

## Correlation of Knowledge Level with Prevention Practice of Tuberculosis Transmission among Household Contacts in Sungai Kunjang Sub-District, Samarinda City

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### ABSTRACT

Household contacts of Tuberculosis (TB) sufferers are significantly at risk of contracting TB because of the proximity and intensity of interaction. TB transmission can be avoided with preventive practices among household contacts. This study aims to analyze the correlation of knowledge level with TB transmission prevention in household contacts of TB sufferers in Sungai Kunjang Sub-District, Samarinda City. This study used an analytical survey design with a cross-sectional approach. The sample of this study, as many as 67 respondents, was taken purposively on household contacts of TB patients. The results of the chi-square test analysis obtained a p-value = 0.239 ( $> \alpha = 0.05$ ). This study concludes that there is no relationship between knowledge variables and variables of TB transmission prevention practices among household contacts of TB sufferers. It is recommended that health workers provide health education about TB transmission prevention practices

## **INTRODUCTION**

Infectious diseases that are a global problem include Tuberculosis (TB) caused by *Mycobacterium tuberculosis*. TB eradication strategies aim to reduce TB incidence and mortality by 90% and 95% by 2035. The WHO strategy will be carried out in conjunction with the SDGs, especially for TB eradication. The target of reducing the incidence and mortality due to tuberculosis is estimated to be 100% achievable through various interventions (World Health Organization, 2022).

Currently, 10.6 million people have suffered from TB worldwide, an increase from previous years. Until now, Indonesia has ranked second in the world (World Health Organization, 2022). The finding of new TB cases in 2022 was 74% or as many as 717,941 cases, lower than the target (85%) (Kemenkes RI, 2022). In 2021, there were 5,306 TB cases in East Kalimantan, and the instances in Samarinda were 1,945 (Dinas Kesehatan Provinsi Kaltim, 2022).

The prevalence of TB in Samarinda City is the highest in East Kalimantan Province, and every year, it increases (Dinas Kesehatan Provinsi Kaltim, 2022). One of the sub-districts that has experienced an increase in new TB cases is Sungai Kunjang Subdistrict. Based on data from four Health Centers in this region, the number of TB cases within six months was 64 from November 2022 to April 2023. The data also illustrates the number of cases that tend to increase from previous years.

The increase in TB cases every year illustrates the high rate of transmission. Risk factors that cause TB transmission include action factors and knowledge factors (Andi Mauliyana & Hadrikaselma, 2021). Several other factors that play a role in the increase in TB cases include factors such as population density and mobility, economic conditions, contact history, home environment, and nutritional status (Pramono & Wiyadi, 2021) (Pramono, 2021). TB transmission is twice as likely in family or household contacts than in ordinary contacts (Kemenkes RI, 2019).

Household contact is defined as the closeness of individuals who live in the same house with TB sufferers (WHO, 2020b). The risk of transmission will significantly increase if inhabited by toddlers, the elderly, someone who has a weak immune system such as people with HIV / AIDS, and unhealthy life actions (Pramono, 2021)

Tuberculosis transmission is high-speed. It is necessary to implement preventive practices for TB transmission, starting with families of household contacts with TB. Individual actions are demonstrated by maintaining the health of oneself, family, community, and physical environment (Sukmawati et al., 2023). Prevention of TB transmission carried out by household contacts is critical so that there is no transmission to other family members (Latif et al., 2023). His knowledge, experience, and attitude influence his actions. Knowledge results from curiosity through the sensory stage, obtained from particular objects' eyes and ears. Knowledge is essential in forming an open action or behavior (Pakpahan et al., 2021).

This study aims to analyze the correlation of knowledge with TB transmission prevention practices in household contacts of TB sufferers in Sungai Kunjang Sub-District, Samarinda City.

## **THEORETICAL REVIEW**

### **Tuberculosis Transmission**

Mycobacterium Tuberculosis is a cause of TB transmitted through sputum splashes when TB sufferers actively cough or sneeze. TB attacks especially the lungs but can develop in other organs (Adigun Rotimi, 2020; William R. Bishai, 2017). Along with the cycle of infectious diseases, certain conditions can transmit tuberculosis, namely due to the presence of agents (causes of disease), places where germs live, the outside environment as a place of survival, people who are susceptible to exposure to disease, and the mechanism or mode of transmission (Floyd et al., 2018; Samal, 2016).

Tuberculosis contact is when a person is in close contact with people with active tuberculosis. A household contact is someone who lived in a household with an index case for one or more nights or frequent or extended daylight periods for three months before the current illness (WHO, 2020b). Assuming that each patient has at least three close contacts, such as in their home, and that the prevalence of active TB among close contacts is 2.5%, the number of identifiable initial TB cases among close contacts is at least 300,000 per year. Prevention of transmission with reasonable practices will reduce further transmission (WHO, 2020a).

### **Knowledge**

Knowledge is the result of sensing knowledge underlying action towards the problem at hand (Pakpahan et al., 2021). Adequate knowledge about TB and its prevention and treatment in the community is necessary to end TB (Floyd et al., 2018). Knowledge about tuberculosis is inseparable from the role of health workers who provide health counseling, the role of health cadres in accompanying and helping with various health problems, and multiple media information about the socio-demographic conditions of respondents (Datiko et al., 2019).

Bloom's taxonomy (Mohan, 2019) mentions the level of knowledge as follows: Know means remembering what has been learned and received, which is the lowest level. Understanding is the ability to explain and interpret what is known accurately. Application is a person's ability to understand a material or thing to use or to apply familiar principles to real-world situations and situations. Analysis is a person's ability to break down separate data or objects into interrelated components following a problem. Synthesis is the human ability to blend or blend the parts of something into a new form. Assessment is a person's ability to evaluate specific data or objects. Create is the most complex stage of the learning process, and it is at the top of Bloom's Taxonomy, which has been revised.

Knowledge changes people's attitudes and skills in performing actions; according to Lawrence Green's theory (1980), good knowledge will change how a person thinks and encourages them to act. In addition, it is mentioned that

attitudes and actions are related to motivation because knowledge shapes a person's values and beliefs, which help them make the right decisions and policies. The knowledge that will influence a person's attitude shapes actions. This aspect of mentality has to do with what a person considers proper and their readiness to take action to react to a particular environment as an objective response (Notoatmodjo, 2014),

### **Health Practices**

Health practices are defined as efforts to maintain and maintain health status to avoid various diseases and to cure diseases. Lawrence Green suggests that a person's actions are influenced by individual and environmental factors, including age, education level, family income, family support, and cultural values (Pakpahan et al., 2021). Reasonable preventive practices will reduce transmission among household contacts of sufferers so that new TB cases can be suppressed (Putra et al., 2019). Changes in action begin with an awareness of the dangers of TB disease and the importance of preventing its transmission, according to the theory of planned behavior (TPB). Based on the SDGs, the action to prevent TB transmission can be predicted from the intention to prevent TB transmission. In contrast, the intention is influenced by the attitude of action (attitude toward a behavior), subjective norms, and perceived action control (perceived behavioral control/PBC) (Abbasi et al., 2021).

## **METHODOLOGY**

The design of this study is an analytical survey with a cross-sectional approach. The population in this study is families of TB patients who are household contacts of TB patients in Sungai Kunjang Sub-District. Based on data from four health centers in this region, as many as 67 TB patients were obtained, which estimated the number of household contact families with TB to be around 3-5 people. The sampling method used is a total sampling of inclusion criteria: 1) Families living in the same house as TB patients; 2) Able to read and write; 3) Willing to be a respondent, and 4) Age > 15 years.

Questionnaires are used as data collection instruments containing questions to obtain information from respondents. The data were analyzed using univariate methods to determine frequency distribution and bivariate with a chi-square test to determine the correlation between variables with a significance level of 95%.

## **RESULTS**

### **Univariate Analysis**

Table 1 illustrates the characteristics of household contacts of TB patients in Sungai Kunjang Sub-District in 2023 based on the most age are adults (40.3%), and more than half (52.2%) are women. Most jobs are housewives (32.8%), while the education level is dominated by Senior high school (47.8%). All respondents had experienced close contact with TB patients between one and six months, and the longest had been in contact for three months (26.87%).

Table 1. Characteristics of Household Contacts of TB Patients

Characteristic Household Contact	n=67	
	n	%
<b>Age</b>		
Adolescent	17	25.4
Adult	27	40.3
Elderly	23	34.3
<b>Gender</b>		
Male	32	47.8
Female	35	52.2
<b>Work</b>		
Housewives	22	32.8
Private Employees	14	20.9
Student	1	1.5
Not Working	16	23.9
Businessman	12	17.9
Farmer	2	3.0
<b>Education</b>		
Primary School	7	10.4
Junior high school	11	16.4
Senior High School	32	47.8
College	17	25.4
<b>Length of Contact</b>		
One month	9	13.43
Two months	10	14.93
Three months	18	26.87
Four months	12	17.91
Five months	10	14.93
Six months	8	11.94

Source: Primary Data Analysis, 2023

Table 2 shows respondents' level of knowledge about preventing TB transmission in household contacts. Most (73.1%) were good, and more than half (50.7%) of respondents had reasonable practices.

Table 2. Knowledge and Prevention Practices of TB Transmission

Variable	n=67	
	n	%
<b>Knowledge</b>		
Less	18	26.9
Good	49	73.1
<b>Practices Prevention</b>		
Less	33	49.3
Good	34	50.7

Source: Primary Data Analysis, 2023

### Bivariate Analysis

The analysis using chi-square obtained a p-value = 0.239 greater than  $\alpha = 0.05$ , which means there is no correlation between knowledge variables and TB transmission prevention action variables in household contacts of TB patients in Sungai Kunjang Sub-District.

Table 3. Correlation of Knowledge Level with TB Transmission Prevention Practices in Household Contacts of TB Sufferers

Knowledge	Prevention Practices				Sum		p-value
	Less		Good		n	%	
	n	%	n	%			
Less	11	16.42	7	10.45	18	26.87	0.239
Good	22	32.84	27	40.30	49	73.13	
Sum	33	49.25	34	50.75	67	100	

## DISCUSSION

### Characteristics of Respondents

The study's results found that the characteristics of household contacts of TB sufferers based on the most age are adults, productive age. The results of this study are similar to previous studies (Baedowi et al., 2022). Age describes a person's physical and mental development and maturity (23). A certain age level has a risk of transmission of tuberculosis, especially susceptibility in infants to toddlers and the elderly. Productive age shows a person's mobility in daily activities such as work, school, and social and religious activities. As a result of high mobility levels, the risk of exposure to various health problems is also higher. (Loh et al., 2023). The productive age group usually has activities and interactions with others more often, so the possibility of exposure to various infections is higher, including TB. Conditions are more risky if they have other risk factors such as decreased immunity levels, health problems, poor nutrition, and poor healthy living actions such as smoking.

The prevalence of TB, in general, is more prevalent in males (Azura Putri et al., 2022); activities outside the home are indeed mostly done in men, so the possibility of exposure to various infectious diseases is higher (Mariana & Chairani, 2018). Active and passive smoking tends to reduce endurance, especially susceptibility to the respiratory tract (Mathofani & Febriyanti, 2020).

The characteristics of household contacts of TB sufferers based on education in this study are primarily high schools. Similar results were obtained regarding the attributes of most TB sufferers' household contacts who are highly educated (Nopita et al., 2023). The level of education indirectly shapes understanding and actions to carry out the prevention of transmission of various diseases, especially TB. Broader insight and the ability to absorb knowledge from various information encourage better behavior (Puspitasari et al., 2022). Conversely, a low level of education illustrates a lack of ability to understand and digest various details on health (Muaz, 2014). Homemakers are generally more at home and interact more often with TB sufferers, so the risk of transmission is higher (Karbito et al., 2022).

Based on this study's results, the length of contact interacting with TB patients was mainly three months, from 1 to 7 months. Someone who lives in the same house with Pulmonary TB sufferers for a long time and with communication intensity is more often at high risk of contracting TB than those who do not live in the same house.

### **Knowledge of Household Contacts of TB Patients**

The study results found that the knowledge of preventing TB transmission in household contacts of TB sufferers in Sungai Kunjang Sub-District in 2023 is primarily good. This study's results align with research conducted previously in several countries (Bashorun et al., 2020) but are higher when compared to the results of research in nine cities in India, which is only 52.5% (Huddart et al., 2018). Similarly, in Ethiopia, it was only 51.9% (Madebo et al., 2023). While some research results in Indonesia also show good knowledge. For example, in Bulungan district, 74% (Kartini et al., 2023) and in Martapura, 86.7% of family members understand the prevention of TB transmission (Maria, 2020).

Good knowledge means having a reasonably good insight or understanding of prevention efforts. Generally, knowledge is obtained from various sources, such as health workers, health cadres, information media, and even families or other communities. Good knowledge also changes attitudes and fosters motivation from respondents for TB prevention (Kaka et al., 2021)—knowledge is a basis for shaping one's attitudes and behavior. A good understanding of TB transmission and the dangers of the disease should shape attitudes and actions in efforts to prevent TB transmission.

### **Practices for Transmission of Household Contacts of TB Patients**

The study results found that the practices most effective in preventing TB transmission in household contacts of TB sufferers in Sungai Kunjang Sub-District in 2023 are reasonable. Previous research has suggested barriers to compliance with contact prevention due to low awareness (Asemahagn et al., 2020). The results of a prior study at the Martapura II Health Center found that 83.3% of respondents had reasonable TB transmission prevention practices (Maria, 2020). However, the results of the survey at the Pimping Health Center were found to be lower, showing that 63.0% of respondents had suitable prevention practices for tuberculosis transmission (Kartini et al., 2023).

Knowledge of family members in preventing transmission of TB to household contacts is needed as a basis for preventive practices. In this case, it is action. However, not all families with good knowledge are willing and able to properly decide on practices to prevent transmission of household contact TB.

### **Correlation of Knowledge with TB Transmission Prevention Practices in Household Contacts of TB Patients**

There is a risk of transmission of tuberculosis to close relatives and household contacts, and each index case can infect 10 to 15 people per year (Hossain et al., 2022)—one of the factors that shape the action of the level of knowledge. Knowledge plays a vital role in preventing disease transmission and early detection of suspected TB symptoms. Nevertheless, the results of the analysis Chi-Square show a value  $p = 0.239$  ( $p\text{-value} > \alpha=0.05$ ), which means that

statistically, there is no correlation of knowledge with TB transmission prevention practices in household contacts of TB sufferers in Sungai Kunjang Sub-District.

Similar studies have shown results are in line with studies in Myanmar, where most respondents have lower secondary education and low knowledge of TB (Aung et al., 2023). An evaluation study of TB clinical examination in South Africa identified a gap in knowledge about TB (Kigozi et al., 2018), while other studies have the opposite (Onyango et al., 2020).

The results of this study are also in line with the research conducted by Kaka et al. (2021), which states that there is no significant relationship between the level of family knowledge and preventive practices for TB disease transmission with values ( $p = 0.051$ ,  $r = -0.359$ ) (Kaka et al., 2021). However, the results of this study are not in line with the research conducted by Kartini et al. (2023), which states that there is a significant relationship between knowledge and preventive practices for tuberculosis transmission among families with a p-value of 0.004 ( $< 0.05$ ) (Kartini et al., 2023). The same research by Susanto et al. (2020) states that there is a relationship between knowledge ( $p$ -value = 0.002) and attitude ( $p$ -value = 0.024) against tuberculosis prevention practices in the Working Area of the Kedaton Bandar Lampung Health Center in 2023 (Susanto et al., 2023).

Knowledge and awareness of TB risks motivate people to seek health care when experiencing TB symptoms. Poor knowledge about TB and its transmission and impact tends to behave poorly when seeking treatment (Salame et al., 2017). The delay in TB examination and diagnosis is currently still high. This condition is due to the low public knowledge and awareness of utilizing service facilities. Therefore, increasing understanding and improving prevention practices is necessary (Teo et al., 2020).

Everyone wants a healthy life to avoid all health problems. Health workers should provide health promotion and direct practice on tuberculosis prevention to family members, especially those at risk of contracting TB. Good support from health workers will improve TB attitudes and prevention practices (Pakpahan et al., 2021).

Factors influencing healthy living attitudes and actions include experience, beliefs, social facilities, and motivation. Action is also a form of the existence of desired needs. Someone who knows is not necessarily willing and able to behave well. Many factors influence a person in determining his decisions, especially in behavior.

## **CONCLUSIONS AND RECOMMENDATIONS**

The study found no correlation between knowledge variables and variables of TB transmission prevention practices among household contacts in Sungai Kunjang Sub-District, Samarinda City. The results of this study can be used to evaluate health workers and provide education with simulation methods or direct practice so that family members can directly implement TB transmission prevention among household contacts.

## **FURTHER STUDY**

Future research should be aimed at the role of health workers in community-based active case finding.

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