Relationship between Temperature and Behavior with Pulmonary TB Incidence in Women in the Banyu Urip Health Center Surabaya, Indonesia

Fenti Nur Aini Amallia[1], Retno Adriyani[1]

[1]Department of Environmental Health, Public Health Faculty, Airlangga, University, 60115, Surabaya, East Java, Indonesia

Abstract

Tuberculosis was a one of infectious disease caused by Mycobacterium tuberculosis. The transmission of this disease was influenced by environmental factors and poor behaviour. Based on observation result, the working area of Banyu Urip Health Center was a densely populated area. The purpose of this research was to analyze the house physical quality and behaviour with pulmonary TB incidence in women at the working area of Banyu urip health center.

This research was observational analytic research with case control study design. The data analysis was using chi square test. The sample was taken by simple random sampling of 30 houses with pulmonary TB patients and 30 house with no pulmonary TB patients. The data collection was using questionnaire, house physical quality measurement was using observation sheets. The result of the study indicate that temperature and behavior have a significant relationship with the existence of Mycobacterium tuberculosis in house air ($p<0,05$).

The conclusion based on chi square test was bedroom temperature and behavior have a relationship with pulmonary TB incidence in women at the working area of Banyu urip health center 2018. The communities were expected to maintain their house physical quality by maintaining the cleanliness of the house and increasing ventilation to facilitate air circulation in the house.

Keyword: *Temperaure, behavior, pulmonary TB*

Introduction

Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis which more often infects the lung organs than other organs. This disease can spread through droplets of people who have been infected with TB bacilli[(1)]. Worldwide, TB is one of the 10 causes of death and the main cause of a single infectious agent. Every year millions of people fall ill due to tuberculosis[(2)].

Corresponding author:
Retno Adriyani
Departement of Environmetal Health, Public Health Faculty, Airlangga University, Surabaya, East Java, Indonesia.e-mail: fenti.nur.aini-2015@fkm.unair.ac.id

Patients and deaths from TB in most countries in the world, more common in men than women. But TB is a cause of death from infectious diseases in women. Every year, around 700,000 women die from TB, and more than three million get TB. The impact of TB on women is primarily economic and reproductive, and affects children and other family members[(3)].

The second highest number of TB cases in Indonesia in the last 3 years (2015 - 2017) are in East Java Province. The discovery of new TB cases in 2017 reached 22,585, in 2016 it reached 23,390, in 2015 it reached 23,487[(1,4)]. The health profile of East Java Province shows that the city of Surabaya is the region with the highest number of TB patients in 2016 with 5,428 cases and increasing in 2017 with 6,338 case[(1)].

Various factors are thought to be related to the incidence of pulmonary TB in women, namely marital status, pregnancy, parity, history of DM involvement, physical activity, education level, knowledge, contact history, kitchen smoke pollution, occupancy density, and ventilation area. Various problems will arise if women suffer from TB, given the role of women, especially those who are married, pregnant, and have children. His role as a housewife who has to carry out the physical and mental care tasks of children while taking care of her husband will be disrupted[4].

Material and Method

Research on the relationship between temperature and behavior with the incidence of pulmonary TB in women in the work area of Banyu Urip Health Center in Surabaya City was an observational analytic study that aimed to obtain an explanation of the risk of a disease cause. This study is a case-control study that is by identifying groups with certain diseases or effects (cases) and groups without effects (controls), this study uses a retrospective approach (looking back) that aims to determine the causes of disease by tracking risk factors in the incidence of tuberculosis Lung in women.

Analysis of the relationship between the incidence of pulmonary TB in women with behavior and temperature is using the chi-square test with α 5%. If $p < 0.05$, it can be said that there is a significant relationship between the two variables so that H1 is accepted, $p > 0.05$, meaning that there is no meaningful relationship between the two variables, H1 is rejected.

Findings

Measurement of temperature variables is carried out using a thermohygrometer. Based on the results of research in the Banyu Urip Health Center Work Area, the environmental characteristics based on temperature can be seen in Table 1 below:

Table 1. Temperature distribution in the Banyu urip Health Center Work Area in 2018

Temperature	Case		Control	
	n	%	n	%
18°C - 30°C	14	46,7	24	80,0
<18°C and >30°C	16	53,3	6	20,0
Total	30	100,0	30	100,0

Temperature categorization based on PMK No. 1077 of 2011 which categorizes room temperature 18 ° C - 30 ° C is the room temperature that meets the requirements. In Table 1, it can be seen that most of the respondents environmental characteristics are based on temperature in the case group, there are 16 (53.3%) respondents having a temperature <18 ° C and> 30 ° C. Whereas in the control group there were 24 (80%) respondents who had a temperature of 18 ° C - 30 ° C which means that most control groups in the Banyu urip Health Center Work Area had temperatures that met the requirements of PMK Number 1077 of 2011[5].

Behavior variables in this study were in the form of knowledge, attitudes, and actions of the case group respondents and the control group related to prevention and control efforts regarding pulmonary TB. In this study several questions were asked with a questionnaire.

Based on the research results of the respondents knowledge with 10 questions in the questionnaire in the Banyu Urip Health Center Working Area, the results in Table 2 can be seen:

Table 2 Distribution of knowledge levels of respondents in the Banyu Urip Health Center work area in 2018

Knowledge	Case		Control	
	n	%	n	%
Less	7	2 3,3	1	3,3
Well	23	7 6,7	29	96,7
Total	30	100,0	30	100,0

Based on Table 2, it can be seen that the assessment of the level of knowledge in the case group respondents obtained less categories as much as 7 (23.3%) people and as many as 23 (76.7%) people. In addition, knowledge in the control group found that there were less categories (1, 3.3%) and 29 (96.7%) good categories. Knowledge of respondents who were still lacking was caused by respondents who did not know the causes of pulmonary tuberculosis and also many respondents who did not know how to prevent transmission of pulmonary tuberculosis.

Based on the results of the research on the attitude of the respondents with 7 questions in the questionnaire in the Banyu Urip Health Center Working Area, the results in Table 3 can be seen:

Table 3 Distribution of the attitude level of respondents in the Banyu Urip Health Center work area in 2018

Attitude	Case		Control	
	n	%	n	%
Less	7	23,3	1	3,3
Well	23	76,7	29	96,7
Total	30	100,0	30	100,0

Based on Table 3, it can be seen that the assessment of attitudinal level in the case group was obtained in the less category as many as 7 people (23.3%) and the good category was 23 (76.7%) people. In the control group, there were less categories of 1 (3.3%) people and 29 (96.7%) good categories of people. The attitude of respondents is still lacking because there are still many respondents who do not agree with how to prevent transmission of pulmonary tuberculosis.

Based on the results of the research of the respondent's actions by being given 7 questions on the questionnaire in the Banyu Urip Health Center Working Area, the results in Table 4 can be seen:

Table 4 Distribution of respondent's practice in the Banyu Urip Health Center work area in 2018

Practice	Case		Control	
	n	%	n	%
Less	22	73,3	2	6,7
Well	8	26,7	28	93,3
Total	30	100,0	30	100,0

Based on Table 4, it can be seen that the assessment of the level of action in the case group obtained less categories as many as 22 (73.3%) people and good categories as many as 8 (26.7%) people. In the control group, there were 2 (6.7%) less categories and 28 (93.3%) good categories. The respondent's actions that were still poor were caused by respondents being lazy and busy working especially in terms of cleaning the house such as mopping with disinfectants and cleaning spiderwebs on the walls and ceiling.

Temperature variables with the incidence of pulmonary TB in women were tested by Chi Square test. The test results can be seen in the following table:

Table 5 Chi Square Test on temperature variable with the incidence of pulmonary TB in women

Variable	***p-value***	**Explanation**	**OR**	**Explanation**
Temperature	0,016	There is a relationship	0,219	protective risk factors

Based on Table 5 shows that the temperature variable has a relationship with the incidence of pulmonary TB in women because it has a significant p value (p <0.05). If seen from the OR value it can be said that the temperature variable that does not meet the requirements is 0.219 times more risky with the incidence of pulmonary TB in women in their homes.

Behavioral variables consisting of knowledge, attitudes and actions of respondents related to prevention and prevention efforts about pulmonary TB with Chi Square test. The test results can be seen in the following table:

Table 6 Chi Square Test on Behavior Variables with the incidence of Pulmonary TB in women

Behavior Variables	**p-value**	**Explanation**	**OR**	**Explanation**
Knowledge	0,052	There is no relationship	0,113	protective risk factors
Attitude	0,052	There is no relationship	0,113	protective risk factors
Practice	0,015	There is a relationship	0,080	protective risk factors

Based on Table 5 shows that the knowledge and attitude variables do not have a relationship with the incidence of pulmonary TB in women because they have a p value that is not significant (p> 0.05). While the action variable has a relationship with the incidence of pulmonary TB in women because it has a significant p value (p <0.05) If seen from the OR value it can be concluded that the respondent's actions were 0.080 times more risky with the incidence of pulmonary TB in women in his home.

Discussion

Temperature is the average air temperature in the house measured using a thermohygrometer. Based on the results of the study it can be seen that the temperature is related to the incidence of pulmonary TB in the Banyu Urip Health Center Work Area in 2018 (p <a = 0.016 <0.05).

Respondents who have a temperature <18 ° C and> 30 ° C 0.219 times more at risk of pulmonary TB incidence than respondents who have a temperature 18 ° C - 30 ° C. According to Gould and Brooker, there is a temperature range that is favored by the bacteria Mycobacterium tuberculosis, in that temperature range there is an optimum temperature that allows the bacteria to grow rapidly. Mycobacterium tuberculosis is a

mesophilic bacteria that thrives in the range of 25 ° C - 40 ° C, but at 31 ° C - 37 ° C it will grow optimally[6].

Knowledge is the result of human sensing or the result of knowing someone about something through their senses. Knowledge plays an important role in forming one's actions. Behavior based on knowledge will be longer than that which is not based on knowledge[7]. Knowledge in this study is knowledge about pulmonary tuberculosis (TB).

The results of the study of 60 respondents indicated that the level of knowledge of patients and non-tuberculosis (TB) patients was good. The Chi Square test results showed that knowledge with the incidence of pulmonary TB in women did not have a significant relationship.

The research obtained results (p = 0.019 and OR = 0.107) which means that there is a relationship between knowledge and the presence of Mycobacterium tuberculosis in the air in his house. The results of this study indicate that there is no relationship between knowledge and incidence of pulmonary TB in women , but knowledge still plays a role in the transmission of pulmonary tuberculosis (TB). This happens because knowledge influences one's actions in clean and healthy lifestyle as an effort to prevent transmission of pulmonary tuberculosis (TB)[8].

Attitude is a reaction or response of someone who is still closed to a stimulus or object. Attitude is not yet an action or activity, but it is a tendency to accept or refuse to take an action in a behavior[7].

The results of the study of 60 respondents showed that patients and non-tuberculosis (TB) sufferers had a positive or good attitude in an effort to prevent transmission and treatment of pulmonary tuberculosis (TB). While the Chi Square test results show that the attitude and presence of Mycobacterium tuberculosis in the air do not have a significant relationship.

Attitudes are very important in an effort to prevent pulmonary tuberculosis (TB), a good attitude will allow someone to have good actions. Attitude is the second stage after knowledge. The attitude is shown by someone's interest to be willing to take an action[7].

Attitudes are not taken from birth but are learned and formed from experience and practice throughout one's development. The formation of a person's attitude is influenced by several factors, including personal experience, culture, other people who are considered important, mass media, educational institutions or institutions and religious institutions, and emotional factors in individuals[9].

The practice is the manifestation of attitude into a real action or activity that requires supporting factors in the form of facilities and support from various parties so that the practice can be realized. This is because an attitude does not automatically manifest in an action (overt behavior)[9].

The results of the study of 60 respondents, most of them showed good action. These results indicate that pulmonary tuberculosis (TB) sufferers are still not paying attention to clean and healthy living practices that can prevent the occurrence of Mycobacterium tuberculosis in the air which is the cause of pulmonary tuberculosis (TB). While the Chi Square test results show that the action and presence of Mycobacterium tuberculosis in the air has a significant relationship, besides that the Odds Ratio (OR) value is 0.080, which means that the respondents who have a bad action 0.080 times the risk of Mycobaterium tuberculosis in the air in the environment his house.

Actions (practices) related to disease include practices in preventing and curing diseases. The results of this study indicate that the majority of respondents both the case group and the control group had actions that tended to be bad even though they had shown a positive or good attitude in an effort to prevent transmission and treatment of pulmonary tuberculosis (TB)[10]. The respondent's practice that were still poor were caused by respondents being lazy and busy working especially in terms of cleaning the house such as mopping with disinfectants and cleaning spiderwebs on the walls and ceiling. There were still many respondents who did not cover their mouths when they sneezed or coughed and did not use masks during their daily activities on the grounds of being hot and uncomfortable. Just as respondents in the case group, which made the actions of the control group respondents still poor. In addition, they also do not limit contact with pulmonary tuberculosis (TB) patients.

Conclusion

From the results of the study it can be concluded that:

1. Based on the results of the analysis of the chi square test, the results showed that the behaviors that included knowledge, attitudes and actions related to the incidence of pulmonary TB in women in the Banyu Urip Health Center Working Area in 2018 were practice.

2. Based on the results of the chi square test analysis that the temperature is related to the incidence of pulmonary TB in women in the Banyu Urip Health Center Working Area in 2018.

Conflict of Interest: All authors have no conflicts of interest to declare.

Source of Funding: This is an article "Relationship between Temperature and Behavior with Pulmonary TB Incidence in Women in the Banyu Urip Health Center Surabaya, Indonesia" of Environmental Health Department that was supported by Faculty of Public Health, Airlangga University.

Ethical Clearance: The study was approved by the institutional Ethical Board of the Universitas Airlangga Faculty of Dental Medicine Surabaya, Indonesia.

Reference

1. Dinas Kesehatan Kota. Profil Kesehatan Provinsi Jawa Timur tahun 2016. Surabaya; 20017.
2. WHO. Global Tuberculosis Report. Geneva; 2018.
3. Leao SC FP. History, In : Palomino, Leao, Ritacco, editors. Tuberculosis 2007 From Basic Science to Patient Care, 1st edition. Antwerp - Sao Paolo Buenos Aires Emma Raderschadt. 2007;25–48.
4. Muslih et. al. Faktor-Faktor yang Berpengaruh terhadap Kejadian Tuberkulosis pada Wanita (Studi Kasus di RSUD Kabupaten Brebes). J Epidemiol Kesehat Komunitas. 2018;3 (1):48–53.
5. Permenkes. Peraturan Menteri Kesehatan Republik Indonesia Nomor 1077/Menkes/Per/V/2011 tentang Pedoman Penyehatan Udara dalam Ruang Rumah. Jakarta; 2011.
6. Gould, D., Brooker C. Mikrobiologi Terapaan Untuk Perawat. Jakarta: EGC; 2003.
7. Notoatmodjo S. Pendidikan dan Perilaku Kesehatan. Jakarta: Rineka Cipta; 2003.
8. Widyawatiningtyas N. Hubungan Sanitasi Rumah dan Karakteristik Responden Penderita dan Non-Penderita Tuberkulosis Paru terhadap Keberadaan Mycrobacterium tuberculosis di Udara dalam Rumah (Studi Dilakukan di Wilayah Kerja Puskesmas Bulak Banteng). 2016;
9. Maulana H. Promosi Kesehatan. Jakarta: Penerbit Buku Kedokteran ECG; 2009.
10. Notoatmodjo S. Metodologi Penelitian Kesehatan. Jakarta: Rineka Cipta; 2010.