

Environmental Risk Factors and Behavior Analysis of Pulmonary Tuberculosis in South Pesisir Regency

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ABSTRACT

Pulmonary tuberculosis (TB) is infectious disease that can cause death. This disease is caused by Mycobacterium tuberculosis. This disease attacks the respiratory organs so that the patient will experience a cough in the long term. The suspected cases of Pulmonary TB had increased from 2018 (200 cases) to 2019 (220 cases) at The Public Health Service Center Lumpo, South Pesisir Regency. The purpose of study was to analyze the risk factors for Pulmonary TB in the work area of Lumpo Public Health Service Center. The research method was analytic with case control design. The sample in the study amounted to 72 consist of 36 cases and 36 controls. The dependent variable was the incidence of pulmonary TB. The independent variables consist of environmental factors (occupancy density) and behavior factors (the habit of throwing sputum any place and smoking habit). The research was conducted by collecting primary and secondary data. The data were analyzed with univariate and bivariate analysis. Statistical test used chi-square test with SPSS application. It showed that the occupancy density (p-value=0.004 and OR=6.476), the habit of throwing sputum any place (p-value=0.000 and OR=16.333), and Smoking habit (p-value 0.000 and OR 0.361) were significant with Pulmonary Tuberculosis at Lumpo Public Health Center, South Pesisir Regency in 2020. It can be concluded that environmental and behavioral factors were risk factors that related with Pulmonary Tuberculosis disease.

Keywords: Tuberculosis, Occupancy density, Throw sputum anyplace, Smoking

1. INTRODUSE

Pulmonary TB disease is transmitted through coughing and sneezing droplets from patients who have positif TB bacteria. The bacteria has sell membrane, acid resistance, and slow growth. It is not resistant to UV rays so it often infects at night. [1]

Based on World Health Organization (WHO) stated Pulmonary Tuberculosis is the main cause of death in the infectious disease group. Global data in 2019 states that the most TB sufferers are in Souteast Asia (44%). Indonesia is the second highest country with the most TB cases from all over the world. [2]

Indonesia has 420.994 cases of pulmonary TB in 2017. The prevalence of smear positive pulmonary TB is 257 cases per one hundred population aged 15 years and over. The target of finding smear positive cases (CDR) which is 43% in Sumatera Barat. In the period 2017-2018, South Pesisir Regency has found 956 suspected cases of TB in 2018, and there were only 936 cases in 2017. [3]

Lumpo Public Health Center is located in the work area of the South Pesisir Regency, which is one of the areas with a small population, but more cases of positive smear pulmonary TB are found. Based on data obtained from TB program holders at the Lumpo Public Health Center, suspected cases of Pulmonary TB has increased from 2018 until 2019. There were 200 suspected cases and 220 cases. Although TB is not among the 10 most common diseases at Lumpo Public Health Center, the number of positive smears and x-ray results has increased from 2018 until 2019. Lumpo public health center found 34 cases positive TB in 2019.

According to Bloom's theory, a person's health is influenced by behavior, environment, genetic, and health care factors. Risk factors for pulmonary TB disease according to Notoadmodjo (2012), namely conditions that allow a mechanism for the relationship between a disease agent and the host and humans, there are two kinds of TB risk factors, namely factors originating from the organism itself, namely intrinsic risk factors, including gender, age

and malnutrition, and then risk factors originating from the environment or extrinsic factors, and smoking habits are risk factors for tuberculosis. [4]

Based on Amelia's research, (2018) there were risk factors between occupancy density (p-value = 0,027) and smoking behavior (OR = 2,776) with pulmonary TB disease. [5] Yigibalon's research found the habit of throw sputum carelessly was risk factors for incidence pulmonary TB, with p-value<0.05 and Odd ratio value with of 4,7 with a 95% CI of 2,008-11,236. [6]

Based on the background, the researcher did research about the related risk factors of Pulmonary Tuberculosis disease at South Pesisir Regency in 2020".

2. METHODS

This research method was an analytic with retrospective approach (case control), to examine relation between exposure and disease. [7] The research subjects were patients with pulmonary tuberculosis who were taken from the medical records of the Lumpo Public Health Center. The case sample was pulmonary tuberculosis patients with sputum BTA (+), which was recorded in the medical record data in 2019 and aged > 15 years. The control sample was a healthy population who did not have clinical symptoms of pulmonary tuberculosis

The sample was found by accidental sampling technic for the case group. The control group found by convenience sampling, patients who were not patients with pulmonary TB who were approximately 10 meters from the pulmonary TB patient's house. Data analysis was carried out univariate (descriptive) and bivariate (relationship) with X2 test (Chi Square) with confidence level = 0.05 with Confidence Interval (CI) = 95%. The were three independent variable such as occupancy density, the habit of throwing sputum anyplace, and smoking habit. The dependent variable was Pulmonary Tuberculosis incidence.

3. RESULTS AND DISCUSSION

The age group of respondents is mostly in the age group 41-60 years with a percentage of 45.65% and the age group at least is 61-80 years with a percentage of 13.04%. There are more female respondents than female respondents. The percentage

of respondents with female sex is 61.9% and the percentage of respondents with male sex is 39.1%.

3.1. Risk Factor of Occupancy Density for Pulmonary Tuberculosis

The Occupancy density was the risk factor for pulmonary TB that have p-value=0.004. From the results analysis also obtained the value of OR = 6.476; 95% CI = 1.78-23.44, which means that people who live in densely populated areas have a 6.4 times chance to suffer from pulmonary tuberculosis compared to those who live in areas healthy house.

Table 1. The Bivariate Analysis

Occupancy Density	Pulmonary Tuberculosis Cases				Total		P-value	OR (95%CI)
	Kasus		Kontrol					
	f	%	f	%				
<8m ² /person	25	69,4	10	27,8	35	48,6	0,004	6,476
≥8m ² /person	11	30,6	26	72,2	37	51,4		
Total	36	50,0	36	50,0	72	100		

The density of occupancy (p-value = 0.008) was significant with the Pulmonary Tuberculosis at the Lumpo Public Health Center, South Pesisir Regency in 2020. The value of Odd Ratio was 6,47, which means that people who live in densely populated areas have a 6.4 times chance to suffer from pulmonary tuberculosis compared to those who live in areas healthy house.

In Kenedyanti's study (2017), he found that all patients with pulmonary tuberculosis had density of house occupancy. [8] The results of the analysis in Tobing's research found that the density of occupancy risked 3,3 times for suffer from pulmonary tuberculosis. [9] Faizal's research (2017) stated that there was risk factor between housing density and tuberculosis. [10]

Based on the report of the Indonesian Ministry of Health, the occupancy of density can be known from ratio of the area with the number of occupants in bedroom, which is at least 8 m2/person. (11) The more the number of residents, the faster the air in the house will be polluted. The bedroom is recommended to be occupied by no more than one person with an area of 10m², except for children under 5 years of age. This is because the population is growing faster than the number of houses, so most people or families are forced to live together in

one house with other families (3 or 4 families in one house). The presence of pulmonary TB sufferers in the house with a fairly high density, then the transmission of the disease through the air or "droplets" will occur more quickly. [12]

It was found that the number of residents ranged from 3-8 people, the floor area of the house owned by the respondents ranged from 35-72 m². Each house is occupied by an average of 4 people. If one family member is infected with TB, it will be easy to transmit it to other family members, especially to vulnerable groups such as infants and toddlers.

3.2. Risk Factor of the Habit of Throwing Sputum Anyplace for Pulmonary Tuberculosis

The habit of throw sputum any place was risk factor for the pulmonary tuberculosis. The p-value is 0.001 (p < 0.05), which means that occupancy density has a significant relationship with pulmonary tuberculosis at South Pesisir in 2019. The value of OR = 16.33; 95% CI = 3.06-87.18 showed that people who throw sputum anyplace have 16.3 times the possibility of suffering from pulmonary tuberculosis compared to people who dispose of sputum in place.

Table 2. The Bivariate Analysis

The Habit of throw sputum	Pulmonary Tuberculosis Cases				Total		P-value	OR (95%CI)
	Kasus		Kontrol		f	%		
	f	%	f	%				
Any place	21	58,3	13	36,1	34	47,2	0,001	12,96
In place	15	41,7	23	63,9	38	52,8		
Total	36	50,0	36	50,0	72	100		

The results showed that the habit of throwing sputum carelessly was associated with the Pulmonary TB (p-value < 0.05). The odd ratio value was 12.96, which means that the probability of pulmonary TB occurring in the habit of throwing phlegm indiscriminately does not meet the requirements about 16.3 times higher than the habit of throwing sputum anyplace.

Suluh (2012) has found that the habit of removing sputum was associated with the increased spread of pulmonary Tb. The risk of someone who disposes of sputum carelessly is 53,5 times more likely to develop pulmonary TB. The p-value obtained in his research was 0,001. Manangsang (2016) has found that the

attitudes and action throw sputum carelessly were risk factor to the transmission of pulmonary TB in Jayawijaya Regency. [13]

Mycobacterium tuberculosis can survive in the air for few hours for 20-30 hours. When someone coughs and throws sputum that contain BTA+ carelessly, it will cause other people to be infected with TB Bacteria. This can potentially infect a person if the droplets are inhaled and enter the respiratory tract. If a patient with pulmonary TB disposes of phlegm in any place, for example in the house or outside the room, it is disposed of in a can that has been given lysol or without lysol, then with the appropriate temperature and humidity conditions it can survive and multiply, the bacteria will still exist in the environment, and at any time can infect. Bacteria will die if they are in an environment with a temperature of 60C for 15-20 minutes or a temperature higher than 600C, also if exposed to direct sunlight for 2 hours. [11]

To avoid transmission of pulmonary TB disease, it is need to avoid contact between healthy people and the sputum removed by the patient. The patient's behavior in terms of removing phlegm can be changed by throwing phlegm in cans or certain places with lysol, and always drying in the sun. Sleeping equipment under the sun, as well as cleaning the surrounding environment so that the transmission of pulmonary TB can be decided. [14]

3.3. Risk Factor of Smoking for Pulmonary Tuberculosis

Smoking variable was found as the risk factor with the pulmonary tuberculosis disease (p-value = 0.023). The value of OR = 16.66; 95% CI = 3.65-106.18 which means that people who has smoking habits have 16.6 times more suffer from pulmonary tuberculosis compare to non-smokers.

Table 3. The Bivariate Analysis

Occupancy Density	Pulmonary Tuberculosis Cases				Total		P-value	OR (95%CI)
	Kasus		Kontrol		f	%		
	f	%	f	%				
Smoking	32	88,8	12	33,3	44	61,1	0,023	16,66
Not Smoking	4	11,2	24	66,7	28	38,9		
Total	36	50,0	36	50,0	72	100		

There was related between smoking habit with pulmonary TB. The results of the analysis also obtained the value of OR = 19.66; 95% CI = 3.65-106.18 which means that people with smoking habits

have 19.6 times more suffer from pulmonary tuberculosis compared to non-smokers.

This study was in line with Nurhanah (2010) regarding the factors associated with the tuberculosis disease in the people of South Sulawesi Province. She found there was significant between smoking habits (p -value= 0.002) and the incidence of pulmonary TB. [15] Another research in Bukittinggi also found that smoking habit was related with pulmonary tuberculosis in 2018.

Cigarettes have effect on health because it can increase morbidity from several types of diseases, such as chronic bronchitis, emphysema, heart disease and tuberculosis. [16]

Smoking is the modifiable from chronic disease. Smoking can attack the respiratory tract so that it can be a cause death. The toxins in cigarette smoke can enter the human lungs and lower the body's resistance. Active smokers who smoke at least 7 cigarettes per day will cause TB germs to multiply in the lungs. [17]

4. CONCLUSION

The conclusion of this study showed the occupancy density, the habit of throwing sputum carelessly, and smoking associated with Pulmonary Tuberculosis disease at the Lumpo Public Health Center, South Pesisir Regency, 2020. We must to consider about environment and behavior to avoid pulmonary tuberculosis disease.

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