Correlation between Family Economic Conditions with Occurrence of Leprosy at Central Jakarta, Indonesia in 2017

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Leprosy transmission in Indonesia has been thought to be mostly through multibacillary (MB) leprosy patients with possible long-term exposure to organisms shed from their skin and respiratory tract. Leprosy prevalence appears to linked to poverty because most leprosy sufferers come from those who are economically weak. This small study aims at determining the relationship of family economic conditions with the occurrence of leprosy. This is an observational descriptive study, using the primary data set of 34 respondents in the Central Jakarta area in 2017. A cross sectional simple random sampling design was used. Statistical analysis of data was done by SPSS 22 for Windows program. The Chi Square Correlation test results show that the p-value was 0.039 < α = 0.05, so H1 is accepted. The results showed a significant relationship between the economic conditions of the family and the occurrence of leprosy in Central Jakarta area in 2017. As study sample size is small, importance of these findings needs to be interpreted with caution and should be confirmed by larger studies.

Keywords : *Mycobacterium leprae*, Leprosy, Economic Conditions, Central Jakarta, Indonesia

Introduction

Leprosy in Indonesia is a public health problem that needs attention because it has been found to be associated with several personal and social complex problems (Muharry 2014). After India and Brazil, Indonesia is one of the three largest endemic regions. In 2010, Indonesia reported a prevalence of registered 19,785 cases, 17,012 new cases and 1,822 new cases with class 2 disability. In the same year, the treatment completion rate was only 80-90% which means that More than 10% of leprosy patients drop out from treatment from Multi Drug Treatment (MDT), and these patients can be a source of new infections with the community (Rachmani et al 2013).

Though the prevalence of leprosy in Indonesia has decreased, yet there are still some areas that have leprosy cases. The cases are in 10 provinces, namely: East Java, West Java, Central Java, South Sulawesi, Papua, NAD, DKI Jakarta, North Sulawesi, North Maluku and East Nusa Tenggara. DKI Jakarta Province is also included in endemic areas although it does not have very high

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prevalence (Muharry 2014). The number of new leprosy cases reported in 2013 was the lowest at 6.79/100,000 population. While the leprosy prevalence rate ranged from 0.79 to 0.96 / 10,000 (7.9 to 9.6/100,000 population) and overall it has reached the target < 1 per 10,000 populations (Indonesia Health Profile 2013). In 2014 number of cases was 170250, in 2015 it was 17202 (Indonesia KK 2015) and in 2016 there were 16826 new cases in Indonesia (WHO 2017).

Leprosy consists of two types, namely pauci-bacillary (PB) and multibacillary (MB) (Ministry of Republic of Indonesia Data 2013). The source of transmission of leprosy is mostly considered to be from MB type of cases. Leprosy is transmitted through direct contact through the skin and possibly through/ via respiratory tract by repeated exposure over a long period of time (Muharry 2014). Factors that influence the occurrence of this disease include occupancy density, personal hygiene, economic conditions, age, gender, education, knowledge, household contact, and lack of contact and the physical environment of the house (Muharry 2014, Tarmii et al 2016).

Leprosy has been linked with poverty because in reality most leprosy sufferers come from the weaker economic group (Tarmisi et al 2016). Economic conditions related to family income determine the fulfillment of household including health-related needs (Muharry 2014). Leprosy if not handled carefully can cause disability, and this situation is a barrier for leprosy patients to lead a socially active life important to meet their socio-economic needs (Tarmisi et al 2016).

The real problem faced by the people of Jakarta, especially Central Jakarta, is that in major sections of society only male family heads who work while women take care of the household. As a result the income received per month is not sufficient to meet the daily needs while the prices of basic and other materials are increasing every year. The data of the Central Bureau of Statistics of DKI Jakarta Province in 2017 observed a large number of poor people in Central Jakarta. This prompted this study team to conduct research on analyzing the relationship between occurrence of leprosy in Central Jakarta and their economic conditions.

Materials and Methods

This study is of analytic Quantitative non-experimental type and is based on quantitative data (as observations) that are relevant to the variables analyzed statistically.

Research methodology used a cross sectional design of data collection of both non-independent and independent variables studied at the same time. This study assessed the correlation between dependent variables (leprosy patients) and independent variables (economic conditions). Subjects for this study were identified from a list of leprosy patients in Public Health Center all regions of Central Jakarta. Study was based on primary data obtained from questionnaire instruments.

Determination of the sample size in this study was done using simple random sampling method by considering the inclusion and exclusion criteria set. When determining the sample size, the case control method was used by dividing the study subjects into case group and the control group. The case group comprised of leprosy patients who were identified through searching the medical records, while the control group included people who did not have leprosy but belonged to one sub-district common with leprosy patients. The sample size obtained is based on a sample formulation for case control cases, which is a sample of 17 respondents for each group (case and control) so that the total study sample is 34 respondents. Subjects were interviewed for various determinants related to economic conditions listed in Table 1.

Table 1 : List of social determinants used to socially classify the families.

S.N.	Criteria used to identify a poor family	YES	NO	ANSWER
1	Building area of home less than 8 m² / person.			
2	Home building made from soil / bamboo / cheap wood.			
3	Type wall place to stay on the bamboo / thatch / wood quality low / wall without plaster.			
4	House walls are made of bamboo / straw / wood / low quality walls without plastered.			
5	Home lighting sources do not use electricity.			
6	The source of drinking water comes from unprotected wells / springs / rivers / rain water.			
7	Fuel for daily cooking is firewood / charcoal / kerosene.			
8	Only consume meat / milk / chicken in a week.			
9	Only buy a new set of clothes in a year.			
10	Only able to eat as much as one / two times a day.			
11	Unable to pay for medical expenses at the public health center / polyclinic.			
12	Sources of income head home household is : farmers with extensive land 500 m², workers peasants, fishermen, laborers building, workers' estates and or work more with income below Rp. 600,000 / month.			
13	Household head of education: no school/ not completing elementary school / completing elementary school.			
14	Do not have savings / goods that are easily sold with a minimum of Rp. 500,000, - such as motorcycle credit/non-credit, gold, livestock, motor boats, or other capital goods.			

Data obtained was analysed to assess correlation between family economic conditions and the incidence of leprosy and for this purpose a chi square correlation analysis was used. SPSS 22 for Windows programme was used for this statistical analysis.

From the data presented in Table 2 it can be observed that most of respondents in the study were males and majority of them were less than 20 years old. Most had high school education. Housewives and students were important groups. Regarding the ethnicity, it is dominated by Betawi.

Families categorized as poor are families that meet the criteria for poverty according to BPS (Badan Pusat Statistik 2018). 14 criteria used for the identification of poor families are listed below:

Among the 34 respondents, 16 (47%) respondents had family economic conditions categorized as poor, whereas 18 respondents (53%) had economic conditions of non-poor families.

Relation of Family Economic Conditions to Leprosy : The following inferential statistical calculation hypotheses were used to assess the correlation of family economic conditions with occurrence of leprosy in Central Jakarta in 2017 :

H0: $\rho = 0$ (There is no correlation between family economic conditions and leprosy events).

Table 2 : Characteristics of Respondents

Characteristics		Case	Control	Total
Gender	Man	12	11	23
	Woman	5	6	11
Age	≤ + 20 years	6	8	14
	21-40 years	6	7	13
	41 - 60 years	2	1	3
	> 60 years	3	1	4
Last education	No school	1	0	1
	Primary school	6	2	8
	Middle school	2	4	6
	High school	8	8	16
	College	0	3	3
Work	Housewife	4	5	9
	Entrepreneurship	2	2	4
	Employee Private	3	3	6
	Student	3	6	9
	Does not work	5	1	6
Ethnic	Betawi	13	9	22
	Malay	2	0	2
	Sunda	1	3	4
	Java	0	1	1
	Minang	1	3	4
	Arab	0	1	1

Table 3 : Cross Tabulation of Family Economic Conditions with Leprosy Events

Economic Conditions	Leprosy		Total
	Positive	Negative	
Poor	11	5	16
Not poor	6	12	18
	17	**17**	**34**

H1: ρ ≠ 0 (There is a correlation between family economic conditions and le prosy events) α= 0.05.

Based on the data research, a cross tabulation of the economic conditions of the family with the occurrence of leprosy was done (Table 3).

Table 3 shows that of the 17 respondents, who suffered from leprosy (cases), 11 of them had family economic conditions of the poor category and the remaining 6 people had economic conditions of non-poor families. On the other of the 17 respondents who did not suffer from leprosy (controls), where there were as many as 5

Table 4 : **Correlation of Family Economic Conditions with Leprosy Occurrence**

	Value	df	Exact Sig (2-sided)
Chi square test	4,250[a]	1	0.039

respondents who had economic conditions of the family of the poor category and 12 other respondents had economic conditions of families who were not categorized as poor.

The test results on the correlation between family economic conditions and the occurrence of leprosy are summarized in Table 4.

The test criteria will accept H_1 if the *p*- value is <α, and accept H_0 if the *p*- value > α. Based on the statistical test of Chi Square correlation (Table 4) the *p*-value was found to be equal to 0.039 <α = 0, 05, thus H_1 obtained means is a significant correlation between family economic conditions with leprosy events at Central Jakarta area in 2017.

Discussion

This study has found a significant correlation between poverty and occurrence of leprosy in Central Jakarta. While the observations are derived from a small sample set and should be interpreted with caution, their importance should not be ignored. These observations support the earlier finding, which implies that poverty continues to be an important factor in leprosy epidemiology even in present times. According to Tarmisi et al (2016) that leprosy is a manifestation of poverty because in reality most leprosy sufferers come from weak economies. In addition, economic conditions are one of the factors that cause leprosy. The results of this study support that there is a significant correlation between family economic conditions and leprosy events.

The results of research conducted by Mudatsir

(2010) show that, leprosy can affect anyone. However, leprosy has statistically attacked many more people with low socio-eeconomic conditions. This is related to low body resistance, poor nutrition and the environment and poor hygiene, low socioeconomic conditions, poor and over-crowded homes also affect the spread of leprosy. The reduction in leprosy cases in Europe even before treatment became available is associated with improvements in socio-economic conditions.

Poverty in Indonesia is defined based on what is made by the Badan Pusat Statistik (BPS). BPS defines poverty by creating criteria based on expenditure per person per day with 14 criteria (Badan Pusat Statistik, 2018). Leprosy is considered as a manifestation of poverty because in reality most leprosy sufferers come from weak economic groups (Tarmisi et al 2016). Economic conditions are related to family income which determines the fulfillment of household needs including health-related needs (Muharry 2014). Income affects the capacity provide various types of food that underlie various nutritional deficiencies (Oktaria et al 2017). This is in accordance with what was reported by Tarmisi et al (2016) that leprosy itself may be a risk factor for the nutritional status of sufferers and associated with the incidence of malnutrition, as earning capacity of leprosy cases is affected it can be a risk factor for poverty. Nutritional status assessment of people suffering from leprosy have shown that these persons are 2.976 times more likely to experience poor nutritional status compared with respondents who do not have leprosy.

Conclusion

Our study has found a significant correlation between economic conditions and occurrence of leprosy in Central Jakarta in 2017. As sample size is small, in depth studies with larger sample size will be required for better understanding of factors required for planning targeted interventions.

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