erythema nodosumleprosum* reaction) [1, 2]. An inadequate or late managements of leprosy patients will result in disability. The disability is due to permanent peripheral nerve damage during leprosy reactions, and this defect will be a burden for patients, families and also communities [2, 3].

Based on Table 1, it can be seen that some of the problems of leprosy prevalence decrease from 2012 to 2014, but the prevalence still exceeds the target of < 1 per 10,000 population while in 2014 it is still above the target of 1.08. CDR (Case Detection Rate) still exceeds of target of < 5 per 100,000, although it decreases from 2009 to 2014. The proportion of leprosy in children still exceeds the target of 5%, the proportion of children in 2014 still reaches at 9%, which illustrates the high incidence of leprosy in children. The proportion of disabilities level 2 is still high over the 5% target of 11% by 2014, many factors can lead to this disability, from late discovery, rehabilitation and monitoring processes that do not go well, and one of the main causes of disability is a leprosy reaction.

Table 1: Results of leprosy program for East Java Leprosy Program 2010–2014.

No.	Indicator	Target	2009	2010	2011	2012	2013	2014
1	Registered Patients		6.392	5.496	6.157	5.570	4.289	4.157
2	Prevalence Rate per 10.000	< 1 per 10.000	1.69	1.48	1.63	1.46	1.12	1.08
3	New Patients		6.040	4.653	5.284	4.807	4.132	4.050
	C D R per 10.000	< 5 per 100.000	16.0	12.5	13.99	12.63	10.62	10.08
	Proportion of Disabilities II (%)	< 5%	11%	13%	13%	14%	13%	11%
	Deformity Rate (per 100.000 population)	Year 2015 decreased 35% compared at year 2010	1.76	1.61	1.85	1.78	1.25	1.10
	Child proportion (%)	5%	12%	11%	11%	9%	9%	9%
4	RFT Rate	90%	94%	90%	90%	89%	87%	90%

Source: Health Profile of East Java in year 2014.

Based on Table 2, it can be seen that the percentage of inpatients with leprosy reaction diagnosis handled at Sumberglagah Leprosy Hospital tends to increase from 2013 to 2016 (until September). Patients treated with leprosy reaction diagnoses 31 people (10.37% of total inpatient in leprosy unit). In 2016 an increase in the percentage of leprosy reaction cases treated in leprosy inpatient units. Most cases of leprosy

reactions that are hospitalized are referral cases from various primary health care throughout East Java (according to regional referral of leprosy to Sumberglagah leprosy hospital).

Table 2: Number of inpatients with leprosy reactions at Sumberglagah Leprosy Hospital, Year 2013–2016 (until September).

No.	Year	Total Patients in Unit Inpatient leprosy*)	Inpatient with Leprosy Reaction	
			Number (people)	Percentage (%)
1	2013	562	38	6.76
2	2014	451	33	7.32
3	2015	207	18	8.70
4	2016 (September)	299	31	10.37

Source: Data processed from inpatient report and registered patient in Sumberglagah Leprosy Hospital.

Note: *) Leprosy Inpatient Unit not only provides health care of inpatient with leprosy diagnosis alone but also with diagnosis other than leprosy in patients with a history of leprosy.

The research problem raised is the increased incidence of leprosy reactions handled that is 6.76% in the year 2013 increased to 10.37% in the year 2016 (until September) in the Leprosy Unit of Sumberglagah Leprosy Hospital of Mojokerto.

The purposed of this study is divided into general purposed and specific purposed. The general purposed of this research is to develop recommendations for prevention of leprosy reactions based on risk factor analysis at Sumberglagah Leprosy Hospital of Mojokerto. The specific purposed of this study are to analyze the influence of individual factors on the incidence of leprosy reactions, to analyze the influence of environmental factors on the incidence of leprosy reaction, to analyze the influence of health service factors on the incidence of leprosy reaction and develop recommendations for prevention of leprosy reaction based on risk factor analysis.

2. Materials and Methods

This research is *observational analytical* research using a research approach by collecting data or information only observe without doing intervention or giving treatment to population. By using *cross-sectional* design, the research variables are measured only once, so which variables are caused and effect is not distinguished [4]. Dependent variable in this research is incidence of leprosy reaction while independent variable that is individual factor, environmental factor and health service factor. The population in this study were all leprosy patients who get treatment and get health serviced

at Sumberglagah Leprosy Hospital on 13 February 2017 until 12 April 2017. While the sample of this research is leprosy patient who get health serviced on 13 February 2017 until 12 April 2017, outpatients or inpatients, not a new leprosy patient, the patient has not RFC (*release from control*) yet and is willing to be interviewed as a respondent. With sampling technique is *total sampling*.

3. Results

The results showed that from the variable of individual factors, there were four variables that influenced the incidence of leprosy reaction such as leprosy type (p = 0.022 and beta = –0.997), comorbid infections (p = 0.023 and beta = 0.319), physical stress P = 0.001 and beta = –0.431) and behavioral stress (p = 0.016 and beta = 0.393). While from environmental factors variable only one sub variable that influenced the incidence of leprosy reaction that is self-stigma (p = 0.025 and beta = –0.226). And for the variable of health service factors there are two variables that influence the incidence of leprosy reaction that is compliance in treatment of MDT (p = 0.021 and beta = –0.349) and counseling (p = 0.011 and beta = –0.247).

Based on Table 3, it can be seen that there are four variables of individual factors that simultaneously affect the incidence of leprosy reaction are leprosy type variables with 0.022 significance, comorbid infections (*premorbid*) with 0.023 significance, sub-variables physical stress with 0.001 significance and sub-variable behavioral stress with 0.016 significance. The incidence of leprosy reaction 93.0% was influenced by MB leprosy type, 31.9% influenced by the presence of comorbid infections (*premorbid*), 43.1% influenced by physical stress and 39.3% influenced by behavioral stress.

Based on Table 4, it can be seen that there is one sub variable of environmental factor (*stigma*) which influence the incidence of leprosy reaction that is sub-variable *self-stigma* with significance 0,025. The incidence of leprosy reaction 22.6% is influenced by highly *self-stigma*.

Based on Table 5, it can be seen that there are two variables of health service factors which simultaneously influence the incidence of leprosy reaction that is sub-variable compliance in MDT treatment with significance 0,021 and variable counseling by officer with significance 0,011. The incidence of leprosy reaction was 34.9% influenced by compliance in MDT treatment and 24.7% was affected by the counseling by officers.

Table 3: Results of Regression Linear Analysis between dependent variable incidence of leprosy reaction and independent variable individual factors at Sumberglagah Leprosy Hospital in Year 2017.

Dependent Variable	Independent Variable		Beta	Sig.	Explanation
Incidence of Leprosy Reaction	Socio-demographic	Age		0,196	Not Significant
		Sex		0,552	Not Significant
		Education		0,116	Not Significant
	Socio-economic	Job		0,873	Not Significant
		Income		0,105	Not Significant
	Medical history	Early Onset		0,189	Not Significant
		Length of sick		0,251	Not Significant
		Leprosy Type	−0,997	0,022	Significant
		Nutritional status		0,292	Not Significant
		Comorbid infections (*premorbid*)	0,319	0,023	Significant
		Psychic Stress		0,800	Not Significant
		Physical Stress	−0,431	0,001	Significant
		Behavioral Stress	0,393	0,016	Significant

Table 4: Results of Regression Linear Analysis between dependent variable incidence of leprosy reaction and independent variable environment factors at Sumberglagah Leprosy Hospital in Year 2017.

Dependent Variable	Independent Variable		Beta	Sig.	Explanation
Incidence of Leprosy Reaction	Family Support	Emotional Support		0,106	Not Significant
		Instrumental Support		0,472	Not Significant
		Information Support		0,079	Not Significant
		Spiritual Support		0,771	Not Significant
	Stigma of society	*Perceived Stigma*		0,937	Not Significant
		Enacted Stigma		0,647	Not Significant
		Self-stigma	−0,226	0,025	Significant

Table 5: Results of Regression Linear Analysis between dependent variable incidence of leprosy reaction and independent variable health services factors at Sumberglagah Leprosy Hospital in Year 2017.

Dependent Variable	Independent Variable		Beta	Sig.	Explanation
Incidence of Leprosy Reaction	Health Service	Communication Information and Education about Leprosy		0,937	Not Significant
		Compliance in MDT treatment	−0,349	0,021	Significant
		History of complete MDT treatment		0,093	Not Significant
		Counseling by officers	−0,247	0,011	Significant

4. Discussion

Result of research indicate that most of respondent with MB leprosy type is 93.0%. It was presented in the Pagolori research, 2003 that MB type leprosy had a risk of get leprosy reaction 2.45 times bigger than PB type and in the Brigitte Ranque research, 2007 also concluded that MB leprosy type 4 times get risk of leprosy reactions [5, 6]. Based on the results of analysis using linear regression also obtained significant results with significant value 0.022 beta –0.997, it shows that the MB types of leprosy will increasingly increase the risk of leprosy reactions. This type of leprosy has been shown to have an effect on the leprosy reaction, and this significant outcome will be used for obtaining a recommendation for prevention of leprosy reactions.

Comorbid infection is an accompanying condition of other infections as long as the respondents suffer from leprosy in the form of fever, common cold and toothache [7–9]. Data on comorbid infection can be obtained from interviews and from medical record. Based on the results of the study found that 79.1% of respondents have a comorbid infection (*premorbid*) during leprosy. It is stated that the presence of other accompanying infections became one of the predisposing of leprosy reactions either type I or type II [10]. Meanwhile, the presence of comorbid infection both bacterial infections and viral infections more often the trigger factor of leprosy reaction [11]. This is in accordance with the results of research that complaints of toothache most accompany type I leprosy reaction of 70.0% compared to type II leprosy reactions. The result of linear regression analysis on comorbid infection to leprosy reaction occurrence found that there was significant result with significance value 0,023 and beta 0,319 which mean that the higher the presence of comorbid infection (*premorbid*) hence the higher incidence of leprosy reaction. The results of this study proved to show that comorbid infection (*premorbid*) to be a risk factor occurs leprosy reaction.

Stress is a state of tension of the physical, psychic, emotional and mental of a person who can be assessed by indicators of psychic characteristics, physical characteristics and behavioral characteristics obtained from interviews of respondents from perceived complaints [12–14]. The results of the study showed that all sub-variables of stress described the stress on the respondents were 93.0% in psychic stress, 95.3% in physical stress and 55.8% in behavioral stress. Stress can lead to a 50% decrease in immunity so that in certain situations that trigger stress such as pregnancy, emotional and menstruation will be able to trigger a type II leprosy reaction (ENL) [15]. While in another study it is mentioned that physical stress and mental stress can trigger the occurrence of type I and type II leprosy reaction [10]. Those results of research in

accordance with other research on stress can trigger leprosy reaction. Psychological stress is a predisposing factor of leprosy reaction [16]. The result of linear regression analysis on sub-variable stress to leprosy reaction incidence got significant result that is with significance 0.001 and beta –0.431 at sub variable of physical which mean the higher the perceived complaint to describe physical stress hence the higher incidence of leprosy reaction. And significant results were also found in the sub-variables of behavioral stress with a significance of 0.016 and beta 0.393 which means the existence of negative behavior to describe the behavioral stress will further increase the incidence of leprosy reaction. The results showed that stress affected the incidence of leprosy reaction.

Stigma is a behavior or negative attributes attached to a person because of the influence of the environment, which is measured based on three indicators: *perceived stigma*, *enacted stigma* and *self-stigma* [17, 18]. This sub-variables of stigma was assessed by interview and then scoring with three categories: low stigma, moderate stigma and high stigma. From the results of the study showed that sub-variable *perceived stigma* and *enacted stigma* in the low stigma category were 93.0% and 72.1%. While only in the *self-stigma* still in the category of high and medium stigma is about 58.2%. Perceived stigma and enacted stigma in low categories can be caused because most of the respondents are living around the hospital, where the environment or the community that most are leprosy patients so it is possible there is no stigma. As for *self-stigma* because it is a stigma from within yourself is still quite high categories because of the fear that comes from within itself. One of the strategies in prevention, control and management of leprosy reactions is treatment planning for the prevention of nerve damage and eliminating existing stigma [19]. The effect of stigmatization are resulted in can make people or others to change the perception of their behavior against individuals who are subjected to stigma [17]. And the stigma that occurs arises because of a perception of the wrong of leprosy. From the results of linear regression analysis showed significant results for sub-variable *self-stigma* to the incidence of leprosy reaction with a significant value of 0.025 and beta –0.26 which means the higher the stigma the higher leprosy reaction occurrence. The results of this study indicate that the stigma effect on the incidence of leprosy reaction. This results can be used in obtaining recommendations in efforts to prevent leprosy reactions based on the analysis of these sub-variable *self-stigma*. The aim that the wrong perception of leprosy can be justified by increasing the knowledge of the community even the patient with the IEC (Information, Education and Communication) about leprosy.

Compliance of MDT treatment found that 93.0% adhered to treatment, whereas based on MDT treatment history most have not completed treatment of about 58.1%. And for respondents who experienced leprosy reaction found that 40.63% of reactions occurred when receiving MDT treatment. A research concluded that type I leprosy reactions occur more frequently in the first 6 months of treatment and type II leprosy reactions are more common after 1 year of treatment [20]. It can be explained that at the time of MDT treatment, many *Mycobacterium leprae* bacteria died because of MDT and resulting in numerous fragments of germs that would trigger cellular immunity to trigger leprosy reactions. From result of linier regression analysis showed significant result between MDT treatment compliance with leprosy reaction incidence with p = 0.021 and beta = −0.349, while for history complete treatment did not give significant result. These significant results provide evidence that compliance to MDT treatment has an influence on the incidence of leprosy reactions.

Counseling is a means to put yourself in a position as a sufferer, guide and help the patient to understand their own feelings, problems and situations that disturb them and identify solutions to the problem and help the patient to make his own choice. This discussion is specific to each individual by keeping in mind the principle of counseling that is by using simple and understand language and do not use scientific terms. To be able to recognize the stigma of leprosy, the patient needs counseling on at least three important things at the beginning of MDT treatment, when the patient undergoes the completion of MDT treatment and when they needed and in the leper family [16, 21, 22]. From the results of the study it was found that most (95.3%) had received counseling from the officers for the four indicators of questions we conveyed during the interviews: motivation during MDT treatment, specific explanation of the side effects of MDT treatment, explanation on prevention of disability and how to prevent disability, and motivate to complete MDT treatment. And from result of regression analysis found that showed significant result between counseling by officer to leprosy reaction incident with got significant result with p = 0.011 and beta = −0.247. From these results can be interpreted that there is influence between counseling with the incidence of leprosy reaction.

5. Conclusion

The results of this study to provided recommendations for prevention of leprosy reaction based on risk factor analysis. Recommendations through primary prevention, which can included *first* is health promotion, such as increased knowledge, to the

community (in reducing stigma), by audio visual and non-visual media, reactivation of self-care group, use an community of patients groups and family groups, counseling technique training for health care officers as well as to increased knowledge for health care officers in hospitals and in primary health care. *Second* is the provision of counseling, conducted on every new leprosy patients, especially with MB leprosy type, also conducted on families conducted regularly and routinely, every leprosy patient should be accompanied by family, cooperation or agreement with the local health authorities in the provision of counseling. Recommendations through secondary prevention, which *first* is included early diagnosis and prompt treatment can be done by enforcing the diagnosis with type MB leprosy is very important, the type of classification is very important, early screening when diagnosed leprosy, alert to any complaints, monitoring psychological status conditions, and improving interpersonal approach. *Second* is the disability limitation it could be done by an counseling clinic and the existence of psychologists as an experts. And the last recommendation through tertiary prevention (rehabilitation) can be done by group therapy and occupation therapy.

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