

## The Relationship between Physical Conditions of the House and the Incidence of Tuberculosis

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### ABSTRACT

Tuberculosis is an infectious disease caused by the bacteria *Mycobacterium tuberculosis* which mostly attacks the lungs. To find out the relationship between the physical condition of the house and the incidence of Tuberculosis in the community in Sorimanaon Village, Angkola Muaratais District. This type of research is a quantitative analytic observational study. Positive people with a total sample of 51 people. The sampling technique is by observation, direct measurement of the physical condition of the house, interviews, and other supporting data such as recording situation reports. The results of bivariate analysis on clean water facilities have a relationship with the incidence of tuberculosis,  $p$  value = 0.017, ventilation with  $p$  value = 0.016, house floor with  $p$  value = 0.002, residential density  $p$  = 0.001. There is a significant relationship between the variables of the physical condition of the house with the incidence of Tuberculosis Chi-Square test below 0.5%. Suggestions for this research is the need for counseling about the requirements of a healthy home and clean and healthy living behavior in tuberculosis patients for Angkola Muaratais District, especially Pintu Padang Health Center, the patient's family to conduct an early examination of Tuberculosis so that the incidence of Tuberculosis can be minimized.

#### Keywords:

Tuberculosis, Characteristics of Respondents, Physical Condition of the House

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## 1. INTRODUCTION

According to WHO in the 2017 Global Report on Tuberculosis, 10.4 million cases of Tuberculosis have occurred globally. Tuberculosis is the 10th leading cause of death in the world and global tuberculosis deaths are estimated at 1.3 million patients. Based on the WHO Global Tuberculosis Report [26], the incidence rate of Tuberculosis in Indonesia is 391 per 100,000 population and the death rate is 42 per 100,000 population, while according to modeling based on data from the 2016-2017 Tuberculosis prevalence survey, the prevalence rate in 2018 was 619 per 100,000 population. 2016 was 628 per 100,000 population.

In 2019, based on Indonesia's health profile, North Sumatra Province occupies the 5th position, being one of the provinces that has the highest cases in Indonesia with 20,429 cases. Based on the 2018 District/City Health Profile, the average treatment success rate at the provincial level reached 92.19%, with a breakdown of the recovery percentage of 85.52%, but this has increased by 2.58% compared to 2017 (89.61%). The success rate in 2018 has been able to exceed the national target of 85%. Of the 33 regencies/cities, there are 3 regencies/cities that have not been able to achieve a success rate of 85%, including Medan and with 3,139 cases (21.50%), Mandailing Natal Regency 187 (9.65%), and South Tapanuli Regency 382 (13.66%). [6]. This figure shows that Tuberculosis in North Sumatra, especially in the South Tapanuli Regency area, still has a high number of Tuberculosis cases.

Regional data of Angkola Muaratais Sub-district which is located in the Working Area of Pintu Padang Health Center, South Tapanuli Regency with a working area of 14 sub-districts and villages, namely: Bintuju Village, Huta Tonga Village, Sipangko Village, Holbung, Promise Mauli, Muara Tais I, Muara Tais II, Muara Tais III, Pargumbangan, Pangaribuan, Sorimanaon, Muara Purba Nauli, Huta Tengger, Pasir Matogu, the

number of cases of Tuberculosis sufferers in 2018 was 233 and increased in 2019 to 353 people, increased again in 2020 increased to 660 people and in From January to March 2021, the number of cases of tuberculosis sufferers was 103 people. The initial survey shows that Tuberculosis is among the 10 highest diseases in South Tapanuli Regency. The majority of patients with pulmonary TB at the Pintu Padang Health Center are 70 men, while 37 women are. In addition, pulmonary TB patients at this health center mostly occur in the productive age (15-69 years) as many as 57 people, while the age of 50 years is 40 people, and the age of children is 17 people [20]

The physical condition of the houses of the people of South Tapanuli Regency was found to be not meeting the requirements of a healthy home and there was still a lack of awareness of the community's actions towards Tuberculosis so that Tuberculosis sufferers in the area were included in the high category. In 2020, in Angkola Muaratais District, 6,111 houses were found that did not meet the health requirements of the 14,869 total houses in the area [21].

Based on an initial survey conducted by researchers on April 10, 2021 on 8 TB patients in the working area of the Pintu Padang Health Center, the results of a preliminary study found that five people with soil and damp house floor conditions, one person did not have ventilation at home. . Three of them said that clean water was not available to meet family needs because the number in one family reached 10 people with low economic reasons, they could only meet their daily needs.

## 2. METHOD

The type of research used is an observational quantitative analytic study. The aim is to determine the relationship between the physical condition of the house (clean water facilities, ventilation, floors, and housing density) with the incidence of tuberculosis in the community in Sorimanaon Village, Angkola Muaratais District, South Tapanuli Regency in 2021, where measurements or observations are carried out at the same time on independent variable data. and dependent (once) in one measurement using a questionnaire measuring instrument [7]. To see a picture of each variable consisting of general data covering the characteristics of the respondent, the physical condition of the respondent's house, and the incidence of tuberculosis. These data are displayed in the form of a frequency distribution. To identify the relationship of the independent variables, namely individual characteristics (age, gender, education, and occupation) and the physical condition of the house (clean water facilities, ventilation, floors, and house occupancy density) with the dependent variable the incidence of tuberculosis. The statistical test used is the Chi-Square Test with a degree of confidence of 0.5% [23]

Table 1. Sample distribution

Characteristics of Respondents	F	%
<b>Age</b>		
<15 years old	8	15,7
15-50 years	36	70,6
>50 years	7	13,7
<b>Gender</b>		
Man	20	39,2
Woman	31	60,8
<b>Education</b>		
No school	3	5,9
Elementary School	17	33,3
Graduated from Middle School/Equivalent	8	15,7
High school graduate/equivalent	16	31,4
Graduated D3/PT	7	13,7
<b>Work</b>		
Civil Servants/Retirees	4	7,8
Private Supervisor	1	2,0
entrepreneur	14	27,5
Student/Student	10	19,6
Farmer	6	11,8
IRT	16	31,4
<b>Income</b>		
Low (<UMR Rp2,903,042)	26	51,0
High (>/UMR Rp 2,903,042)	25	49,0
<b>Total</b>	<b>51</b>	<b>100,0</b>

## 3. RESULTS AND DISCUSSION

The supporting facilities for health services at the Pintu Padang Health Center are as follows: 1) Individual health business (UKP) includes: registration, outpatient care, emergency department, pharmacy, MCH and family planning, childbirth and child health, dental and oral health, nutrition, laboratory. 2) Community health efforts (UKM Development) include: mental health, elderly health, community dental health, sensory

health, pulmonary TB, PTM. 3) Essential UKM and public health nursing include: SP2TP, immunization, P2 ARI, P2 TB, P2 Leprosy, P2 Rabies, P2 Diarrhea, P2 Measles, P2 Typhoid, P2 Malaria, surveillance, nutrition, maternal health, child health, family planning, health reproduction, early detection and IMCI, health promotion, PHBS, PSM, UKS. 4) The puskesmas service network and the pasyankes network include: mobile health centers, pasyankes facilities, sub-health centers, and village midwives.

### 3.1. Result

It was conducted to identify the relationship between the independent variables, namely the physical condition of the respondent's house (clean water facilities, ventilation, floors, and housing density) and the dependent variable on the incidence of tuberculosis in the community in Angkola Muaratais District, South Tapanuli Regency with chi-square test at a 95% confidence level.

Table 2. Relationship between physical conditions at home with tuberculosis.

Variable	Tuberculosis Disease				Amount		P value
	No Tuberculosis Patients		Tuberculosis Patients		F	%	
	F	%	F	%			
<b>Clean Water Facilities</b>							
Not eligible	10	19,6	19	37,3	29	56,9	0,017
Qualify	15	29,4	7	13,7	22	43,1	
<b>Ventilation</b>							
No ventilation	11	21,6	20	39,2	27	52,9	0,016
There is ventilation	14	27,5	6	11,8	24	47,1	
<b>House floor</b>							
Not waterproof	6	11,8	21	41,2	27	52,9	0,002
Water proof	19	37,3	5	9,8	24	47,1	
<b>Occupancy density</b>							
< 8m2 2 persons	8	15,7	20	39,2	28	54,9	0,001
8m2 < 2 people	17	33,3	6	11,8	23	45,1	
<b>Total</b>	<b>25</b>	<b>49,0</b>	<b>26</b>	<b>51,0</b>	<b>51</b>	<b>100,0</b>	

Based on the results of the bivariate analysis between the variables covering the physical condition of the respondent's house (clean water facilities, ventilation, floors, and housing density) and the incidence of tuberculosis in the community in Sorimanaon Village, Angkola Muaratais District, South Tapanuli Regency, it was found that:

First, based on the results of the cross tabulation between clean water facilities and the incidence of tuberculosis, it shows that of the 29 respondents who did not meet the requirements, there were 10 people (19.6%) who did not have tuberculosis and 19 people (37.3%) who had tuberculosis. Meanwhile, of the 22 respondents who did not meet the requirements, there were 15 people (29.4%) who did not have tuberculosis and 7 people (13.7%) who had tuberculosis. The results of the Chi Square analysis show that the p value is 0.017 ( $p < 0.05$ ) meaning that  $H_a$  is accepted and  $H_0$  is rejected. These results prove that there is a significant relationship between clean water facilities and the incidence of tuberculosis in the community in Sorimanaon Village, Angkola Muaratais District, South Tapanuli Regency 2021.

Second, based on the results of the cross tabulation between ventilation and the incidence of tuberculosis, it shows that of the 27 respondents who did not have ventilation, there were 11 people (21.6%) who did not have tuberculosis and 20 people (39.2%) who had tuberculosis. Meanwhile, of the 24 respondents who had ventilation, there were 14 people (27.5%) who did not have tuberculosis and 6 people (11.8%) who had tuberculosis. The results of the Chi Square analysis show that the p value is 0.016 ( $p < 0.05$ ) meaning that  $H_a$  is accepted and  $H_0$  is rejected. These results prove that there is a significant relationship between ventilation and the incidence of tuberculosis in the community in Sorimanaon Village, Angkola Muaratais District, South Tapanuli Regency 2021.

Third, based on the results of the cross tabulation between the floor of the house and the incidence of tuberculosis, it showed that of the 27 respondents who were not waterproof, there were 6 (11.8%) who did not suffer from tuberculosis and 21 people (41.2%) who had tuberculosis. Meanwhile, of the 24 respondents who were waterproof, there were 19 people (37.3%) who did not have tuberculosis and 5 people (9.8%) who had tuberculosis. The results of the Chi Square analysis show that the p value is 0.002 ( $p < 0.05$ ) meaning  $H_a$  is accepted and  $H_0$  is rejected. These results prove that there is a significant relationship between the floor of the house and the incidence of tuberculosis in the community in Sorimanaon Village, Angkola Muaratais District, South Tapanuli Regency 2021.

Fourth, based on the results of cross tabulation between residential density and the incidence of tuberculosis, it shows that of the 28 respondents who were  $< 8m^2$  2 people, there were 8 (15.7%) who did not have tuberculosis and 20 people (39.2%) who had tuberculosis. Meanwhile, from 23 respondents with  $8m^2 < 2$  people, there were 17 people (33.3%) who did not suffer from tuberculosis and 6 people (11.8%) who had tuberculosis. The results of Chi Square analysis show that the p value is 0.001 ( $p < 0.05$ ) meaning  $H_a$  is accepted and  $H_0$  is rejected. These results prove that there is a significant relationship between residential density and the incidence of tuberculosis in the community in Sorimanaon Village, Angkola Muaratais District, South Tapanuli Regency 2021 [4].

### **3.2. Discussion**

The results of the analysis of the relationship between the physical conditions of the house include several aspects, namely: clean water facilities for house ventilation, house floors, house occupancy density can be described as follows:

#### **3.2.1. Clean Water Facilities**

This is in accordance with the results [2], that there is a significant relationship between clean water facilities and Tuberculosis, this indicates that there are factors that cause the non-compliance of clean water facilities in the respondent's house affected by tuberculosis. This study is in accordance with research conducted [8], which revealed that there was a significant relationship between clean water facilities and the incidence of tuberculosis. Clean water requirements are regulated by the Regulation of the Minister of Health of the Republic of Indonesia Number 32 of 2017 concerning Environmental Health Quality Standards and Water Health Requirements. Wells are the main source of clean water supplies for people living in rural and urban areas [1]. One of the types of wells used to obtain groundwater is dug wells. In order for dug well water to meet health requirements, it must be protected against the dangers of pollution. The effort that can be done is to pay attention to the construction of wells, which must meet the requirements.

#### **3.2.2. Ventilation**

Air quality in the house is related to ventilation problems and the activities of the occupants in it. The increasing number of residents in urban settlements causes building density and it is difficult to make ventilation and there are even houses that do not have windows, no vents and no sunlight enters, the air in the house feels stuffy. The journey of Tuberculosis germs after being coughed up will be inhaled by the people around them to the lungs, so that good ventilation will ensure air exchange, so that the droplet concentration can be reduced. The concentration of droplets per volume of air and the length of time inhaling the air allows a person to be infected with Tuberculosis germs [10-12].

#### **3.2.3. Floor**

Floors that do not meet the requirements can be used as a place to live and breed bacteria, especially Mycobacterium Tuberculosis bacteria. Making the air in the room humid, in the summer the floor becomes dry, causing dust that is harmful to the occupants. According to the Decree of the Minister of Health of the Republic of Indonesia No. 829/Menkes/SK/VII/1999 concerning Housing Health Requirements, the floor of the house is not made of materials that can grow and develop pathogenic microorganisms, the floor is waterproof and easy to clean [13-14].

#### **3.2.4. House Occupancy Density**

The condition of residential density will affect the air quality in the room. Such as increasing levels of CO<sub>2</sub> in the room so that the supply of O<sub>2</sub> needed by residents in the house is reduced. Density of residents will also affect the transmission of tuberculosis through close contact with tuberculosis sufferers with other residents of the house, so that the risk of contracting this disease is even greater.

## **4. CONCLUSION**

Based on the results of observations, interviews and statistical tests in research with the incidence of tuberculosis in the community in Angkola Muaratais District, South Tapanuli Regency 2021, conclusions can be drawn: 1) There is a relationship between clean water sources and the incidence of tuberculosis in the community in Angkola Muaratais District, South Tapanuli Regency with a value of p value 0.017( $p < 0.05$ ). 2) There is a relationship between home ventilation conditions and the incidence of tuberculosis in the community in Angkola Muaratais District, South Tapanuli Regency with a p value of 0.016 ( $p < 0.05$ ). 3) There is a relationship between the condition of the floor of the house and the incidence of tuberculosis in the community in Angkola Muaratais District, South Tapanuli Regency with a p value of 0.002 ( $p < 0.05$ ). 4) There is a relationship between housing density conditions and the incidence of tuberculosis in the community in Angkola Muaratais District, South Tapanuli Regency, with a p value of 0.001 ( $p < 0.05$ ).

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