Yani, D. I., Hidayat, Y.F., Amrullah, A.A. Belitung Nursing Journal. 2018 October;4(5):482-491
Received: 4 July 2018 | Accepted: 27 July 2018 | Corrected: 27 June 2020
https://belitungraya.org/BRP/index.php/bnj/index

ORIGINAL RESEARCH **ISSN: 2477-4073**

KNOWLEDGE, ATTITUDE, AND PRACTICE OF COUGH ETIQUETTE IN PATIENTS WITH TUBERCULOSIS IN THE COMMUNITY HEALTH CENTERS

Desy Indra Yani[1]*, Yayat Fajar Hidayat[2], Afif Amir Amrullah[3]

[1]Department of Community Health Nursing, Faculty of Nursing, Universitas Padjadjaran, Indonesia
[2]Faculty of Nursing, Universitas Padjadjaran, Indonesia
[3]Department of Fundamental of Nursing, Faculty of Nursing, Universitas Padjadjaran, Indonesia

***Corresponding author:**
Desy Indra Yani
Department of Community Health Nursing, Faculty of Nursing, Universitas Padjadjaran
Jl. Raya Bandung-Sumedang Km 21 Jatinangor, Bandung Indonesia 45363
Email: desy.indra.yani@unpad.ac.id

Abstract
Background: Tuberculosis is the major global health problem. A high number of tuberculosis cases are as a result of the disease spreads through droplet nuclei which mainly through a cough. Transmission prevention of tuberculosis is important to lower the rate of new infection. Since the transmission is through a cough, therefore, one of the preventive behaviors is by implementing the good and right cough etiquette.
Objectives: The aim of this study was to find out the overview of knowledge, attitude, and practice of cough etiquette in patients with tuberculosis.
Methods: This study was descriptive quantitative with the cross-sectional approach. The population were all patients with Acid-Fast Bacillus (AFB) and tuberculosis registered in Community Health Centers of Rancaekek, Linggar and Nanjung Mekar in Bandung, Indonesia. A total sampling was used with a total number of 52 patients. Data on knowledge, attitude, and practice were measured via validated questionnaires and observation sheets. Frequency distribution, mean and median were used for data analysis.
Results: Of the total respondents, 65.4% of the respondents had good knowledge about cough etiquette (median value 83.33 and IQR 20), 50.9% had negative cough etiquette attitude (mean value 47.87 and SD 5.885), and 63.5% had bad practice in cough etiquette (median value 5 and IQR 2).
Conclusions: The result of this study is expected to be an input for primary health care facilities in doing improvement in delivering health education to patients with tuberculosis and their families about the good and right cough etiquette, which focus on the affective and psychomotor aspects to prevent the spread of tuberculosis and decrease its infection.

Keywords: AFB positive tuberculosis; attitude; cough etiquette; knowledge; practice

INTRODUCTION

Tuberculosis or TB is a major global health problem, which has also been stated by World Health Organization (WHO) as a global emergency for the humanity since 1993. WHO reported that 9.6 million of new TB cases worldwide are estimated by 2014, and Indonesia accounted for 10% of total new global cases and ranked the second after India. In 2014 WHO has noted that TB killed 1.5 million individuals worldwide (World Health Organization, 2015). In 2013, the estimated prevalence of patients with tuberculosis in Indonesia was based on the diagnosis of 0.4% of the total population, and West Java province

Editor's Note: This article has been corrected on 27 June 2020. A separate erratum can be seen at https://doi.org/10.33546/bnj.1153

had the highest prevalence of pulmonary TB in Indonesia of 0.7% (MOH, 2013). In 2014, 176,677 new cases of AFB+ (Acid-Fast Bacilli) TB were found, in which West Java, East Java and Central Java accounted for 40% of the total findings (MOH, 2015).

TB is easily transmitted to others, specifically from those who diagnosed as AFB (Acid-Fast Bacilli) positive with the probability of 65%. However, the AFB negative patients can also pass on others (MOH, 2014). In addition, TB transmission rates also are dependent on the number of released germs, virulence of TB germs, immunity of the exposed individuals, aerosolization during coughing and sneezing and duration of exposure (Lewis et al., 2016).

TB is a droplet transmission disease. TB will not be transmitted through touching, sharing cutlery, kisses, or any other type of physical contacts (Lewis et al., 2016). The primary sources of TB transmission are coughing and sneezing, which contain Mycobacterium Tuberculosis. One cough produces about 3,000 droplets, and a sneeze produces one million droplets that will spread in the air and may be contagious if it is inhaled by others (MOH, 2014). However, people can be avoided by applying prevention of TB transmission.

Prevention of TB transmission is an attempt we must undertake. If we do not carry it out, it will lead to the wide impacts such as increasing rate of new infections, mortality rate and economic impact due to TB, and inhibiting the principal program toward TB elimination. Considering that the high rate of TB transmission or ARTI (Annual Risk of TB Infection) in Indonesia is about 1-3%, which indicated that every year there are about 1,000 to 3,000 individuals at risk of TB infection per 100,000 population (MOH, 2014). In addition, at the global level, it is estimated that every year there are 3 million undiagnosed, untreated and unreported TB cases. Though every undiagnosed and untreated individual can infect at least 15 people per year (UNOPS, 2015).

Prevention of tuberculosis transmission is related to environmental and behavioural aspects. The behavioural aspects include not spitting out in the open places, regularly take TB drugs, cover mouth and nose when coughing or sneezing, and not smoking. The home environmental aspects include good home lighting that is >60 LUX, high-density housing that is >8 m^2 per individual, ventilation area >10% of the residential area, and house humidity between 18-30^{0}C. The shortcoming in the prevention of TB transmission based on previous studies is the habit of not covering the nose and mouth when coughing or sneezing.

One of the components of TB prevention behaviour is cough etiquette. The cough etiquette is a set of actions one must perform when coughing or sneezing by closing the mouth and nose using a disposable tissue or an elbow sleeve (Government of South Australia, 2014). Cough etiquette is an important thing to control the spread of infection (Depkes, 2008). Patients with TB should perform the correct cough etiquette since the droplets emit when they cough and sneeze are the causes of TB transmission. Therefore, prevention of TB transmission is very important to implement, because it is the basis of elimination that can break the chain of TB transmission. Thus we can achieve the target of "Stop TB Partnership" in 2050 that TB is no longer a global public health problem (UNOPS, 2015).

Rancaekek sub-district had the highest number of patients with TB among the districts of Bandung. In 2016 there were 425 patients with TB in Rancaekek sub-district. Rancaekek sub-district has three Community Health Centers or called Puskesmas, namely Rancaekek Health Center, Linggar Health Center and Nanjung Mekar Health Center. The three Community Health Centres have poly DOTS. According to nurses who held TB program and cadres in the three Community Health Centers, they carried out the counselling about treatment and prevention of TB transmission. But the counselling only focused on the cognitive aspects (knowledge) without exploring the affective (attitude) and

psychomotor (practice) aspects. Therefore, this study was to identify the knowledge, attitude and practice of cough etiquette in patients with TB at Rancaekek Health Center, Linggar Health Center, and Nanjung Mekar Health Center in Bandung district, Indonesia.

METHODS

Study design

This research used a quantitative descriptive design. The identified variables were knowledge, attitude, and practice of cough etiquette. This research was conducted at Rancaekek Health Center, Linggar Health Center and Nanjung Mekar Health Center in Bandung district from May to June 2017.

Population and sample

The population in this study were all patients diagnosed with AFB+ pulmonary TB and were undergoing treatment. The population size of TB AFB+ patients recorded in Rancekek Health Centre, Linggar Health Centre, and Nanjung Mekar Health Centre in District of Bandung from January to May 2017 were 52 people. The samples in this study were selected using total sampling technique.

Instrument

The instruments used in this study were in the form of questionnaires and observation sheets. The knowledge questionnaire was developed from the knowledge of respiratory hygiene/ cough etiquette instrument of a previous study (Choi & Kim, 2016), which contains 15 questions using Guttman scale (true or false) with the validity rate of Pearson correlation of 0.619 to 0.940 and Kuder Richardson (KR20) reliability rate of 0.923. The attitude questionnaire was developed with reference to the 15 statements questionnaire of Choi & Kim's cough etiquette knowledge and using the Likert scale with the validity rate of Pearson correlation of 0.668 to 0.839 and the Cronbach alpha reliability rate of 0.954. While the practice variable was measured by the observation sheet that was developed from the cough etiquette procedure according to the Ministry of Health of Indonesia, the CDC (Center for disease control and prevention), and the Department for Health and Aging South Australia with Kuder Richardson (KR20) reliability rate of 0.768.

Data analysis

Data were analyzed using univariate analysis. Data with interval scale and ratio were presented in mean and standard deviation if having a normal distribution, and presented in median and interquartile range if having abnormal data distribution. Data with nominal and ordinal scale were presented in the frequency distribution table explained in percentage.

Ethical consideration

Concerning the rights of human subjects, the study permission was granted from Department of Health of Bandung District, West Java, Indonesia. All respondents who participated in this study received verbal and written explanation of the study, and signed an informed consent if they agreed to participate. We assured that the participation in this study is voluntary. All of the information was classified.

RESULTS

Table 1 shows that 61.5% of respondents were males, 100% of Sundanese, 36.5% of respondents had senior high school background, 34.6% worked as housewives, and 63.5% had income below minimum wage (MW). Of the total respondents, 75% had the quality of AFB +1 and 71.2% were in the advanced stage. The respondents who took drugs regularly as many as 96.2%. The family members of the respondents who experienced TB symptoms were 19.2%. All respondents had coughing complaints (100%).

Table 1 Frequency Distribution of Demographic Characteristics, TB Characteristics, and Health Behaviors of Patients with Tuberculosis (N=52)

Variable	f	%
Demographic characteristics		
Gender		
Male	32	61.5
Female	20	38.5
Tribe		
Sunda	52	100.0
Educational background		
Not completed in primary school	3	5.8
Completed in primary school	16	30.8
Junior high school/equals	13	25.0
Senior high school/equals	19	36.5
College	1	1.9
Occupation		
Student/College student	4	7.7
Private employee	10	19.2
Entrepreneur	17	32.7
Housewife	18	34.6
Unemployed	3	5.8
Income		
< Minimum wage in District of Bandung	33	63.5
≥ Minimum wage in District of Bandung	19	36.5
TB characteristics & treatment		
Quality of AFB		
+1	39	75.0
+2	7	13.5
+3	6	11.5
Treatment stage		
Intensive stage	15	28.8
Advanced stage	37	71.2
Regularity of taking anti-TB drugs		
Regular	50	96.2
Irregular	2	3.8
The presence of family member experiencing TB symptoms		
Present	10	19.2
Not present	42	80.8
Health characteristics		
Coughing complaints		
Present	52	100.0
Smoking		
Yes	4	7.7
No	48	92.3
Smoking habit of family members		
Not	21	40.4
Inside the house	8	15.4
Outside the house	10	19.2
Inside and outside the house	13	25.0
Availability of cough etiquette support tools		
Providing disposable tissue	33	63.5
Providing surgical mask	52	100.0
Providing trash bin	52	100.0
Providing alcohol-based hand-rubs (hand sanitizer)	9	17.3
Providing clean water and soap	52	100.0
Ever got information about TB		
Yes	52	100.0
Ever got information about cough etiquette		
Yes	45	86.5
Never	7	13.5

The respondents who smoked as many as 7.7%. Of those, 15.4% of the family members of respondents had smoking habits inside the house and 25% smoking both inside and outside the house. In the availability of cough etiquette support tools, all respondents provided surgical mask, trash bin, clean water and soap (100%). 63.5% of the respondents provided disposable tissue and only 17.3% of respondents provided hand sanitizers. All respondents had received information about TB and 86.5% had received counselling about cough etiquette.

The mean age of the respondents was 43 years old, the youngest was 12 years and the oldest was 80 years. The average of daily cigarette consumption was 0.52 cigarettes, while the average of smoking family members was one person. On the average, there were four people living together in one house (**Table 2**).

Table 2 The Average of Demographic Characteristics of Patients with Tuberculosis (N=52)

Variables	Mean	Min	Max
Age (year)	42.96	12	80
Total daily cigarette consumption (the number of cigarettes)	0.52	0	12
Number of smoking family members	0.98	0	3
Number of family members living together	4.44	2	8
Number of adult family members experiencing TB symptoms	0.17	0	3
Number of children family members experiencing TB symptoms	0.08	0	2

The knowledge of cough etiquette had a median score of 83.33 from the possibility of a score of 0-100, with a minimum score of 33.33 and a maximum score of 100.00 and the distribution of data of interquartile range of 20. The average of attitude of cough etiquette was 47.87 from a possible score of 15-60, with a minimum score of 33 and a maximum score of 60 and the distribution of numbers on the respondents (standard deviation) of 5.885 (**Table 3**).

As for the variable of cough etiquette practice, the median score of 5 from the possibility of a score of 0-6, with minimum score 1 and maximum score 6 with the distribution of data of interquartile range of 2. More than half of respondents, or 65.4%, had good cough etiquette knowledge and 34.6% of respondents had poor cough etiquette knowledge.

For cough etiquette attitude, more than half of respondents, or 51.9%, had negative cough etiquette attitude and 42.3% of the respondents who had positive cough etiquette attitude. More than half of respondents, or 65.5%, had bad cough etiquette practice and 34.5% had good cough etiquette practice (**Table 4**).

Table 3 Knowledge, Attitude, and Practice of Cough Etiquette in Patients with Tuberculosis (N=52)

Variable	Min	Max	Mean/ Median	SD/ IQR
Knowledge	33.33	100.00	83.33[2]	20[2]
Attitude	33	60	47.87[1]	5.885[1]
Practice	1	6	5[2]	2[2]

1 Mean and SD 2 Median and IQR

Table 4 Frequency Distribution of Knowledge, Attitude, and Practice of Cough Etiquette in Patients with Tuberculosis (N=52)

Variable	Criteria	f	%
Knowledge	Good	34	65.4
	Poor	18	34.6
Attitude	Positive	25	48.1
	Negative	27	51.9
Practice	Good	19	36.5
	Poor	33	63.5

Table 5 Frequency Distribution of Knowledge of Cough Etiquette on Patients with Tuberculosis (N=52)

Questions	True		False		Mean	SD
	f	%	f	%		
Sites to cover when coughing						
Only cover the nose when coughing/sneezing	43	78.2	9	16.4	0.83	0.382
Only cover the mouth when coughing/sneezing	43	78.2	9	16.4	0.83	0.382
Cover the nose and mouth when coughing/sneezing	43	78.2	9	16.4	0.83	0.382
It is all right not to cover when coughing as long as you do not cough on others	43	78.2	9	16.4	0.83	0.382
Things used to cover a cough						
Cover with disposable tissue when coughing/sneezing	40	72.7	12	21.8	0.77	0.425
Cover with handkerchief when coughing/sneezing	35	63.6	17	30.9	0.67	0.474
Cover with a sleeve when coughing/sneezing, if a tissue is not available	39	70.9	13	23.6	0.75	0.437
Wear a mask as much as possible when coughing/sneezing	49	89.1	3	5.5	0.94	0.235
Hand hygiene						
Spit out sputum anywhere immediately	46	83.6	6	10.9	0.88	0.323
Throw the sputum into a trash bin immediately	35	63.6	17	30.9	0.67	0.474
Spit the sputum out into a pot/specific container that is given Lysol liquid or bathroom floor cleaning fluid	45	81.8	7	12.7	0.87	0.345
Spit the sputum out into the toilet	36	65.5	16	29.1	0.69	0.466
How to dispose of sputum						
After coughing/sneezing must wash hands with soap and clean water	45	81.8	7	12.7	0.87	0.345
After coughing/sneezing no need to wash hands if the hands are clean	45	81.8	7	12.7	0.87	0.345
After coughing/sneezing, if the hands are contaminated with saliva, apply alcohol-based hand-rubs thoroughly over the hands	40	72.7	12	21.8	0.77	0.425

Table 6 Frequency Distribution of Attitude of Cough Etiquette in Patients with Tuberculosis (N=52)

Statements	Strongly Agree		Agree		Disagree		Strongly Disagree		Mean	SD
	f	%	f	%	f	%	f	%		
Sites to cover when coughing										
I think the correct cough etiquette does not only cover the mouth when coughing/sneezing	22	40.0	21	38.2	7	12.7	2	3.6	3.21	0.825
I think it's very dangerous if I do not cover my mouth and nose when coughing/sneezing	23	41.8	19	34.5	5	9.1	5	9.1	3.15	0.958
I think the good cough etiquette is by covering the nose and mouth when coughing/sneezing	23	41.8	19	34.5	7	12.7	3	5.5	3.19	0.886
I will cover my nose and mouth when I cough/sneeze	25	45.5	19	34.5	3	5.5	5	9.1	3.23	0.942
Things used to cover a cough										
I think I should not use one tissue repeatedly to cover my nose and mouth when coughing/sneezing	27	49.1	11	20.0	11	20.0	3	5.5	3.19	0.971
I think using a handkerchief to cover the nose and mouth when coughing/ sneezing is not allowed	20	36.4	13	23.6	13	23.6	6	10.9	2.90	1.053

I will cover my nose and mouth with my elbow sleeve when coughing/sneezing	18	32.7	21	38.2	6	10.9	7	12.7	2.96	1.009
I will use disposable tissue to cover my nose and mouth when coughing/sneezing	21	38.2	17	30.9	9	16.4	5	9.1	3.04	0.989
Hand hygiene										
I think it's dangerous if I throw sputum anywhere immediately	36	65.5	10	18.2	5	9.1	1	1.8	3.56	0.752
If I cough and spit out, I will throw my sputum into the toilet	26	47.3	22	40.0	3	5.5	1	1.8	3.40	0.693
If I cough and spit out, I will not throw my sputum into the trash bin	18	32.7	14	25.5	15	27.3	5	9.1	2.87	1.010
I think throwing sputum into pots/specific containers given Lysol fluid or bathroom floor cleaner liquid was allowed	25	45.5	17	30.9	5	9.1	5	9.1	3.19	0.971
How to dispose of sputum										
Although my hands still look clean, I will still wash my hands after I cough/sneeze	37	67.3	13	23.6	1	1.8	1	1.8	3.65	0.623
I think washing hands after coughing/sneezing may use alcohol-based hand-rubs (hand sanitizer)	17	30.9	23	41.8	6	10.9	6	10.9	2.98	0.960
I think washing hands after coughing/sneezing is a must	28	50.9	17	30.9	3	5.5	4	7.3	3.33	0.901

Table 7 Frequency Distribution of Practice of Cough Etiquette in Patients with Tuberculosis (N=52)

Practice	Carried out		Not carried out		Mean	SD
	f	%	f	%		
Look away from others when coughing/sneezing	51	92.7	1	1.8	0.98	0.139
Cover the nose and mouth with a surgical mask.	49	89.1	3	5.5	0.94	0.235
Cover the nose and mouth with disposable tissue	29	52.7	23	41.8	0.56	0.502
Cover the nose and mouth with the elbow sleeve	39	70.9	13	23.6	0.75	0.437
Immediately dispose the used tissue to the trash bin	29	52.7	23	41.8	0.56	0.502
Hand washing using clean water and soap or using an alcohol-based hand-rubs (hand sanitizer)	45	81.8	7	12.7	0.87	0.345

DISCUSSION

The cough etiquette is a set of actions that one must take when coughing or sneezing. This is intended to reduce the spread of respiratory disease to others. Cough etiquette is an important thing to control the spread of infection at its source (Government of South Australia, 2014).

Based on the results of this study, more than half of respondents had good cough etiquette knowledge (65.4%). But more than half of respondents had negative cough etiquette attitude (51.9%) and also had poor cough etiquette practice (63.5%). According to research in South Korea, various factors influenced the quality of one's cough etiquette, such as carrying tissues, never having health education about cough etiquette, daily

handwashing frequency, and cough etiquette knowledge level (Choi & Kim, 2016). In this study, more than half of the respondents provided disposable tissue (63.5%), and 86.5% of respondents claimed to receive counselling about cough etiquette.

Finding of this study also showed that the median score of knowledge was 83.33, which considered good knowledge. The result was higher than the cough etiquette in the research conducted in South Korea to the general population which showed the median score of 56.1. It may be caused by the health education on cough etiquette at the health centers and health cadres. In our study, 86.5% of the respondents claimed had a counselling about cough etiquette, but only 44.5% of the respondents in South Korea research (Choi & Kim, 2016).

The cough etiquette knowledge in this study was divided into four components with the mean of true score percentage of sites to cover when coughing (78.2%), things used to cover a cough (74.08%), hand hygiene (73.63%), and how to dispose of sputum (78.77%) (**Table 5**). These results were higher than the research conducted by Choi & Kim (2016) with the mean of true score percentage of sites to cover when coughing (44.3%), things used to cover a cough (68.7%), hand hygiene (49.8%), and how to dispose of sputum (70.1%). In this study, the highest true score percentage was item about wear a mask as much as possible when coughing/sneezing of 89.1%. The lowest percentage was item about cover with a handkerchief when coughing/sneezing and dispose of the sputum into a trash bin immediately, both had a true score percentage of 63.6% (**Table 5**).

From the results of this study, more than half of the respondents, or 65.4%, had good cough etiquette knowledge. It was slightly higher than the study conducted in India in which only 53.6% of the respondents knew cough etiquette (Das & Baidya, 2015).

In the variable of attitude, it is found that more than half of respondents, or 51.9%, had negative cough etiquette attitude. In this study, the attitude of cough etiquette was divided into four components with the mean percentage of "strongly agree" and "agree" answers of sites to cover when coughing (77.7%), things used to cover a cough (67.28%), hand hygiene (76.4 %), and how to dispose of sputum (81.8%) (**Table 6**). The answer with the highest mean of 3.65 was on item 3 (although my hands still look clean, I will still wash my hands after I cough/sneeze), and the lowest mean of 2.87 was on item 12 (If I cough and spit out, I will not throw my sputum into the trash bin). A study in South Africa suggested that positive attitudes and good knowledge levels are a major factor in the establishment of good TB infection control practices (Engelbrecht, van Rensburg, Kigozi, & van Rensburg, 2016).

In the variable of practice, it is found that more than half of respondents, or 63.5%, had bad cough etiquette action and 36.5% had good cough etiquette practice. The percentage of the respondents who had good cough etiquette practice in this study was greater than that conducted in New Zealand, where only 4.7% of the respondents performed proper cough etiquette, either by using a tissue or elbow sleeve (Barry et al., 2011). Similarly, in Bangladesh, only 7% of respondents in the household level performed cough etiquette and they only covered by the clothes (Nasreen et al., 2010). In this study, the respondents who looked away from others when coughing/sneezing were 92.7%, covering the nose and mouth using a surgical mask 89.1%, covering the nose and mouth using disposable tissue (52.7%), covering the nose and mouth by using the elbow sleeve as many as 70.9%, those who immediately dispose of used tissue to the trash bin (52.7%), respondents who washed their hands with clean water and soap or used hand sanitizer 81.8 % (**Table 7**).

For good practice, other factors such as facilities or infrastructure are required (Soekidjo, 2014). Practicing cough etiquette requires supporting tools such as masks, tissues, trash bins, soap and clean water or hand sanitizer to wash hands. In regards to the

cough etiquette supporting tools, all respondents provided surgical masks (100%), trash bins (100%), and clean water and soap (100%). More than half of respondents, or 63.5%, provided disposable tissue and only 17.3% provided hand sanitizers. In this study, if the respondents did not have the facilities to support the cough etiquette, we would provide mask, disposable tissue and alcohol-based hand wash which can be used by the respondents to perform cough etiquette.

CONCLUSION

Knowledge, attitude and practice of cough etiquette in AFB+ tuberculosis patients at Rancaekek Health Center, Linggar Health Center and Nanjung Mekar Health Center in Bandung showed that more than half of respondents had good cough etiquette knowledge, but more than half of respondents also had negative cough etiquette attitude and bad cough etiquette practice.

Declaration of Conflicting Interest
None declared.

Funding
This study has been supported by Faculty of Nursing, Universitas Padjadjaran, Indonesia.

Author Contribution
All authors contributed equally in this study.

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Cite this article as: Yani, D. I., Hidayat, F. Y., Amrullah, A. A. (2018). Knowledge, attitude, and practice of cough etiquette in patients with tuberculosis in primary health care facilities. *Belitung Nursing Journal,4*(5), 482-491. https://doi.org/10.33546/bnj.509