

Research Article

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## THE RISK FACTORS OF RESIDENTIAL DENSITY AND HABITS OF WASHING THE CURTAINS TO POSITIVE LUNG TUBERCULOSIS PREVALENCE IN BOMBANA DISTRICT

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### Abstract

**Background:** Based on a preliminary survey conducted in Bombana District on new TB smear positive patients, this was carried out by interviews with 15 respondents, the following results were obtained. It was also found that 73.3% of patients who live in the same house exceed the area of the house and 26.6% of patients who have a very decent house as well as ventilation and almost all sufferers who wash their curtains for more than 3 (three) months, around 93.3% and the rest (6.7%) are quite good at washing their curtains.

**Methods:** This research is quantitative method with a case control study approach. Guided interviews were conducted using an occupancy density questionnaire, and the habit of washing curtains for risk factors for the incidence of smear positive pulmonary TB which were traced retrospectively. The population is all tuberculosis patients, both positive and suspected, were recorded in Bombana Regency in 2019. With 77 case samples, each for cases and controls.

**Results:** Occupancy density Chi square test obtained the calculated  $\chi^2$  value = 9.416 and  $\chi^2$  table = 3.841 at  $\alpha = 5\%$  and  $df = 1$ , or the calculated  $\chi^2$  value is greater than the  $\chi^2$  table, namely ( $9.416 > 3.841$ ). This shows that there is a relationship between occupancy density and the incidence of positive smear pulmonary tuberculosis in Bombana Regency. The habit of washing curtains in the chi square test obtained the calculated  $\chi^2$  value = 6.690 and  $\chi^2$  table = 3.841 at  $\alpha = 5\%$  and  $df = 1$ , or the calculated  $\chi^2$  value is greater than the  $\chi^2$  table, namely ( $6.690 > 3.841$ ). This shows that there is a relationship between the habit of washing curtains and the incidence of positive smear pulmonary tuberculosis in Bombana Regency.

**Conclusion:** There is a relationship between the risk factors for occupancy density and the habit of washing curtains to the incidence of positive smear pulmonary tuberculosis in Bombana District.

**Key words:** *Occupancy, Density, Washing, Curtains, Tuberculosis*

## INTRODUCTION

The spread of infectious diseases is still a global health problem that can threaten health and cause death. According to the World Health Organization (WHO) in 2018, the disease is included in the top 10 deadly diseases in the world, one of which is tuberculosis which contributes (2.4%) to all deaths in the world. The five countries with the highest cases are India, China, Indonesia, the Philippines and Pakistan(1).

This situation also occurred in Southeast Sulawesi Province, where the prevalence rate was recorded in 2017 of 2.5 per 1000 population. In 2018, there was a significant increase, where the prevalence rate was recorded at 2.9 per 1000 population, while in 2019 the prevalence rate increased by 3.1 per 1000 population. The increase in the prevalence rate of pulmonary tuberculosis in 2019 is directly proportional to the mortality rate due Tuberculosis, where in 2019 the death rate due to TB disease reached 1.73% (127 cases)(2).

Bombana Regency is an area with a fairly high mortality rate due to pulmonary tuberculosis in the Southeast Sulawesi Province, with the number of cases experiencing a significant increase, which was recorded in 2017, the prevalence rate of TB was 1.29 per 1000 population. In 2018 the prevalence rate decreased by 1.17 per 1000 population. In 2019, there was a significant increase, where the prevalence rate was recorded at 2.36 per 1000 population. Tuberculosis mortality rate in 2019, no less, reaching 4.69%(3).

The case finding of pulmonary tuberculosis every year continues to increase. This is due to various factors including the behavior of the community who do not care about the prevention of transmission of pulmonary tuberculosis and do not know how to behave towards someone who has the disease, so that there is no transmission. Especially families diagnosed with pulmonary tuberculosis must know exactly

what pulmonary tuberculosis is, how it is transmitted and, more importantly, how to prevent it. A person's health behavior is a risk factor for the transmission of pulmonary tuberculosis. Behaviors that are at risk of infection include not opening windows, the habit of not washing or drying curtains and mosquito nets once a week, using eating and drinking utensils together with sufferers, to the habit of spitting in any place. This causes it to be related to the capacity or condition of the lungs of the surrounding community(4). Even the habit of a person not covering his mouth when coughing and people who close their windows during the day are also associated with the transmission of tuberculosis. (5).

The increasing coverage of the discovery of new TB sufferers is evenly distributed in all health centres in Bombana Regency, adding to the anxiety and fear of many TB cases that are found due to the density of the occupancy and the habit of washing curtains against the incidence of positive Acid-Resistant Lung Tuberculosis (BTA) which is a risk factor for the occurrence TB in Bombana Regency.

## METHOD

This type of research is quantitative with a case control study approach. Guided interviews were conducted using an occupancy density questionnaire, and the habit of washing curtains for risk factors for the incidence of smear positive pulmonary TB which were traced retrospectively. The population was all tuberculosis patients, both positive and suspected, recorded in Bombana Regency in 2019, consisting of a case population of 369 people and a control population of 184,201. The number of case samples was 77 people each for cases and controls, the sample was taken using simple random sampling.

## RESULTS

Table 1 shows that most of the respondents have an occupancy density level in the high risk category, namely as many as 82 respondents (53.2%) and 72 respondents (46.8%) the rest are in the low risk category.

Table 2 shows that most respondents have the habit of washing curtains in the low risk category, namely 83 respondents (53.9%), while the remaining 71 respondents (46.1%) are in the high category.

Table 3 shows that of the 82 respondents with high occupancy density categorized as high risk, 51 respondents (62.2%) had smear positive pulmonary tuberculosis and 31 respondents (37.8%) did not suffer from smear positive pulmonary tuberculosis. Meanwhile, of the 72 respondents with a low-risk category of occupancy, 26 respondents (36.1%) had smear positive pulmonary tuberculosis and 46 respondents (63.9%) did not suffer from smear positive pulmonary tuberculosis. The results of data analysis using the chi square test obtained the calculated  $\chi^2$  value = 9.416 and  $\chi^2$  table = 3.841 at  $\alpha = 5\%$  and  $df = 1$ , or the calculated  $\chi^2$  value is greater than the  $\chi^2$  table, namely ( $9.416 > 3.841$ ). This shows that there is a relationship between occupancy density with the incidence of positive smear pulmonary tuberculosis in Bombana Regency. The results of the calculation of the Odds Ratio (occupancy density to the incidence of positive smear pulmonary tuberculosis at a 95% CI), obtained OR equal to 2,911. This means that people with high-risk occupancy categories have a 2,911 times greater risk of suffering from smear-positive pulmonary tuberculosis

than people with low occupancy density categories (95% CI: 1,510-5,610). Because the OR value  $> 1$ , it can be concluded that the occupancy density is a risk factor for the incidence of positive AFB pulmonary tuberculosis in Bombana Regency.

Table 4 shows that out of 71 respondents with the habit of washing curtains in the high risk category, 44 respondents (62%) had smear positive pulmonary tuberculosis and 27 respondents (38%) did not suffer from smear positive pulmonary tuberculosis. Meanwhile, of the 83 respondents with the habit of washing curtains in the low risk category, 33 respondents (39.8%) had smear positive pulmonary tuberculosis and 50 respondents (60.2%) did not suffer from smear positive pulmonary tuberculosis. The results of data analysis using the chi square test obtained the calculated  $\chi^2$  value = 6.690 and  $\chi^2$  table = 3.841 at  $\alpha = 5\%$  and  $df = 1$ , or the calculated  $\chi^2$  value is greater than the  $\chi^2$  table, namely ( $6.690 > 3.841$ ). This shows that there is a relationship between the habit of washing curtains and the incidence of positive smear pulmonary tuberculosis in Bombana Regency. 289-4,731). Because the OR value  $> 1$ , it can be concluded that the habit of washing curtains is a risk factor for the incidence of positive AFB pulmonary tuberculosis in Bombana Regency. 289-4,731). Because the OR value  $> 1$ , it can be concluded that the habit of washing curtains is a risk factor for the incidence of positive AFB pulmonary tuberculosis in Bombana Regency.

**Table 1**  
**Distribution of Respondents Based on Occupancy Density in Bombana Regency**

Occupancy Density	amount	
	n	%
High Risk	82	53.2
Low Risk	72	46.8
amount	154	100

Source: Primary Data, 2020

**Table 2**  
**Distribution of Respondents Based on the Habit of Washing Curtains in Bombana Regency**

Habits of Washing Curtains	amount	
	n	%
High Risk	71	46.1
Low Risk	83	53.9
amount	154	100

Source: Primary Data, 2020

**Table 3**  
**Analysis of Residential Density Risk Factors For Incidence of Positive BTA Lung Tuberculosis in Bombana Regency**

Occupancy Density	TB incidence				amount		Statistic test
	Case		Control		n	%	
	n	%	n	%			
High Risk	51	62.2	31	37.8	82	100	X <sup>2</sup> Calculate = 9,416
Low Risk	26	36.1	46	63.9	72	100	OR = 2,911
amount	77	50.0	77	50.0	154	100	LL-UL = 1,510-5,610

Source, Primary Data, 2020

**Table 4**  
**Analysis of Risk Factors for the Habit of Washing Curtains on the Incidence of Positive BTA Lung Tuberculosis in Bombana Regency**

Habits of Washing Curtains	TB incidence				amount		Statistic test
	Case		Control		n	%	
	n	%	n	%			
High Risk	44	62.0	27	38.0	71	100	X <sup>2</sup> Calculate = 6,690
Low Risk	33	39.8	50	60.2	83	100	OR = 2.469
amount	77	50.0	77	50.0	154	100	LL-UL = 1.289-4,731

Source, Primary Data, 2020

## DISCUSSION

### Occupancy Density

The density of residents in one house will have an impact on the residents. This is unhealthy because in addition to causing a lack of oxygen, if one of the family members is infected with a disease, especially pulmonary TB disease, it will be easily transmitted to other family members.(6). The occupancy density in this study is the ratio of

the floor area to the number of family members in one house. The floor area of a healthy house building must be sufficient for the occupants in it, meaning that the floor area of the building must be adjusted to the number of occupants. Building area that is not proportional to the number of occupants will cause overcrowded. In general, the assessment of occupant density using the minimum standard provisions, namely the density of occupants who meet health requirements is obtained from the quotient

between the floor area and the number of occupants of 8 m<sup>2</sup> / person.(7).

The results of this study indicate that occupancy density is a risk factor for the incidence of positive AFB pulmonary tuberculosis in Bombana Regency, where the OR was 2,911. This also means that people with high occupancy rates in the high risk category have a 2,911 times greater risk of suffering from smear-positive pulmonary tuberculosis than people with low occupancy density. This research is in line with research conducted at the Hutarakyat Sidikalang Health Center, which states that there is a significant effect between dense and non-crowded occupancy on the occurrence of pulmonary tuberculosis  $p = 0.000$  ( $p < 0.05$ ) and Odds Ratio = 5,400(8). This study is also in line with research conducted in the slum areas of Palembang City, which stated that occupancy density is the most dominant variable in the incidence of pulmonary tuberculosis, with an OR value of 6.42.(9).

If this result is analyzed more deeply, it is because a person with a relatively dense occupancy will facilitate the transmission of smear positive pulmonary tuberculosis from one person to another in one house. This happens because the frequency of contact and closeness between one person and another in a densely packed house is getting higher, thus affecting the temperature and humidity in the room. High humidity conditions in the room, causing bacteria to multiply rapidly so that it can increase the risk of disease.

In addition, the density of the occupancy also causes mycobacterium that causes smear positive pulmonary tuberculosis to reproduce more rapidly in the air, because the density of the occupancy can affect the air quality in the house, where the greater the number of residents, the faster the air in the house is polluted, because of CO<sub>2</sub> in the house will quickly increase and will reduce the level of O<sub>2</sub> in the room, occupancy density is closely related to the number of bacteria that cause infectious diseases

The results of this study also showed that of the 82 respondents with high-risk category, 31 respondents (37.8%) did not suffer from smear positive pulmonary tuberculosis. According to researchers, this is more due to other factors including the respondent never having direct contact with the patient and the respondent's good nutritional status so as to increase body immunity. This is in line with the theory which states that good nutrition will increase a person's resistance to infection and disease. A good immune system and antibodies will make a person less susceptible to infection, one of which is smear positive pulmonary tuberculosis. And vice versa if when the body's defense system is disrupted,

This is in line with the theory which states that the spread of smear positive pulmonary tuberculosis will occur more easily in people who live in groups or are densely populated in an environment such as dormitories, groups of school children, among family members in a densely populated house, even among residents in a village. . Occupancy density is one of the requirements for housing health, where the high density of occupancy, especially in the bedroom, will facilitate the transmission of smear positive pulmonary tuberculosis by direct contact from one person to another. In addition, the density of the occupancy can also affect the humidity in the room, where residents who exceed the capacity of the room will increase the room temperature to become hot. This temperature change is due to the process of expelling heat from the human body and coupled with the release of moisture from respiration and evaporation of body fluids through smear positive pulmonary tuberculosis. This will increase the humidity in the room. Humidity in the room is not only influenced by one factor, but by several factors, namely local climate, ventilation conditions, intensity of incoming sunlight and so on.(10).

Meanwhile, of the 72 respondents with a low-risk category, 26 respondents (36.1%) had smear positive pulmonary tuberculosis.



This is due to several factors, one of the strongest factors according to the researchers is the contact history factor. Based on the researcher interview with this respondent, it is known that the respondent has ever lived or is living in the same house with smear positive pulmonary tuberculosis. This respondent lives with the patient when he returns to his hometown. Living in a house with a smear positive pulmonary tuberculosis patient can cause infection. The main source of infection with AFB positive lung tuberculosis is untreated or untreated sufferers, so there needs to be public awareness in adhering to treatment.(11).

This research is in line with the regulation of the Director General of the Indonesian Ministry of Health No. 829 / Menkes / SK / VII / 1999 regarding Housing Health requirements stipulates that the minimum bedroom area is (8) m<sup>2</sup>, and it is not recommended that more than (2) people sleep in one bedroom, except for children under (5) years old. The transmission of smear positive pulmonary tuberculosis occurs due to contact between the patient and other occupants of the house, the possibility of this contact is greater in a house with a densely populated population. Density of occupants is associated with respiratory infections because high occupancy density affects intensive inhalation, which makes it easier for other family members to be transmitted. The high level of occupancy density can cause high levels of environmental pollution. So that the number of morbidity increases.(12).

### **Habits of Washing Curtains**

The habit of washing curtains is the behavior of the community in an effort to keep the house clean, by cleaning curtains or blinds using laundry soap.(13). Curtains may offer a space of privacy, but curtains can also contain harmful bacteria that can transmit various diseases(14).

The results of this study indicate that the habit of washing curtains is a risk factor for the incidence of positive AFB pulmonary

tuberculosis in Bombana Regency, where the OR of 2.469 was obtained. This also means that people with the habit of washing curtains in the high risk category have a 2.469 times greater risk of suffering from smear positive pulmonary tuberculosis compared to people who wash curtains in the low risk category.

This result, if examined more deeply, is due to the habit or behavior of the community using drapery as a mouth cloth. Dirty, unwashed curtains and sputum from TB sufferers can be an intermediary for the transmission of TB disease by mycobacterium tuberculosis. Mycobacterium tuberculosis can last a long time in fabrics at temperatures below 4 ° C, this can be an intermediary vehicle for the transmission of TB disease. However, according to researchers, the main factor of the above cases is actually a history of household contact with patients with pulmonary tuberculosis.

The results of this study also showed that out of 71 respondents with the habit of washing curtains, there were 27 respondents (38%) who did not suffer from smear positive pulmonary tuberculosis. According to the results of interviews with researchers, these respondents had never had direct contact with patients with pulmonary tuberculosis, so there was no transmission by mycobacterium tuberculosis. In addition, there are several other factors that support this respondent not suffering from pulmonary tuberculosis such as good nutrition and the respondent does not smoke so that the respondent's immune system against infection increases.

Meanwhile, of the 83 respondents with the habit of washing curtains in the low risk category, 33 respondents (39.8%) had smear positive pulmonary tuberculosis and 34 respondents (60.7%) did not suffer from smear positive pulmonary tuberculosis. Based on the researcher interview with this respondent, it is known that the respondent had or is currently living in the same house as a smear positive pulmonary tuberculosis

patient. Living in a house with a smear positive pulmonary tuberculosis patient can cause infection. The main source of infection with AFB positive lung tuberculosis is untreated or untreated sufferers, so there needs to be public awareness in adhering to treatment (11).

## CONCLUSION

There is a relationship between the risk factors for occupancy density and the habit of washing curtains to the incidence of positive smear pulmonary tuberculosis in Bombana District. So that It is hoped that the government will be able to facilitate people who will make their houses according to the standards of a healthy house and always maintain the cleanliness of their home environment. One of the ways is to always clean the house curtains, at least once a week.

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