

Characteristics of Pulmonary Tuberculosis Patients and Their Houses in Kedungwuni Subdistrict, Pekalongan Regency, Indonesia

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ABSTRACT

Pulmonary tuberculosis (TB) is a health problem in terms of mortality, disease incidence, and its diagnosis and treatment. In 2015, there were 175,029 positive cases of pulmonary TB. Pulmonary TB is more prevalent in males with a prevalence of 106,554 (60.9%) than females with prevalence of 68,475 (39.1%). Based on data from the Health Office of Pekalongan Regency in 2016, Pekalongan had 610 patients with pulmonary tuberculosis suspects consisting of men as many as 338 and women as many as 272. This study aimed to explore the characteristics of pulmonary tuberculosis patients and their house in Kedungwuni Subdistrict, Pekalongan Regency. This study was a descriptive quantitative study. The majority of respondents were 38 men (62.3%), their age of 46-55 was 17 people (27.9%), almost half of the respondents had elementary school education (27 people, 44.3%), most respondents had low economic status (55 people, 90.2%), almost half of the respondents were employee (27 people, 44.3%), and the majority of respondents did not have the same TB in their family (42 people, 78.9%). Most of the respondents (57.4%) had poor housing conditions. The results of this study are expected to be used to improve the quality of care in tuberculosis patients.

Keywords: *pulmonary tuberculosis, health, Kedungwuni Subdistrict*

1. INTRODUCTION

Tuberculosis (TB) remains one of the ten leading causes of death worldwide. Millions of people continue to get sick from TB every year. Pulmonary tuberculosis (TB) is a contagious lung infection that is still a health problem in the world, especially in developing countries. Tuberculosis has been declared by the WHO (World Health Organization) as a Global Emergency since 1992 [1]. Unfortunately, clinical trials to find out a vaccine that prevents transmission of infection has been disappointing. Significant problems include lack of biomarkers and understanding of the mechanisms of disease and protection [2].

WHO estimates that between 2002 and 2020, 1,000 million people will be infected, more than 150 million people will be sick, and 36 million will die of TB if control is not good in the future. Tuberculosis is the number one killer among infectious diseases and the 3rd leading cause of death after heart disease and acute respiratory disease in Indonesia. The death rate due to tuberculosis in Indonesia reaches 100 thousand people in a year plus 26 thousand people with tuberculosis who are HIV positive, while the world mortality rate caused by the *bacterium mycobacterium tuberculosis* has reached 1.4 million-plus 390 thousand people who are HIV positive. While the prevalence of TB patients in Indonesia in 2018 is 842 per 100 thousand population with a mortality rate of 107 thousand cases. This number makes Indonesia ranked as the third-highest for TB cases after India and China [1]. In Pekalongan Regency,

pulmonary TB is one of the ten leading causes of death in Pekalongan [3].

Pulmonary tuberculosis is a health problem in terms of mortality, disease incidence, and diagnosis and treatment [1]. Tuberculosis (TB) is a chronic infectious disease caused by *mycobacterium tuberculosis*. This bacterium grows slowly in the body that contains a lot of blood vessels and oxygen. Therefore, TB often attacks the lungs.

In 2015, there were 175,029 positive cases of pulmonary tuberculosis. Pulmonary TB by sex is more prevalent in males with a prevalence of 106,554 (60.9%) than females with an incidence of 68,475 (39.1%)[4]. Pulmonary tuberculosis, according to the provincial level was ranked highest, namely North Sulawesi with 206, Gorontalo with 129, and North Sumatra with 120 cases from 34 provinces. The Province of Central Java in 2015 was ranked as the 26th out of 34 Provinces with 56 positive *Mycobacterium tuberculosis* cases [4]. Patients with positive of *bacterium Mycobacterium tuberculosis* in Central Java in 2015 amounted to 115.17 per 100,000 population. In the Health Office of Pekalongan Regency, in 2016, the number of patients with suspect of tuberculosis was 610 consisting of 338 men and 272 women from first to third quarter.

Tuberculosis is also related to social problems. The characteristics of tuberculosis patients are related to tuberculosis cases. There are several factors of tuberculosis: well-established risk factors (such as human immunodeficiency virus, malnutrition, and young age), emerging variables such as diabetes, indoor air pollution, alcohol, use of immunosuppressive drugs, and tobacco smoke, socioeconomic and behavioural factors [5]. On the

other hand, the household condition and community sources will increase the risk of infection from birth until 20 years of age [6]. However, the data of the patient's houses, including floor, wall, density and other relating house conditions have not been reported yet. The objective of this study was to explore the characteristics of pulmonary tuberculosis patients and their house in Pekalongan Regency, Central Java, Indonesia.

2. METHOD

This research was a survey study. It was conducted on December 22 to January 7, 2019, in Kedungwuni Public Health Center I and Kedungwuni Public Health Center II in Pekalongan Regency with a total sample of 61 respondents. The data analysis was descriptive-analytic to determine the percentage of data.

Table 1 Characteristic of respondents

No	Characteristic	n	f (%)	N (%)
1	Sex			
	Male	38	62.3	34 (100)
	Female	23	37.7	
2	Age			
	Late adolescents	14	23.0	34 (100)
	Early old	16	26.2	
	Late old	9	14.8	
	Early elderly	17	27.9	
	Late elderly	5	8.2	
3	Education level			
	No school	7	11.5	34 (100)
	Elementary school	27	44.3	
	Junior high school	15	24.6	
	Senior high school	12		
4	Economic status			
	Low	55	90.2	34 (100)
	High	6	9.8	
5	Employment			
	Unemployed	26	42.6	34 (100)
	Private/public employee	2	3.3	
	Entrepreneur	4	6.6	
	Labour	27	44.3	
	Others	2	3.3	
6	Similar Tuberculosis			
	Yes	19	31.1	34 (100)
	No	42	68.9	

3. RESULTS AND DISCUSSION

The majority of respondents were male (62.3%). TB case notification rate is usually higher in men than in women. Moreover, in the low-and middle-income countries, TB prevalence is significantly higher among men than women[7]. Men should be considered a high-risk group for TB. The incidence of pulmonary TB more often affects men than women [14]. This is because men tend to like to consume cigarettes and alcoholic drinks so that it can decrease the immune system. So, it is natural that smokers and alcoholic drinkers are often referred to as agents of pulmonary TB. Another study showed that the most significant percentage of tuberculosis (59%) was found in males compared to females (41%) [8].

In terms of the age of respondents, most of the respondents have an early elderly category (46-55 years) which was 17 people (27.9%). The previous study revealed that the incidence of TB has begun to shift to the older population. The proportion of older people increased from 10.5% to 12% and the medium age from 38 to 41 years between the period between 1986 and 1996. The medium age of death increased from 53 to 55 years between 1980 and 1996. Higher mobility and social interaction in people aged 15-50

years, who have to work to earn income to meet family needs, allows them to be infected from other people to be higher [9].

Based on the results of the study, the data obtained most of the respondents who graduated from elementary school were 27 people (44.3%). According to WHO states that pulmonary TB attacks people with low education. The level of education can influence behaviour. The higher the knowledge of a person, the easier it is to receive information. The study is likely to occur because before pulmonary TB patients undergo treatment, they lack information or knowledge about pulmonary TB disease. The main risk factor for TB was not having university-level education (OR=4.45.95%CI (1.50-13.17), p=0.007) [10]. There was also a significant relationship between education to the dropout treatment of TB [8]. On the other hand, low education, in turn, can lead to further poverty[10]

Based on the results of the study, some respondents (90.2%) had a low economic status with income below the regional minimum wage. Adequate nutritional needs will guarantee a good immune status, and a healthy home environment will reduce the risk of developing M. tuberculosis germs, as well as protect people from transmitting germs. Meanwhile, health needs that cannot be met will delay the recovery

process and increase the risk of transmission to others. Therefore, low economic status will increase the risk of infection and the risk of pulmonary TB transmission. Lower socioeconomic status is associated with increased risk of TB in Asia. In Asia, social-determinants of TB often include unemployment, co-habitation with TB infection, poverty, and other risk factors known to be associated with TB (15–18)[10]. Family income is very closely related to the transmission of pulmonary TB because low income makes people unable to live appropriately, which meets health requirements. Then it causes food consumption patterns

and health maintenance. Based on the results of the study, the majority of respondents had jobs as labourers (44.3%). Regarding the TB cases in the neighbourhood, the majority (68.9%) of respondents did not have similar TB both from their families and neighbours. While 19 respondents (31.1%) had the same TB from their family members and their neighbours. The risk of progression from exposure to the tuberculosis bacilli to the development of active disease is a two-stage process governed by both exogenous and endogenous risk factors [5].

Table 2 The profile of patients' home

No	Characteristic	n	f (%)	N (%)
1	House yard			
	Available and clean	14	23.0	
	Available and dirty	17	27.9	34 (100)
	Unavailable	30	49.2	
2	Each house position			
	With space	31	50.8	
	No space	30	49.2	34 (100)
3	Road condition			
	>2m	7	11.5	
	1.5-2 m	27	44.3	34 (100)
	<1m	27	44.3	
4	House density			
	Good	38	62.3	
	Bad	23	37.7	34 (100)
5	Neighbourhood			
	Good	20	32.8	
	Bad	41	67.2	34 (100)
6	House ceiling			
	Available, clean, safe	20	32.8	
	Available, dirty, difficult in caring, unsafe	24	39.3	34 (100)
	Unavailable	17	27.9	
7	Wall			
	Permanent	41	67.2	
	Semi-permanent/combination	21	34.4	34 (100)
8	Floor			
	Permanent/ceramics	50	82.0	
	Semi-permanent	9	14.8	34 (100)
	Soil	2	3.3	
9	Windows in the bedrooms			
	Available	54	88.5	
	Unavailable	7	11.5	34 (100)
10	Windows in the family rooms			
	Available	56	91.8	
	Unavailable	5	8.2	34 (100)
11	Ventilation			
	Available (>10%)	16	26.2	
	Available (<10%)	45	73.8	34 (100)
12	Kitchen smoke ventilation			
	Available (>10%)	18	29.5	
	Available (<10%)	38	62.3	34 (100)
	Unavailable	5	8.2	
13	Lighting			
	Good enough	24	39.3	
	Bad	37	60.7	34 (100)
14	Clean water facilities			
	Available, public, bad	2	3.3	
	Available, private, bad	7	11.5	
	Available, private, good	48	78.7	34 (100)
	Available, public, good	4	6.6	

No	Characteristic	n	f (%)	N (%)
15	Toilet facilities			
	Available, bad	10	16.4	
	Available, moderate	39	63.9	34 (100)
	Available, good	12	19.7	
16	water disposal facilities			
	Unavailable	3	4.9	
	Available, bad	23	37.7	
	Available, moderate	29	47.5	34 (100)
	Available, good	6	9.8	
17	Waste disposal facilities			
	Available, bad	16	26.2	
	Available, moderate	25	41.0	34 (100)
	Available, good	20	32.8	
18	Daily habit			
	Open bedroom windows regularly	12	19.7	
	Sometimes	42	68.9	34 (100)
	Never	7	11.5	
	Open family room windows regularly	12	19.7	
	Sometimes	42	68.9	34 (100)
	Never	7	11.5	
19	Cleaning house			
	Daily	18	29.5	
	Sometimes	42	68.9	34 (100)
	Never	1	1.6	
20	Baby faeces			
	River/pool/undefined	1	1.6	
	sometimes waste bracket	36	59.0	34 (100)
	Waste bracket (daily)	24	39.3	
21	House condition			
	Good	26	42.6	
	Poor	35	57.4	34 (100)

Based on the results of the study, most of the respondents (57.4%) had poor housing conditions. Respondents who had good housing conditions were only 26 people (42.6%). Most respondents have a window in the room and family room, but the window did not meet the minimum standard of ventilation that it should be a minimum 10% of the area of the room. The condition of the house of patients with pulmonary TB who have ventilation area that was not good (<10% of the floor area) was 45 people (73.4%). Area of ventilation that was inadequate for health would result in the function of ventilation to be not optimal. Therefore, the possibility that occurs was that the bacteria Micro bacterium tuberculosis could not be eliminated by expelling through ventilation into the house; this might increase the risk of infection in the room.

This study confirms the previous research on the characteristics of pulmonary TB sufferers in West Bandung Regency, which states that poor home conditions will affect the transmission of pulmonary TB such as poor ventilation area (<10%) and lighting that is not optimal. So that M. Tuberculosis germs will be difficult to get out and pollute the room [13]. Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 1077 / MENKES / PER / V / 2011, several diseases such as pulmonary tuberculosis often occur in environments and places with poor indoor air quality. Low air change rates were typical to happen among TB patients, particularly in bedrooms, and overcrowding was also common [11]. Poor hygiene might lead to various environmental-based diseases [12].

“Narrated from Sa'ad bin Abi Waqas from his father, from Prophet Muhammad PBUH: Verily, Allah SWT is Holy who likes things that are pure, He is clean, who likes cleanliness, He is noble who likes glory, He is beautiful and loves beauty, therefore clean your places "(HR. Tirmizi). The condition of a dirty house, dirty, and a lot of garbage scattered about it is something that is not liked by Allah SWT. As obedient servants, of course, we must be compelled to do things that are liked by God one of which is the cleanliness of the house.

4. CONCLUSION

There were variances regarding the characteristics of the respondent and their houses. Specific approaches are needed for caring patients with TB disease.

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REFERENCES

- [1] World Health Organization, Global tuberculosis report 2018. World Health Organization. <http://www.who.int/iris/handle/10665/274453>. 2018.
- [2] R. Hunter and J. Actor, "The pathogenesis of post-primary tuberculosis. A game changer for vaccine development," *Tuberculosis*, vol. 116, no. November 2018, pp. S114–S117, 2019.
- [3] WHO Global Report. Global Tuberculosis Control; Epidemiologi Strategy and Financing. WHO Library Cataloguing-in Publication Data. 2009.
- [4] K. K. dan K. Ketenagakerjaan, "Panduan Pengendalian Tuberkulosis diTempat Kerja," pp. 1–80, 2015.
- [5] P. D. O. Davies, "Risk factors for tuberculosis," *Monaldi Arch. Chest Dis. - Pulm. Ser.*, vol. 63, no. 1, pp. 37–46, 2005.
- [6] J. L. Zelner et al., "Age-specific risks of tuberculosis infection from household and community exposures and opportunities for interventions in a high-burden setting," *Am. J. Epidemiol.*, vol. 180, no. 8, pp. 853–861, 2014.
- [7] K. C. Horton, P. MacPherson, R. M. G. J. Houben, R. G. White, and E. L. Corbett, "Sex Differences in Tuberculosis Burden and Notifications in Low- and Middle-Income Countries: A Systematic Review and Meta-analysis," *PLoS Med.*, vol. 13, no. 9, pp. 1–23, 2016.
- [8] V. Da Silva, S. Tigeh, N. Wirawan, and M. Bakta, "The Relationship Between Education, Job, and Family Income with TB Medication Dropouts in Timor-Leste," *Bali Med. J.*, vol. 5, no. 2, p. 97, 2016.
- [9] F. Chaimowicz, "Age transition of tuberculosis incidence and mortality in Brazil," *Rev. Saude Publica*, vol. 35, no. 1, pp. 81–87, 2001.
- [10] A. Jiamsakul et al., "Socio-economic status and risk of tuberculosis: A case-control study of HIV-infected patients in Asia," *Int. J. Tuberc. Lung Dis.*, vol. 22, no. 2, pp. 179–186, 2018.
- [11] F. A. Khan et al., "Housing characteristics as determinants of tuberculosis in an Inuit community: a case-control study," 2015.
- [12] P. Tuberculosis, "Analisis Mycobacterium Tuberculosis Dan Kondisi Fisik," no. February, pp. 152–162, 2017.
- [13] Hartono, A.Y. 'Karakteristik Penderita Tuberkulosis Paru dan Lingkungan Rumah di Wilayah Kerja Puskesmas Padalarang Kabupaten Bandung Barat Periode Mei-Juli 2012'. Skripsi. Fakultas Kedokteran. Universitas Islam Bandung. 2012.
- [14] Naga, S.S. Buku Panduan Lengkap Ilmu Penyakit Dalam. Yogyakarta: Diva Press. 2014.