

# Tuberculosis

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# Family Health Tasks to Prevent the Transmission of Pulmonary Tuberculosis in Kupang City, East Nusa Tenggara Province, Indonesia

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## Abstract

**Background:** Tuberculosis (TB) is a chronic infectious disease that causes morbidity and mortality. Family members who lived in the same household with Pulmonary TB Patients have a greater risk of getting an infection. **Aims:** The study aimed to analyze the relationship between family characteristics and family health tasks in preventing TB disease in Kupang City, East Nusa Tenggara Province, Indonesia. **Setting and Design:** This study used a cross-sectional design. **Methods and Material:** The sample of the study was 28 families who had a positive TB diagnosis living in the same household. **Statistical analysis:** The Spearman rho correlation test was used to figure out the relationship between family characteristics and family health duties in preventing TB disease. **Results:** The study indicated that the family health care tasks showed that knowing the tuberculosis issue accounted for 85,7% at a good level, 100% of the family had good ability to make a good decision regarding tuberculosis, 71,4% of the family were at sufficient level to take care TB patients and to manage the healthy environment and utilizing health facilities was 100% good. The age of the head of household had a significant relationship to recognizing problems, deciding on appropriate actions, caring for the sick, utilizing health facilities, and modifying the environment to reduce TB transmission. Meanwhile, the occupation of the head of the family, family income, number of family members, and type of family influenced the ability to make the right decision and utilize health facilities. Furthermore, the level of family independence and the stage of family development had a strong correlation to the ability of the family to decide the right action, to take care of family members, modify the environment for prevention and utilize health service facilities. **Conclusion:** In conclusion, there is a significant relationship between family characteristics and family health tasks in the prevention of tuberculosis transmission.

**Keywords:** family characteristics, family health tasks, pulmonary tuberculosis, prevent transmission

**Key Messages:** Family plays an important role to prevent tuberculosis transmission and treatment. Therefore, it is crucial to increase family members and involve them in taking care of the TB patients.

## Introduction

Pulmonary tuberculosis (Pulmonary TB) is a chronic and direct infectious disease that contributes to high morbidity and mortality rates in the community. It is estimated that one-third of the world's population is infected and 2.5 million people die each year. The number of new TB cases in Indonesia was 569,899 in 2019<sup>1-3</sup>. It is predicted that it will continue to increase due to ineffective prevention behavior and drop-out of TB treatment<sup>4</sup>. The Indonesian Basic health research (2018) illustrated that 0.3% of the people of East Nusa Tenggara are diagnosed with TB, 8.8% have TB symptoms with cough symptoms > 2 weeks, and 4.0% have symptoms of pulmonary tuberculosis with symptoms of coughing up blood<sup>1</sup>

Pulmonary TB is transmitted through the air from one person to another. When a person with TB disease coughs, speaks, and sneezes, the bacteria are put in the air and then people nearby will breathe in these bacteria and become infected. Pulmonary TB patients are the main source of transmission. The Quickest source of transmission is sputum sparks containing positive acid-resistant bacilli (BTA) released by pulmonary tuberculosis patients. One cough is estimated to be 3000 sputum sparks<sup>5</sup>. Therefore, it is accepted that someone who has the closest contact with Pulmonary TB Patients (PTB) is at the highest risk for disease transmission<sup>5</sup>. Families who live in the same house are at twice the risk of being infectious. A previous study stated that 100% of respondents (12 TB Patients) had symptoms of pulmonary tuberculosis after contact and lived at home with PTB patients.<sup>6-9</sup>

Family members are a high-risk group for transmission if preventive behavior is not implemented properly in the family. The risk also increases if the person who has a cough does not cover his mouth with a handkerchief. Tuberculosis bacteria can survive in the air for a very long time until they are inhaled through human respiration and can only die by exposure to direct sunlight. Family members are in the high-risk group for pulmonary TB transmission, especially vulnerable groups such as toddlers and the elderly as well as groups with comorbidities such as HIV and DM. In patients with comorbidities such as HIV / AIDS, a low immune system causes the patient to be easily infected by tuberculosis bacteria. Therefore, the family members play important roles to prevent TB transmission and need to practice the preventive measures consistently at home. Families are highly expected to be the main actors to reduce the risk of pulmonary TB transmission<sup>3,6,10</sup>.

The Indonesian government, through the Ministry of Health, has established a healthy Indonesian program with a family approach that aims to increase the accessibility of people to health services<sup>11</sup>. The program has 12 main indicators, one of which is the effort to control infectious diseases (TB). The main activity of the program is a home visit activity to support the healing process of TB disease in the community, prevent the spread of TB disease, and prevent complications. During the process,

there will be the process of transferring the health providers' roles to the family members to take care of the patients. The family should be able to implement the 5 health family tasks consisting of recognizing the family health problems, making the appropriate decision regarding a health issue, taking care of the family members who are sick, modifying the environment to support the healing process, and utilizing the health facilities in terms of having a health problem or suffering from a disease <sup>12-15</sup>. The purpose of this study was to analyze the relationship between family characteristics and family health care tasks in preventing Pulmonary TB in Kupang City-East Nusa Tenggara Indonesia.

## <sup>5</sup> Subjects and Methods

The study design was cross-sectional. The study was conducted in Kupang, East Nusa Tenggara Indonesia in 2019. The sample size was 28 families. Purposive sampling was used to recruit families, who meet the inclusion criteria: 1) had a positive TB diagnosis living in the same household, 2) one of the family has been infected. Ethical approval was obtained from the Ethics Committee of The Health Polytechnic of Kupang, Indonesia (LB.02.03//0076/2019). Data collection was conducted from January 2019 to Juli 2020 through a set questionnaire. The data were analyzed using the Spearman rho correlation test with a significant level of  $p < 0.05$  and 95 % confidence intervals.

## Results

The result of this study indicated that most of the head of the family household was over 40 years old (57.1%), the occupation of the head of the family was 42.9% farmers, the family income was 57.1% less than 1 million rupiahs, 71.4% family were categorized as an extended family which consists of 3-5 people. Regarding the family development stage, 42.9% of families were at the Family with School Children stages and independence level accounted for about 71,4% as Independent family stage 3 (Table 1).

Table 1. Characteristics of families with Pulmonary TB

Characteristics	N	%
<b>Age of The head of household</b>		
31 to 40 years old	12	42,9
more than 40 years old	16	57,1
<b>The profession of The head of household</b>		
Farmers / laborers	12	42,9
Private employees	8	28,6
Civil servants	8	28,6
<b>Family income</b>		
less than 1 million	16	57,1
1 to 2 million	4	14,3
more than 2 million	8	28,6

<b>Type of Family</b>		
nuclear family	8	28,6
extended family	20	71,4
<b>Number of household members</b>		
3-5	20	71,4
more than 5	8	28,6
<b>Family Development Stage</b>		
families with pre-school children	4	14,3
Families with school children	12	42,9
Adult Family	8	28,6
elderly family	4	14,3
<b>Independence family level</b>		
Independent family stage 2	8	28,6
Independent family stage 3	20	71,4

Table 2. Description of family health tasks level in Kupang City, East Nusa Tenggara Indonesia

Family Health Tasks	n	%
<b>Knowing tuberculosis and how it is transmitted</b>		
Enough	4	14,3
Good	24	85,7
<b>Making the right decision of health care for the patient</b>		
Good	28	100,0
<b>Taking care of the family members who suffered from TB</b>		
Enough	20	71,4
Good	8	28,6
<b>Modifying a healthy living environment to prevent transmission</b>		
Less	8	28,6
Enough	20	71,4
<b>Utilizing health care facilities for the treatment</b>		
Good	28	100,0

The findings illustrated that almost all tuberculosis patient families were knowing the tuberculosis issue, it accounted for 85,7% at a good level. 100% of families made the appropriate decision in terms of treatment and related caring practiced for the sufferer; 71,4% of the family were at sufficient level to take care of TB patients and to manage the healthy environment and utilizing health facilities was 100% good (table 2).

Table 3: Statistical analysis of the relationship between family characteristics and family health tasks in preventing transmission of tuberculosis

Variable		Sign (2-tailed)
Age of the head of household	The ability of the family to recognize Pulmonary TB and modes of transmission	0,011
	The ability of the family to make the right decision to prevent disease transmission	0,000
	The ability of the family to take care the TB Patients	0,000

	The ability of the family to modify the environment to prevent transmission	0,000
	The ability of the family to use health facilities	0,000
Occupation of Head of Family	The ability of the family to recognize Pulmonary TB and modes of transmission	0,584
	The ability of the family to make the right decision to prevent disease transmission	0,000
	The ability of the family to take care the TB Patients	0,198
	The ability of the family to modify the environment to prevent transmission	0,345
	The ability of the family to use health facilities	0,000
Family Income	The ability of the family to recognize Pulmonary TB and modes of transmission	0,075
	The ability of the family to make the right decision to prevent disease transmission	0,000
	The ability of the family to take care the TB Patients	0,655
	The ability of the family to modify the environment to prevent transmission	0,655
	The ability of the family to use health facilities	0,000
Number of household members	The ability of the family to recognize Pulmonary TB and modes of transmission	0,185
	The ability of the family to make the right decision to prevent disease transmission	0,000
	The ability of the family to take care the TB Patients	0,035
	The ability of the family to modify the environment to prevent transmission	0,035
	The ability of the family to use health facilities	0,000
Family Type	The ability of the family to recognize Pulmonary TB and modes of transmission	0,185
	The ability of the family to make the right decision to prevent disease transmission	0,000
	The ability of the family to take care the TB Patients	0,121
	The ability of the family to modify the environment to prevent transmission	0,121
	The ability of the family to use health facilities	0,000
Family independence's Level	The ability of the family to recognize Pulmonary TB and modes of transmission	0,274
	The ability of the family to make the right decision to prevent disease transmission	0,000
	The ability of the family to take care the TB Patients	0,000
	The ability of the family to modify the environment to prevent transmission	0,000
	The ability of the family to use health facilities	0,000
Family development stage	The ability of the family to recognize Pulmonary TB and modes of transmission	0,274



	The ability of the family to make the right decision to prevent disease transmission	0,000
	The ability of the family to take care the TB Patients	0,000
	The ability of the family to modify the environment to prevent transmission	0,000
	The ability of the family to use health facilities	0,000

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The result of the spearman rho correlation test showed that the age of the head of household had a statistically significant relationship with the family's ability to recognizing problems, deciding on appropriate actions, taking care of the TB patients, utilizing health facilities for taking care of the TB patients, and modifying the environment to reduce TB transmission; with sign values (2-tailed) less than 0.05. Meanwhile, the work of the head of the family, family income, number of family members, and type of family has a meaning in the ability to decide the preventive measures and utilize health facilities. Furthermore, the level of family independence and the stage of family development have a significant relationship with the ability of the family to decide the right action, the ability to take care of the sick, modify the environment for prevention of transmission, and utilize health service facilities.

## Discussion

Findings indicated that the majority of the family recognized the main causes, signs and symptoms, and the preventive measures of TB. It is because they have been exposed to various information from TB program managers in Public Health centers. The length of time of being diagnosed can make information available that can be obtained from health workers during the visits. Recognizing health problems includes the family's ability to recognize understanding, symptoms, treatment, and prevention of transmission <sup>2,15</sup>. A survey conducted by Marwansyah (2015) pointed out that 62,5% of families have a better understanding of Pulmonary TB. The family accepted that PTB is quite dangerous and needs to be treated properly as standard (13). This is in line with the ability of families to use health facilities and making the right decision for treatment which accounted for 100% and 93,8% respectively. The ability to make decisions is generally influenced by the prominence of the problems felt by the family. The family views health problems based on the urgency and severity that need to be immediately addressed <sup>15</sup>. The results showed that all families had used health service facilities and had OAT.

In contrast with the ability of the family to make the right decision of treatment, the study indicated that the majority of the family's ability to take care of family members who are sick was categorized at a sufficient level. There were still many families who do not dry the mattresses, open windows, which increases the risk of pulmonary TB transmission to family members who share the same house. The

main cause of this situation is due to the lack of knowledge regarding the modes of transmission of TB<sup>5</sup><sup>16</sup>. According to Erlinda (2015), an unclear health message provided by the health care provider will lead the family to practice unhealthy behavior. Providing the health messages effectively is therefore essential to achieve optimal outcomes. Good knowledge will increase awareness to behave well. Some families also do not provide nutritious food due to economic conditions which greatly affect the recovery of pulmonary TB patients and also the transmission of pulmonary tuberculosis. Regarding TB transmission, there are still many patients/families who allow patients to cough without covering their mouths with a handkerchief/tissue<sup>14</sup>.

Regarding the correlation between family characteristics, the study found that the Age of the head of household had a strong relationship with 5 health care tasks; recognizing tuberculosis issues, Making the right decision of health care for the TB patients, caring for sick family members, utilizing health facilities, and modifying the environment to reduce TB transmission. The more mature a person is, the more mature he will be in acting, thinking, and behaving. As people get older, people are getting wiser, have a high commitment to the quality of their family's life, and have more experience<sup>15,17</sup>. The results of this study illustrate that most of the age of the family heads of TB patients is more than 40 years (57.1%).<sup>10</sup>

This study also illustrated most of the heads of the household of pulmonary tuberculosis patients were farmers, accounted for 42.9% (12 people), followed by private employees, and civil servants, 8 people (28.6%). It was found that farmer families are two times more likely to have Pulmonary TB. This could be assumed due to some related conditions such as the location of residence, the density of residence and nutritional status, and economic status<sup>18</sup>. Although not all farmer families experience pulmonary tuberculosis, there are still families with good health status. Concerning family income, it was claimed that 57,1% (16 Families) with low-level income families tended to get Pulmonary TB. Spearman rho test found that the job of the head of household had merely a strong correlation with the level of the family's ability to decide the preventive measures and to utilize health facilities for TB treatment<sup>9,19</sup>.

The more people who live in the same house, the higher the risk of infection, especially in a narrow house. This study indicated that families with TB patients are mostly extended family (71.4%) with more than 5 people who lived in the same house. On one hand, it will increase the risk of disease transmission, however, on the other hand, it will advantage the family in term of making the right decision for caring and treatment, taking care of TB patients, and modifying the environment to prevent the disease transmission in terms of sharing duties, ideas of caring for family members<sup>20</sup>. Likewise, the large number of family members supports a quick decision-making process within the family<sup>6,20</sup>.



Considering the stage of family development stages, findings indicated that most of the TB families were at the stage the families with school children; it was about 42.9%. At this stage, children have a susceptibility to contracting pulmonary TB due to nutritional problems and environmental problems both at home and at school <sup>11,19</sup>. Furthermore, the study also found that the majority of families (71,4%) were categorized as Family independence's Level 3. In this stage, families can receive health care and can take simple precautions <sup>19</sup>. It will then support the health care providers to provide various kinds of health information and can be accepted and implemented particularly for preventing disease transmission <sup>4,15</sup>.

## Conclusion

The study aimed to analyze the relationship between family characteristics and family health tasks in preventing TB disease in Kupang City, East Nusa Tenggara Province, Indonesia. The study found that the Age of the head of household had a strong relationship with 5 health care tasks; recognizing tuberculosis issues, making the right decision of health care for the TB patients, taking care of the TB patients, utilizing health facilities, and modifying the environment to reduce TB transmission. While the occupation of the head of households, family income, number of family members, and family type affected the ability of the family to make the right decision and to utilizing the health service facilities. Furthermore, the family development stages and the family independence level influenced the family in making the right decisions, caring for TB Patients, modifying the environment, and utilizing health service facilities. Future studies should be focused on a qualitative study regarding the factors that cause the transmission.

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