Artikel Icoph tcd

By Dyah Wardani

WORD COUNT 1754
TIME SUBMITTED 04-SEP-2018 12:01PM
PAPER ID 40008641

Housing Condition as Tuberculosis Infection Risk Factor

Abstract
Indonesia is a country with the third tuberculosis (TB) incidence in the world. Bandar Lampung is one of the cities in Indonesia with a high TB incidence. TB incidence in the city increased about 80% during four years period (2,056 cases in 2016 compared to 1,195 cases in 2012). Bandar Lampung is located in the fifth poorest province in Indonesia, which closely related to poor housing condition. This study aimed to identify significant influence of housing condition, which consisted of variables: ventilation, in-house sunlight, in-house smoking pollution and in-house TB contact; to TB infection. A case control study was used to study the influence of related variables. Case sample group consisted of 31 smear-positive TB patients; meanwhile control sample group consisted of 62 patients without TB. Both sample groups were obtained from Sukaraja and Panjang Community Health Service which have performing Directly Observed Treatment Shortcourse and have highest TB incidence in Bandar Lampung. Data were collected by using structured interview questions and observation; and was then analyzed using bivariate Chi square analysis. Less ventilation (odds ratio/OR: 4.747; 95 % confidence interval/CI: 1.875–12.022), no in-house sunlight (OR: 5.219; 95 % CI: 2.040–13.355), existence of in-house smoking pollution (OR: 3.067; 95 % CI: 1.240–7.584) as well as existence of in-house TB contact (OR: 10.688; 95 % CI: 3.792–30.121) are TB infection risk factors. In conclusion, TB control program should be highlighted the concerned variables in order to accelerate TB incidence reduction, especially in countries with poor housing conditions.

Keywords: housing condition; tuberculosis; risk factor

Introduction

Indonesia is a country with the third tuberculosis (TB) incidence in the world. The number of TB incidence in 2016 was 1,020,000 (660,000 – 1,460,000)(1), increased 122% compared to TB incidence in 2012 which was 460,000 (380,000 – 540,000)(2). Bandar Lampung is one of the cities in Indonesia with a high TB incidence. Moreover, TB incidence in the city also increased about 80% during four years period. TB incidence in 2012 was 1,195 cases, increased to 2,056 cases in 2016(3,4). Bandar Lampung also a city in Lampung province, a fifth poorest province in Indonesia. One of indicators of poor province is poor housing condition(5).

Housing condition is socio-economic indicator of health and welfare related to the environment. Poor housing condition is linked to poverty, which increase vulnerability to disease(6). Poor housing condition includes such as poor air ventilation, poor in-house sunlight and existence of in-house smoking pollution(7). Poor air quality in the house as a result of insufficient ventilation and the presence of cigarette smoke contribute to decreased respiratory health and have impact to TB transmission. Moreover, poor air quality caused by in-house smoking pollution can disrupting the mucociliary defense function of airways, impair alveolar pulmonary macrophages function and make the lung vulnerable to infection, including TB(8).This condition is deteriorated by the presence of in-house TB contact, which will increase the probability of in-house TB transmission(9). This study aimed to study whether poor housing condition in Bandar Lampung is associated with a TB incidence increasing.

Methods

This study was a case control study, conducted at Sukaraja and Panjang Community Health Centre (CHC), which had the highest TB incidence in Bandar Lampung. Population of this research consisted of case and control population. Case population was TB smear positive patients during period of January – April 2016 in the study sites, which were 35 TB smear positive patients. Meanwhile, control population was TB suspect which have been confirmed did not suffer TB in the same study sites and period, which was 147 patients. Case sample was all population which was eligible, those was 31 TB smear positive patients. Meanwhile, control sample was twice as case samples, those were 62 patients.

Research variables in this study consisted of ventilation, in-house sunlight, in-house smoking pollution, in-house TB contact and TB infection. Ventilation was measured by percentage of ventilation area of house width (less ventilation: <20%, adequate ventilation: ≥20%)(10). In-house sunlight was observed by existence of sunlight in-house (there was no in-house sunlight, there was in-house sunlight)(10). In-house smoking pollution was indicated by existence of family member who smoke inside the house (there was in-house smoking pollution, there was no in-house smoking pollution)(11). In-house TB contact was indicated by existence of TB contact inside the house (there was in-house TB contact, there was no TB contact).

In this research, data was collected through in-depth interview, observation and measurement. Data was then analyzed using bivariat analysis Chi-Square to identify the significance (p value) and significant

influence (odds ratio/ OR) of each independent variable to dependent variable.

Results and Discussion

This result shows that there are more respondents in case group (smear positive TB respondents) who most live in a house with less ventilation (56.2%), no in-house sunlight (58.1%), existence of in-house smoking pollution (50.0%) as well as existence of in-house TB contact (70.4%); compared to respondents in control group (respondents with no TB infection). Respondents in control group most live in a house with adequate ventilation (78.7%), have in-house sunlight (79.0%), have no in-house smoking pollution (75.4%) and have no in-house TB contact (81.8%) (table 1). Based on the bivariat analysis using Chi Square, it is also shown that all of research variables have p value of less than 0.05. In addition, existence of in-house TB contact is categorized as variable with the highest OR (OR: 10.688; 95% Confidence Interval/ CI: 3.792 – 30.121) among the other variables (table 1).

Table 1: Bivariat Analysis of Housing Condition to TB.

Variables	TB Infection		p value	OR (95% CI)
	Yes	No		
Less ventilation				
Yes	18 (56.2%)	14 (43.8%)	0.001	4.747 (1.875 – 12.022)
No	13 (21.3%)	48 (78.7%)		
No in-house sunlight				
Yes	18 (58.1%)	13 (41.9%)	0.001	5.219 (2.040 – 13.355)
No	13 (21.0%)	49 (79.0%)		
Existence of in-house smoking pollution				
Yes	16 (50.0%)	16 (50.0%)	0.025	3.067 (1.240 – 7.584)
No	15 (24.6%)	46 (75.4%)		
Existence of in-house TB contact				
Yes	19 (70.4%)	8 (29.6%)	< 0.001	10.688 (3.792 – 30.121
No	12 (18.2%)	54 (81.8%)		

OR: Odds ratio
CI: Confidence interval

In this research, existence of in-house TB contact is the strongest risk factor to TB infection. TB contact is the source of TB transmission. The transmission risk is greater when index case is sputum smear positive(12). Research result in Pakistan showed that in-house smear positive TB contact has probability of 11.73 to transmit smear positive TB to in-house family member. In addition, he also has probability of 9.6% to transmit smear negative TB to in-house family member(9). Family members who have more intimacy and contact duration to in-house TB contacts have greater risk to have TB infection rather than family member who have less intimacy and contact duration of family member to in-house TB contacts. Research in India showed that a husband with smear positive TB rarely transmits his disease to his wife but more to his mother, due to social structure relationship which refer to intimacy. The disease can get most manifested in in-house family member within the first four months of the active disease of the smear positive in-house TB contacts. Although, the disease also can get manifested during the active disease of in-house TB contacts or even after 4 – 24 months of successfully treating the smear positive TB contacts(12).

In this research, in-house TB contact influences TB infection together with less ventilation, no in-house sunlight as well as existence of in-house smoking pollution, which refer to poor housing condition, especially poor in-house air quality. Previous research showed that most of TB patients in Bandar Lampung, Indonesia, clustered in areas with poor housing condition(13). Moreover, in Bandar Lampung, Indonesia, among other TB infection risk factors (food security and health access), poor housing condition is the greatest risk factor(14).

Based on observation, most of case sample's respondents live in slum areas which are densely populated residential areas and crowded houses. Moreover, most of their houses are small houses with fewer windows or even cannot be opened windows due to crowded houses surrounding their houses. This condition caused the houses have less ventilation and less or even no in-house sunlight. The condition also makes worse in-house air quality if there is in-house smoking pollution.

Tuberculosis was spread via respiratory tiny particles droplets containing *Mycobacterium tuberculosis*, which would rapidly evaporated, leaving droplet nuclei. These tiny particles would remain suspended on in-house air until either inhaled or ventilated out of the house. Therefore, in a house with less ventilation, droplet nuclei might remain suspended in the in-house air for prolonged periods, which mean will increased risk to be more inhaled(15). However, droplet nuclei

would not remain on in-house air with good in-house air circulation and adequate ventilation. In the other hand, most of respondent's case sample houses in this research have less ventilation which will increase the risk of transmission and infection, with OR: 4.747 (95% CI 1.875 – 12.022).

Droplet nuclei are also susceptible to ultraviolet light, including sunlight. Therefore, sufficient in-house sunlight is needed to control *M. tuberculosis*(7). In a house with have less or even no in-house sunlight, risk of droplet nuclei to be inhaled will increase which also increase TB transmission and infection(16). In this research the risk of no in-house sunlight to TB infection is 5.219 (95% CI 2.040 – 13.355).

In this research, TB infection is also influenced by in-house smoking pollution. Smoking pollution will impaired the normal mucociliary clearance of tracheal bronchial secretions and alveolar macrophage function, therefore it will weakening resistance to *Mycobacterium tuberculosis* and increasing of risk infection(17). In this research, the probability of existence in-house smoking pollution to increase risk of infection is 3.067 (95% CI 1.240 – 7.584).

Conclusions

This research shows that poor housing condition consisted of: less ventilation, no in-house sunlight, existence of in-house smoking pollution as well as existence of in-house TB contact are TB infection risk factors. Therefore, TB control program should be highlighted the concerned variables in order to accelerate TB incidence reduction, especially in countries with poor housing conditions.

Artikel Icoph tcd

ORIGINALITY REPORT

2%

SIMILARITY INDEX

PRIMARY SOURCES

1	Wardani, Dyah Wulan Sumekar Rengganis, Lutfan Lazuardi, Yodi Mahendradhata, and Hari Kusnanto. "Structured Equation Model of Tuberculosis Incidence Based on Its Social Determinants and Risk Factors in Bandar Lampung, Indonesia", Open Journal of Epidemiology, 2014. Crossref	22 words —	1%
2	Hernandez, C.. "Tuberculosis in the age of biologic therapy", Journal of the American Academy of Dermatology, 200809 Crossref	8 words —	< 1%
3	Ettinger, B.. "Effect of the Women's Health Initiative on women's decisions to discontinue postmenopausal hormone therapy", Obstetrics & Gynecology, 200312 Crossref	8 words —	< 1%

EXCLUDE QUOTES	OFF	EXCLUDE MATCHES	OFF
EXCLUDE BIBLIOGRAPHY	OFF		