

The effect of personal, physical environmental, and socio-economic factors on preventive behaviour of leprosy transmission among lepers

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Abstract: Leprosy is an infectious disease that requires health behaviour modification to combat the disease and at the same time to prevent the transmission. This study aims to determine the relationship between personal, physical environmental, and socio-economic factors and the preventive behaviour of leprosy transmission. This study was a correlational descriptive analytic study with a cross-sectional approach. As many as 60 out of 77 lepers in Surabaya were chosen through a purposive sampling technique. The dependent variable was the preventive behaviour of leprosy transmission, while the independent variables were personal, physical environmental, and socio-economic factors. Data was collected using questionnaires and then was analyzed by using Spearman's Rho and Chi-Square test with $\alpha = 0.05$. The study revealed that preventive behaviour of leprosy transmission was significantly related with age ($p=0.033$), gender or sex ($p=0.002$), education ($p=0.016$), occupation ($p=0.043$), knowledge ($p=0.000$), physical environment ($p=0.012$), family support ($p=0.000$), income ($p=0.000$) and stigma ($p=0.043$). Age and stigma performed a negative relationship with the preventive behaviour of leprosy transmission. Otherwise, education, knowledge, and physical environment showed a positive relationship. Further research is expected to provide intervention to promote the preventive behaviour of leprosy transmission.

Keywords: leprosy transmission, personal, physical environment, socio-economic, preventive behaviour

1. Introduction

Morbus Hansen or commonly known as leprosy is a disease that remains a public health problem in Indonesia. According to WHO (World Health Organization), leprosy in Indonesia ranks third globally, after India and Brazil [1]. Leprosy is an infectious disease with a long incubation period caused by *Mycobacterium Leprae* which attacks the skin, the peripheral nerves, the mucosal surface, the upper respiratory tract and also the eye [2]. The long incubation period makes it difficult to detect leprosy in the initial phase. It is very susceptible to transmit to other people having long and intense contact with lepers.

WHO reports 71% of leprosy cases are contributed by two countries in Southeast Asia: India and Indonesia which contribute to 92% of cases in Southeast Asia [1]. Ministry of Health of Indonesia in 2017 reported 10,477 new cases of leprosy. East Java occupied the first position in contributing new cases of leprosy (2007 cases), followed by West Java and South Sulawesi. In the same year, Surabaya reported 124 new cases of leprosy [3]. In Surabaya, leprosy case detection rate remains in a high position year by year. In 2015, 97 cases were found in Surabaya consisting of 5 paucibacillary leprosy cases and 92 multibacillary leprosy cases [4]. Meanwhile, in 2016, leprosy cases in Surabaya increased by 125 cases

consisting of 12 paucibacillary leprosy cases and 113 multibacillary leprosy cases [5]. There was a slight decrease in 2017 which included 124 new cases, while in 2018, 97 new cases were still found [6].

Leprosy patients who take Multi Drug Therapy (MDT) within two months should no longer transmit the *Mycobacterium Leprae* [7]. Case detection rate which tends to be high in Surabaya indicates that the disease transmission process in the community is still ongoing, even though the diagnosed one has already received a treatment. Preliminary studies conducted by the researchers showed that health workers did not teach how to behave in a healthy behavior to prevent leprosy transmission such as wearing a mask when interacting with others or doing such a good personal hygiene. Lepers stated that the health worker said the leprosy transmission can be stopped immediately after the patient take the medicine. Previous study states that employment, education, socio-economics, knowledge, cleanliness and contact history also influence the number of leprosy events [8], but it is still unclear what factors are related to leprosy transmission, especially in Surabaya, the second largest city in Indonesia. Thus, this study aims to identify the relationship of personal, physical environmental, and socio-economic factors and the preventive behavior of leprosy transmission.

2. Method

This research was a descriptive correlative study with a cross sectional approach. The population in this study were 77 lepers undergoing treatments in 23 community health centers in Surabaya. As many as 60 lepers were selected using purposive sampling technique. The criteria applied were 1) less than or equal to 18 years old, 2) able to communicate, read, and write in Bahasa, 3) undergo *Multi Drug Therapy (MDT)* treatment. On the other hand, 17 patients were excluded due to various reasons including 1) reject to participate, 2) reside outside Surabaya, and 3) loss contact with the community health center.

The independent variables included 1) personal factors including sub-variables of age, sex or gender, education, knowledge, and occupation; 2) physical environmental factors; and 3) socio-economic factors including sub-variables of income, family support and stigma. The dependent variable was the preventive behaviour of leprosy transmission. The data collection was carried out from June to August 2019 and then was analyzed by using Spearman's Rho and Chi-Square test with $\alpha = 0.05$.

3. Results

This study showed that most lepers were in early adult age (26.7%) and male (80%). Lepers mostly had basic education level (58.3%) and did not work (21.7%). Knowledge (48.3%) and family support (41.7%) categories were also at low level. Furthermore, the data showed moderate felt-stigma (48.3%). The result also revealed that mostly lepers earned less income than the minimum wage of Surabaya (63.3%). The result also indicated average quality of physical environment (46.7%) and performed poor behaviour in preventing leprosy transmission (63.3%) (see Table 1).

Tabel 1. Distribution of Personal, Physical Environmental, Socio-economic Factors and Preventive Behavior of Leprosy Transmission among Lepers in Surabaya

Variables	Categories	n	%
Age	17-25 y.o	11	18.3
	26-35 y.o	16	26.7
	36-45 y.o	11	18.3
	46-55 y.o	9	15.0
	56-65 y.o	11	18.3
	>65 y.o	2	3.3
Sex	Female	12	20.0
	Male	48	80.0

Variables	Categories	n	%
Education	Basic level	35	58.3
	Intermediate level	23	38.3
	Higher education	2	3.3
Occupation	Student	4	6.7
	Private employee	11	18.3
	Government employee	7	11.7
	Entrepreneur	19	31.7
	Farmer / Fisherman	6	10.0
	None	13	21.7
Knowledge	Poor	29	48.3
	Fair	27	45.0
	Good	4	6.7
Family support	Poor	25	41.7
	Fair	12	20.0
	Good	23	38.3
Felt stigma	Low	22	36.7
	Moderate	29	48.3
	High	9	15
Income	≤ minimum wage of Surabaya	38	63.3
	> minimum wage of Surabaya	22	36.7
Physical environment	Poor	20	33.3
	Average	28	46.7
	Good	12	20.0
Preventive behavior of leprosy transmission	Poor	38	63.3
	Fair	12	20.0
	Good	10	16.7

The statistical test results showed that age, sex, education, occupation, knowledge, physical environment, family support, felt stigma, and income had a significant relationship with the preventive behaviour of leprosy transmission, respectively. Family support performed strong relationship with the leprosy transmission preventive behaviour followed by knowledge and income with a moderate correlation. Otherwise, age, education, physical environment, and stigma performed a weak link with the preventive behaviour of leprosy transmission (see Table 2).

Table 2. The Relationship among Variables Based on Statistical Results

Variable	Preventive behavior of leprosy transmission						Statistical Test Result ($\alpha = 0.05$)
	Poor		Fair		Good		
	n	%	n	%	N	%	
Age							
17-25 y.o	3	5.0	6	10.0	2	3.3	<i>Spearman Rho</i> p= 0.033 r= -0.276
26-35 y.o	12	20.0	2	3.3	2	3.3	
36-45 y.o	6	10.0	2	3.3	3	5.0	
46-55 y.o	5	8.3	1	1.7	3	5.0	
56-65 y.o	10	16.7	1	1.7	0	0.0	
>65 y.o	2	3.3	0	0.0	0	0.0	
Sum	38	63.3	12	20.0	10	16.7	
Sex / gender							
Female	12	20.0	0	0.0	0	0.0	<i>Chi Squares</i> p=0.013
Male	26	43.3	12	20.0	10	16.7	
Sum	38	63.3	12	20.0	10	16.7	
Education							
Basic level	27	45.0	5	8.3	3	5.0	<i>Spearman Rho</i>

Variable	Preventive behavior of leprosy transmission						Statistical Test Result ($\alpha = 0.05$)
	Poor		Fair		Good		
	n	%	n	%	N	%	
Intermediate level	9	15.0	7	11.7	7	11.7	p= 0.016
Higher education Total	2	3.3	0	0.0	0	0.0	r= 0.311
Sum	38	63.3	12	20.0	10	16.7	
Occupation							
Student	3	5.0	0	0.0	1	6.7	<i>Chi Squares</i> p= 0.043
Private employee	8	13.3	0	0.0	3	5.0	
Government employee	1	1.7	4	6.7	2	3.3	
Entrepreneur	12	20.0	4	6.7	3	5.0	
Farmer / Fisherman	4	6.7	1	1.7	1	1.7	
None	10	16.7	3	5.0	0	0.0	
Sum	38	63.3	12	20.0	10	16.7	
Income							
≤ minimum wage of Surabaya	31	51.7	7	11.7	0	0.0	<i>Spearman Rho</i> p= 0.000
> minimum wage of Surabaya	7	11.7	5	8.3	10	16.7	
Sum	38	63.3	12	20.0	10	16.7	r= 0.567
Knowledge							
Poor	24	40.0	4	6.7	1	1.7	<i>Spearman Rho</i> p= 0.000
Average	12	23.3	7	11.7	6	10.0	
Good	0	0.0	1	1.7	3	5.0	r= 0.473
Sum	38	63.3	12	20.0	10	16.7	
Physical environment							
Poor	16	26.7	3	5.0	1	1.7	<i>Spearman Rho</i> p= 0.012
Average	17	28.3	7	11.7	4	6.7	
Good	5	8.3	2	3.3	5	8.3	r= 0.321
Sum	38	63.3	12	20.0	10	16.7	
Family supports							
Poor	23	38.3	1	1.7	1	1.7	<i>Spearman Rho</i> p= 0.000
Average	9	15.0	3	5.0	0	0.0	
Good	6	10.0	8	13.3	9	15.0	r= 0.608
Sum	38	63.3	12	20.0	10	16.7	
Felt-Stigma							
Low	10	16.7	5	8.3	7	11.7	<i>Spearman Rho</i> p= 0.043
Moderate	22	36.7	5	8.3	2	11.7	
High	6	10.0	2	3.3	1	1.7	r= - 0.262
Sum	38	63.6	12	20.0	10	16.7	

4. Discussion

This study revealed that personal factors (age, sex, occupation, education, and knowledge) had a significant relationship with the preventive behaviour of leprosy transmission. Lepers stated that preventive behaviour was still poor particularly in the use of masks while interacting or socializing in the community. Furthermore, age showed a negative relationship with the preventive behaviour of leprosy transmission. The older the lepers, the worse the behaviour they performed. Some studies showed several factors can affect individual behaviour related to health, such as socio-psychological and demographic. Health behaviour also can be modified by several other variables, such as age [9,10]. The older the person, the more mature that person in thinking and acting [11]. However, cognitive decline in older lepers affected their ability to modify their health behaviours.

On the other hand, education and knowledge factors showed positive relationships, fair and moderate correlations with the leprosy transmission preventive behaviour. Thus, the higher the education

level of lepers, the better the preventive behavior performed. This study showed that respondents with primary education level did less preventive behavior of leprosy transmission, such as not wearing masks and not changing bed linen regularly. It might be due to the lack of information received either from health workers or the community. The result of the investigation was in line with the previous research stating that lepers with low education level had difficulties in reading, writing and catching information particularly about self-care content and thus they had little or no knowledge regarding the disease [12,13]. Education is one factor that affects knowledge. Therefore, knowledge and cognitive ability are important components in encouraging overt behavior [15]. Well educated lepers had better understanding of a problem and better attitude towards health information.

In addition, Lawrence Green and Glanz stated that sex or gender is a predisposing factor in health promotion behavior [9,15]. The result of this study indicated that compared to female, male respondents have poor prevention behaviors (43.3%), especially mask wearing behavior. Some male respondents stated that they hid their illness from their families and communities. They did not wear masks because people around them tended to be suspicious of their health condition. They worried about the stigma attached in the community that leprosy is a curse.

This study showed that respondents working as employees (private or government) performed good behavior compared to those who did not have jobs. In line with it, respondents with minimum wage income showed worse behavior in preventing leprosy transmission. Therefore, it became acceptable to say that work environment surely could make a person gain experience and knowledge, both directly and indirectly and affect the development of behavior [14]. Similarly, income could also influence a person's ability to perform action or behavior related to individual health [16]. Low income could also cause lepers to perform poor behavior.

Another important aspect that might affect lepers' behavior particularly in preventing leprosy transmission is the physical environment around lepers [10]. Lepers with good physical environment (8.3%) showed good behavior particularly in performing adequate personal hygiene. On the other hand, lepers with poor (26.7%) and fair (28.3%) physical environment performed poor behavior in preventing leprosy transmission. The aspects of poor physical environment were house ventilation, bathroom, and home lighting. Otherwise, the source of clean water was included in the good aspect. For lepers, clean water sources were essential to suppress bacteria spreading the disease [17].

Family support and stigma were also important factors affecting the behavior of lepers. Family support indeed affected lepers' attitude and behavior [18]. In fact, the study showed that 15% of respondents with good family support showed good behavior in preventing leprosy transmission. In contrast, 38.3% of lepers with poor family support exhibited poor preventive behavior. Good family support as shown in the active role of the family in most treatment processes and in information access about leprosy. Meanwhile, the lack of family support manifested in the absence of family attention to remind sufferers about what they should and should not do.

In line with family support, lepers suffered from moderate to high stigma (46.7%) showed poor behavior, while, lepers received low to moderate stigma (23.4%) exhibited good behavior in preventing leprosy transmission. The stigma suffered by lepers in Surabaya mostly generated guilty, bad, and shunned feeling. In addition, due to their fear of being ostracized by the neighbors and the work partners, lepers usually failed to perform good preventive behaviours. At the end, lepers tried to hide their illness from the environment and refused to wear masks to avoid suspicion of others. Stigma given to lepers created feelings of inferiority, shame and frustration. Lepers got difficulties in uniting with the society, finding job, education and marriage because of their illness [19,20].

5. Limitations of the Study

The limitation of this study was it only conducted in Surabaya, the capital city of East Java province and the second biggest city in Indonesia. The result might be different compared to other rural cities, such as some cities in Madura Island. Madura Island was in the first rank in leprosy population which contributed approximately 34.85% leprosy in East Java province.

6. Conclusion

Personal factors (age, sex, education, work, and knowledge), physical environment, and socio-economic factors show statistically significant relationships with the preventive behaviour of leprosy transmission among leprosy patients in Surabaya. Age and felt stigma perform a negative relationship with the leprosy transmission preventive behaviour. Otherwise, education, knowledge, and physical environment show positive relationships. Based on the result, the government and health workers are suggested to pay attention to economic wellness, knowledge and family support among leprosy patients in order to improve their leprosy transmission preventive behaviour. In addition, further research is expected to conduct a study in a rural area and develop such an intervention to modify the behavior of leprosy patients to prevent the transmission of leprosy.

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