

Knowledge and Intention to Use Personal Protective Equipment among Health Care Workers to Prevent Tuberculosis

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Abstract

Background: Tuberculosis (TB) is one of the main world health problems. Indonesia has the fourth highest incidence in the world. Tuberculosis is very infectious, but it can be prevented in high risk group such as health care worker by using personal protective equipment (PPE). This study aimed to reveal knowledge and intention to use PPE among health care worker to prevent TB transmission in Public Health Center (*Pusat Kesehatan Masyarakat*, Puskesmas) in Bandung.

Methods: Descriptive study was conducted from September to October 2014 in 15 Puskesmas in Bandung. Those 15 Puskesmas had been reported as having the highest incidence in TB cases. Ninety seven health care workers were assessed using questionnaire. Samples were obtained using purposive sampling method. Data were collected and analyzed for frequency and proportion.

Results: Among 97 health care workers, 76 (78.4%) had good knowledge, 16 (16.5%) had sufficient knowledge, and 5 (5.2%) had poor knowledge. Based on intention of PPE usage among health care workers, it was found that 41.2% had positive intention and 58.8% had negative intention.

Conclusions: Most of health care workers have good knowledge about TB transmission, however, intentions to use PPE are low. [\[AMJ.2016;3\(1\):120-5\]](#)

Keywords: Intention, knowledge, personal protective equipment, tuberculosis

Introduction

Tuberculosis (TB) is one of the diseases with high mortality rate. Indonesia is ranked as the fourth country with highest cases of TB worldwide. There are 0.4–0.5 million new cases of TB in Indonesia. In 2013, the prevalence of TB was 0.4%.¹ TB is an infectious disease caused by *Mycobacterium tuberculosis*. Risk of TB transmission infection in Indonesia every year is calculated using Annual Risk of Tuberculosis Infection (ARTI) and the result is 1–3%. TB infects various groups of people and health care workers are included as a high risk group. Annual incidence of TB infection in health care workers is 69–5,780 in 100,000.² TB is an occupational hazard among health care workers.

Several efforts have been initiated to reduce TB transmission in health care facilities, such as administration control, environmental control,

and use of personal protection equipment (PPE). Use of PPE is influenced by predisposing factors, such as knowledge, enabling factors, reinforcing factors, and intention is the best predictor of a behavior.³ Considering PPE usage is important for health care workers, this study aimed to reveal knowledge and intention to use PPE among health care workers to prevent TB transmission in public health center (*Pusat Kesehatan Masyarakat*, Puskesmas) in Bandung.

Methods

This was a descriptive study. Purposive sampling was conducted to select research subjects. Based on sample size calculation, minimum sample of 97 subjects were required. Among 73 Puskesmas in Bandung City, 15 centers with highest incidence of TB cases were selected as research population.

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Table 1 Subjects' characteristics

Subject	Numbers of participating health care workers (%)
Sex	
Male	21 (21.6)
Female	76 (78.4)
Age, year	
<31	27 (27.8)
31-40	31 (32.0)
41-50	26 (26.8)
>50	13 (13.4)
Public health center	
Babatan	5 (5.2)
Caringin	6 (6.2)
Cetarip	6 (6.2)
Cibuntu	5 (5.2)
Cijagra Lama	6 (6.2)
Cijerah	5 (5.2)
Garuda	11 (11.3)
Kopo	6 (6.2)
Kujangsari	3 (3.1)
Moch. Ramdan	5 (3.1)
Padasuka	7 (7.2)
Puter	16 (16.5)
Sukajadi	5 (5.2)
Talagabodas	6 (6.2)
Tamblong	5 (5.2)
Highest level of education	
Senior high school	13 (13.4)
Diploma	39 (40.2)
Bachelor's degree	17 (17.5)
Medical Doctor	27 (27.8)
Master's	1 (1.0)
Length of employment, years	
<1	9 (9.3)
1-5	26 (26.8)
6-10	13 (13.4)
11-15	11 (11.3)
16-20	5 (5.2)
21-25	17 (17.5)
>25	16 (16.5)
Occupation	

Physician	29 (29.9)
Nurse	57 (58.8)
Laboratory assistant	11 (11.3)
TB history	
Yes	7 (7.2)
No	90 (92.8)
TB history on contacted or lived with family members	
Yes	7 (7.2)
No	90 (92.8)

Puskesmas workers such as doctors, nurses, and laboratory workers were involved in this study.

This study was approved by Health Research Ethics Committee Faculty of Medicine Universitas Padjadjaran. The permission to conduct research was also given by local government and Bandung District Health Office. Data collection using validated questionnaire was conducted from September to October 2014. Questionnaire was given to health care workers who had agreed to participate in this study. Besides, verbal and written informed consents were given.

The questionnaires assessed knowledge and intention. Knowledge questionnaire consisted of 10 questions regarding TB transmission, including transmission media, modes, control, and high risk groups in Puskesmas. Intention questionnaire consisted of 17 questions about the intention to use PPE, such as mask and gloves, and the responds were recorded using likert scale (5, strongly agree; 4, agree; 3, neutral; 2, disagree; 1, strongly disagree).⁴⁻⁷

Data were collected and analyzed for frequency and proportion. Knowledge was grouped into 3 categories based on accumulated score percentage (good, 76-100%; sufficient, 56-75%; poor, ≤55%), while intention was classified as positive and negative.

Results

Total respondents from appointed Puskesmas were 154. Only 97 subjects qualified according inclusion criteria who participated in this study. These numbers were appropriate to minimum sample size required.

Most of health care workers were female. Age range of health care workers were 22-55 years old. Most of health care workers were 31-40 years old and the least subjects were

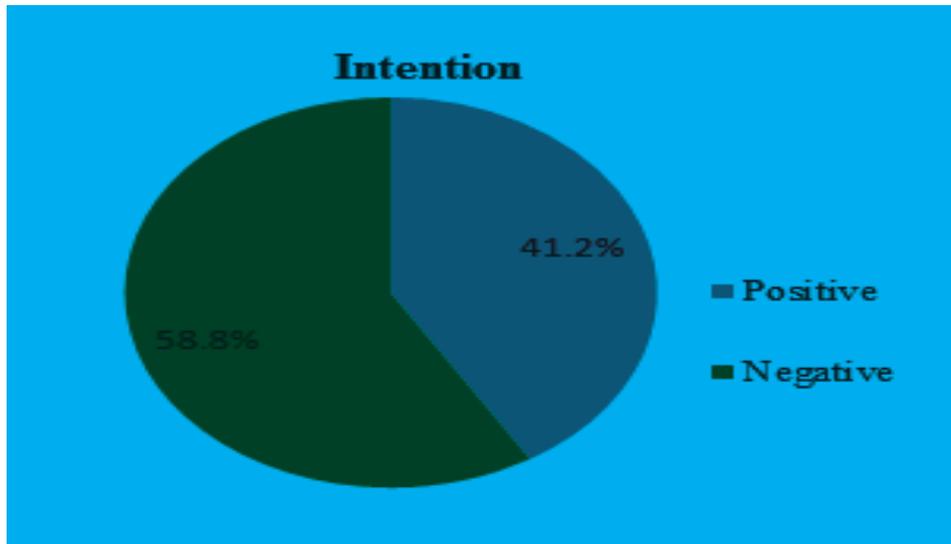


Figure 2 Proportion of Participants based on Intention

over than 50 years old (Table 1).

Most of health care workers were from Puskesmas Puter followed by Puskesmas Garuda, and the least subjects were from Puskesmas Kujangsari. Numbers of subjects from each Puskesmas were affected by the presence of doctors or nurses who were doing internship program and the event of Bulan Imunisasi Anak Sekolah (BIAS) program in Puskesmas during data collection.

Highest level of education among health

care workers varied from senior high school until master's degree. Most of them were diploma 1 and diploma 3.

Based on length of employment, there were health care workers that had been working for 7 months. On the contrary, there were health care workers that had been working for 33 years. In this study, most of them had been working for 1-5 years and the least subjects had been working for 16-20 years.

The doctors, nurses, and laboratory

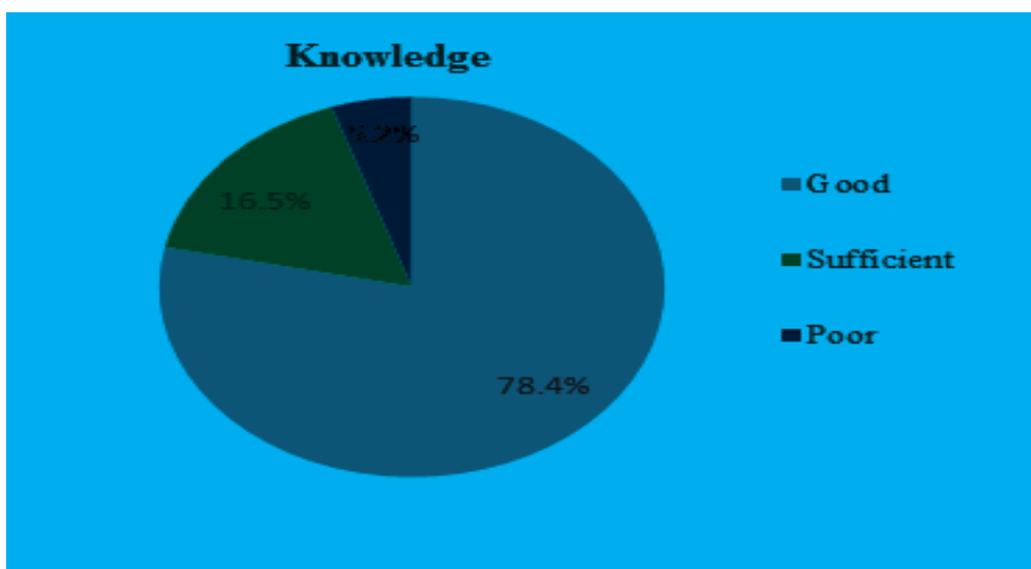


Figure 1 Proportion of Participants based on Knowledge

Table 2 Cross tabulation participant characteristic, knowledge and intention

	Number of participating health care workers (%)				
	Knowledge			Intention	
	Good	Sufficient	Poor	Positive	Negative
Highest level of education					
Senior high school	9 (69.2)	4 (30.8)	0 (0)	5 (38.5)	8 (61.5)
Diploma	32 (82.1)	5 (12.8)	2 (5.1)	19 (48.7)	20 (51.3)
Bachelor's degree	11 (64.7)	3 (17.6)	3 (17.6)	5 (29.4)	12 (70.6)
Medical Doctor	23 (85.2)	4 (14.8)	0 (0)	11 (40.7)	16 (59.3)
Master's	1 (100.0)	0 (0)	0 (0)	0 (0)	1 (100.0)
Length of employment, yr					
<1	7 (77.8)	1 (11.1)	1 (11.1)	3 (33.3)	6 (66.7)
1-5	22 (84.6)	3 (11.5)	1 (3.8)	11 (42.3)	15 (57.7)
6-10	9 (69.2)	4 (30.8)	0 (0)	6 (46.2)	7 (53.8)
11-15	9 (81.8)	2 (18.2)	0 (0)	5 (45.5)	6 (54.5)
16-20	3 (60.0)	2 (40.0)	0 (0)	1 (20.0)	4 (80.0)
21-25	13 (76.5)	3 (17.6)	1 (5.9)	7 (41.2)	10 (58.8)
>25	13 (81.3)	1 (6.3)	2 (12.5)	7 (43.8)	9 (56.3)
Occupation					
Physician	25 (86.2)	4 (13.8)	0 (0)	12 (41.4)	17 (58.6)
Nurse	46 (80.7)	6 (10.5)	5 (8.8)	22 (38.6)	35 (61.4)
Laboratory assistant	5 (45.5)	6 (54.5)	0 (0)	6 (54.5)	5 (45.5)
TB history					
Yes	6 (85.7)	1 (14.3)	0 (0)	4 (57.1)	3 (42.9)
No	70 (77.8)	15 (16.7)	5 (5.6)	36 (40.0)	54 (60.0)
TB history on contacted or lived with family members					
Yes	6 (85.7)	1 (14.3)	0 (0)	5 (71.4)	2 (28.6)
No	70 (77.8)	15 (16.7)	5 (5.6)	35 (38.9)	55 (61.1)

workers were included in this study because they worked in clinic in which their interactions with TB patients might increase the risk of acquiring infection. Most of subjects (58.8%) were nurses, followed by doctors (29.9%), and laboratory workers (11.3%) (Table 1).

According to TB history among health care workers, 7.2% had TB infection previously. Similar to TB history among health care workers, 7.2% contacted or lived with family members who had been infected with TB previously. This number was similar but it happened to different subject.

There were 76 subjects (78.4%) had good knowledge, 16 subjects (16.5%) had sufficient knowledge, and 5 subjects (5.2%) had poor knowledge (Figure 1). Based on intention, 57

subjects (58.8%) were classified as having negative intention and 40 subjects (41.2%) were classified as having positive intention to use PPE (Figure 2).

After stratification based on highest level of education, 32 subjects with good knowledge had diploma degree but proportionally most of subjects who had good knowledge were medical doctors and had master's degree. These findings indicated that good knowledge was related to education level. In each education level, more than half subjects had negative intention (Table 2).

Based on employment, most subjects (46 nurses) had good knowledge, followed by doctors and laboratory workers. Proportion of doctors with good knowledge was higher

Table 3 Cross tabulation knowledge and intention

	Number of participating health care workers (%)		Total
	Positive	Negative	
Good	29 (38.2)	47 (61.8)	76
Sufficient	8 (50.0)	8 (50.0)	16
Poor	3 (60.0)	2 (40.0)	5

compared with nurses and laboratory workers.

According to length of employment, most of subjects with positive intention to use PPE had been working for 1–5 years, followed by subjects who had been working for 21–25 years and more than 25 years.

Based on occupation, most of subjects with positive intention to use PPE were nurses. In proportion, laboratory assistants, whose proportion of positive intention to use PPE was more than fifty percents, had highest proportion compared to nurses and doctors.

Table 3 showed among subjects with positive intention to use PPE, 29, 9, and 8 subjects had good, sufficient, and poor knowledge, respectively. Among subjects with negative intention to use PPE, 47, 8, and 2 subjects had good, sufficient, and poor knowledge, respectively.

Many subjects who had good knowledge regarding TB transmission, in contrast did not have positive intention to use PPE.

Discussion

TB is transmitted via inhalation of respiratory droplet in which high amounts of bacteria are contained. The droplet is spread when active TB patients are coughing, sneezing, talking, or spitting. Use of PPE in high risk group is one of TB prevention methods.

In this study, females were the most subjects participating. Similar result to 88% female subjects was found in study about perception of health care worker regarding the use of PPE conducted by Gralton et al.⁸ Based on employment, doctors have a higher proportion of good knowledge compared to nurses and laboratory workers. Significant differences in level of knowledge based on employment were also found in study conducted by Woith et al.⁹

Most of subjects had good knowledge regarding transmission of TB, including transmission media, modes, control, and high risk groups in Puskesmas. Similar results were found in study conducted by Hashim et al.¹⁰ which stated that 98.4% health care workers

have good knowledge. Level of knowledge is influenced by education level, age, and length of employment. National TB training or health promotion program may also modify level of knowledge.¹⁰

Knowledge may be reached by a person through experience of an object using special senses. Knowledge or cognition influences a person's behavior. Good knowledge about TB transmission will determine someone's behavior in attempt to prevent the disease. A person with a good knowledge about TB transmission should have better prevention action compared to a person with poor knowledge.

The results from intention questionnaire stated that 41.2% subjects have positive intention, while 58.8% have negative intention. These suggested that majority of health care workers do not have self awareness to use PPE, like masks or hand gloves, to prevent TB transmission in Puskesmas in where they work. Previous study with similar findings showed that health care workers' intention to wear mask during contact with patients are low.⁸ This may be related to application of prophylaxis or vaccination before contacts with patients. There is also ethical consideration regarding the use of mask. Some doctors believe that wearing a mask may disrupt doctor-patient relationship and communication. Other study stated that intention to vaccination as an attempt to prevent infection is also low.¹¹ Specific study about the use of PPE by health care workers to prevent TB have not been conducted previously. According to planned behavior theory and reasoned action theory, negative intention is associated with negative behavior because intention is a best predictor of behavior. An action of wearing PPE was the behavior considered in this study. By using this approach, it was assumed that in this study, the action of wearing PPE was low in health care workers. In conclusion, majority of subjects have good knowledge regarding TB transmission. However, this knowledge was not followed with positive intention. Limitation of

this study is that this study cannot explain the relation between the variables.

Health care workers should protect themselves when they have contacts with TB patients. One of the protection methods is by using PPE. Although the knowledge about TB transmission is good, in contrast the intention to wear PPE is poor. It is recommended to conduct health promotion program about TB transmission for all workers, not limited only for health care workers in Puskesmas facilities. District Health Office needs to provide adequate and satisfactory PPEs to prevent TB. Provision of PPEs might improve the willingness to wear them.

Further study to determine the reasons health care workers, despite having a good knowledge, do not have a positive intention to use PPE needs to be done. A qualitative study is recommended to explore the causes.

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