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(Research/ Review) Article

Behavioral Factors Influencing Pulmonary TB Prevention Among Families in Sibolahotang SAS Village, Toba, 2025

Munarni Simatupang [1*], Erita Saragih [2]

[1] Akademi Keperawatan HKBP Balige, Indonesia 1; e-mail : arnysweet84@gmail.com
[2] Akademi Keperawatan HKBP Balige, Indonesia 2; e-mail : eritasaragih1212@gmail.com
* Corresponding Author : Munarni Simatupang

Abstract: Pulmonary tuberculosis is an infectious disease caused by Mycobacterium tuberculosis and is transmitted through droplets when coughing, sneezing, talking, or spitting. This study aims to determine the relationship between various factors and the behavior of TB patients in preventing transmission within their families. The study used a cross-sectional design and was conducted in Sibolahotang SAS Village, Balige Sub-district, Toba District, involving a total sample of 24 pulmonary TB patients diagnosed as smear-positive and undergoing DOTs therapy. The analyzed factors included age, gender, education, occupation, nutritional status, knowledge, housing density, and the role of health workers. The results showed that all these factors had a significant relationship with TB prevention behavior ($P < 0.05$), with gender being the most dominant factor (Exp(B) = 106.648). It was concluded that various social and environmental factors influence TB prevention behavior. It is recommended that health workers become more proactive in educating patients through visual and printed media, and that health workers and cross-sector collaboration become involved in community education. TB patients are also advised to adopt healthy behaviors such as covering their mouths when coughing or sneezing, not spitting carelessly, wearing masks, maintaining proper nutrition, and adhering to treatment protocols.

Keywords: Behavior, Families, Sibolahotang SAS Village, Tuberculosis Risk Factors

1. Introduction

Pulmonary tuberculosis (TB) hereinafter referred to as TBC is a lower respiratory tract infection. This disease is caused by *mycobacterium tuberculosis* which is transmitted through inhalation of saliva droplets , from one individual to another and forms colonization in the bronchioles or alveoli. The infectiousness of a patient is determined by the number of germs released by the lungs. Each patient with pulmonary TB can infect an average of 15-20 other people. Transmission of pulmonary TB occurs in relation to the lack of preventive behavior of pulmonary TB sufferers, such as taking medication regularly, checking with a doctor, throwing away sputum/ phlegm , covering the mouth when coughing and others (Ministry of Health of the Republic of Indonesia, 2010)

The World Health Organization (WHO) has released a report on global tuberculosis (TB) in 2021, including a report on the state of TB in Indonesia in the *Global Tuberculosis Report 2022 document* . In its report, the Covid-19 pandemic is still one of the factors causing disruption to achievements. Especially in case finding and diagnosis, access to care and treatment of TB. The progress that has been made in previous years has continued to slow down and even stopped since 2019. The target for achieving TB-free globally is currently "off track" *from* what has been planned. (Global and Indonesian TB Case Report, 2022).

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WHO reported that the estimated number of people diagnosed with TB in 2021 globally was 10.6 million cases or an increase of around 600,000 cases from 2020 which was estimated at 10 million cases of TB. Of the 10.6 million cases, there were 6.4 million (60.3%) people who had been reported and underwent treatment and 4.2 million (39.7%) people had not been found/diagnosed and reported. TB can be suffered by anyone, of the total 10.6 million cases in 2021, at least 6 million cases were adult men, then 3.4 million cases were adult women and other TB cases were children, which was 1.2 million cases. The overall death rate from TB is also very high, at least 1.6 million people died from TB, this figure is up from the previous year which was around 1.3 million people. There were also 187,000 people who died from TB and HIV. Several countries have succeeded in reducing the burden of TB from year to year (>20%), including Bangladesh (2020), Lesotho (2020 and 2021), Myanmar (2020 and 2021), Mongolia (2021) and Vietnam. (Global and Indonesian Tuberculosis (TB) Case Report, 2022).

Indonesia itself is in the second position (2nd) with the largest number of TB sufferers in the world after India, followed by China, the Philippines, Pakistan, Nigeria, Bangladesh and the Democratic Republic of Congo in sequence. In 2020, Indonesia was in third position with the burden of the largest number of cases, so 2021 is clearly not better. TB cases in Indonesia are estimated at 969,000 TB cases (one person every 33 seconds). This figure is up 17% from 2020, which was 824,000 cases. The incidence of TB cases in Indonesia is 354 per 100,000 population, which means that for every 100,000 people in Indonesia there are 354 people suffering from TB. The disruption due to the Covid-19 pandemic since 2020 is predicted to cause a decline in achievement of up to 5-8 years. The death toll from TB in Indonesia reached 150,000 cases (one person every 4 minutes), up 60% from 2020 which was 93,000 cases of TB deaths. With a mortality rate of 55 per 100,000 population. TB Case Findings in Indonesia Of the total 969,000 estimated TB cases in Indonesia, only 443,235 (45.7 %) cases were found , while 525,765 (54.3%) other cases had not been found and reported. In 2020, the number of cases that had not been found was 430,667 cases. This means that there has been a significant increase in the number of cases that have not been found. Meanwhile, the achievement of case discovery increased from 2020 which was 393,323 cases. (Global and Indonesian Tuberculosis (TB) Case Report, 2022 .

Pulmonary TB is an infectious disease caused by infection with the bacteria *Mycobacterium Tuberculosae*. This disease can spread through *droplets* of people who have been infected with TB bacilli. Together with Malaria and HIV/AIDS, TB is one of the diseases whose control is a global commitment of the MDGs. According to the results of the 2018 Riskesdas, the prevalence of pulmonary TB based on diagnosis was 0.4% of the population. According to the Province, the highest prevalence of pulmonary TB based on diagnosis was West Java at 0.7%, DKI Jakarta and Papua each at 0.6%, while for North Sumatra itself there were 0.2% of diagnosed TB cases. The majority of pulmonary TB

tends to increase with age (65-74 years, namely 0.8 %) with male gender (0.4%), with low education levels (0.5%) and not working (11.7%). The population diagnosed with TB by health workers 0.4 % were treated with program drugs (Riskesdas, 2018).

Pulmonary TB is a disease that is very quickly transmitted. One way of transmitting pulmonary TB is through droplet nuclei when the patient coughs or sneezes, especially to people closest to the patient, namely family members who live in the same house as the patient. This is supported by Sari's research (2013), which stated that as many as 12 people (100% of 12 respondents) showed symptoms of pulmonary TB in families who live in the same house as pulmonary TB patients. This is because families tend to have the intensity and frequency to make direct contact or interact with patients. In addition, families also find it difficult to avoid direct contact because of the responsibility to care for or simply visit patients.

The behavior of TB sufferers in prevention plays a very important role in reducing the risk of transmission. The increasing number of TB sufferers in Indonesia is caused by unhealthy behavior. For example, families who still use eating or drinking utensils together, lack of lighting in the house, patients who still spit carelessly. In addition, there are myths related to the transmission of TB in the community. For example, the public assumes that the spread of TB is not due to direct contact with TB patients (infectious) but rather due to the habit of smoking, alcoholism, eating fried foods, sleeping on the floor and sleeping late at night (Ministry of Health of the Republic of Indonesia , 2011).

Transmission of TB is related to the behavior of sufferers, families and communities in preventing transmission of TB disease. Behavior in preventing transmission of TB disease includes, covering the mouth when coughing and sneezing, spitting in a certain place that has been given disinfectant, BCG immunization in infants, avoiding cold air, trying to let sunlight into the bed, and eating foods that are high in carbohydrates and high in protein (Ministry of Health, 2008).

Based on the recapitulation report of the number of TB sufferers, village midwives in 2025 had 24 sufferers . One of the indicators used in TB control is *the Case Detection Rate* (CDR), which is the proportion of the number of new BTA positive patients found and treated to the number of new BTA positive patients estimated to exist in the area (Village Midwife Profile).

The results of a survey in Sibolahotang Village SAS Balige , in 2025 found 24 people with Pulmonary TB. From the data above, from 2024 to 2025 there was an increase in positive BTA pulmonary TB cases the previous year. Likewise with the behavioral survey in Sibolahotang Village SAS, Balige District, Toba Regency, there are some people who have bad behavior, where when the sufferer is working they do not wear a mask or when coughing or sneezing they do not cover their mouths. In addition, pulmonary TB sufferers often or always spit phlegm in random places and many still share a room with family members who do not suffer from pulmonary TB. This is the background for

researchers to be interested in conducting a study entitled "Determinant Factors of Pulmonary TB Sufferer Behavior in Preventing Pulmonary TB Transmission in Sibolahotang Village SAS, Balige District, Toba Regency in 2025".

2. Method

This study is an analytical study with a *cross-sectional approach* , which aims to observe the relationship between independent and dependent variables simultaneously at one point in time. The focus of the study is to analyze factors related to the behavior of pulmonary TB patients in preventing transmission in the family environment. The instruments used were structured questionnaires and medical record data. The study was conducted in Sibolahotang SAS Village, Balige District, Toba Regency, North Sumatra, from February to April 2025. This location was chosen because there were active pulmonary TB patients living with their families. The population in this study were all pulmonary TB patients who were diagnosed as positive for AFB and undergoing DOTs therapy. The sampling technique used *purposive sampling* with the following criteria: positive AFB patients, living in the research location, able to read and write, and willing to be respondents. The total sample was 24 people.

Data collection was conducted through direct interviews using questionnaires as a tool . Primary data were obtained from respondents, while secondary data came from medical records of village midwives. The variables studied included TB transmission prevention behavior as the dependent variable, and eight independent variables: age, gender, education, occupation, nutritional status, knowledge, housing density, and the role of health workers. Each variable was measured using an appropriate scale: ordinal for age, education, nutritional status, and knowledge; and nominal for gender, occupation, housing density, and the role of health workers. The assessment of TB patient behavior was categorized as good and bad based on the score of the questionnaire answers. Knowledge was measured based on the number of correct answers from 15 questions.

The data obtained through the process of *editing* , *coding* , *entry* , and *cleaning* , were then analyzed with the help of statistical software. The analysis was carried out in three stages: univariate, bivariate, and multivariate. Univariate analysis aims to describe the characteristics of each variable. Bivariate analysis uses the Chi Square test to test the relationship between each independent variable and the dependent variable, with a significance level of $p < 0.05$.

If the p value < 0.05 , then the relationship is considered significant. In addition, to measure the strength of the relationship and determine risk factors, the prevalence ratio (RP) calculation is used. Meanwhile, multivariate analysis uses the logistic regression method to identify the most dominant variables that influence the behavior of preventing pulmonary TB. This logistic regression model predicts the probability of an effect (behavior) based on a combination of nominal and ordinal independent variables. This

method was chosen to obtain a comprehensive picture of the determinants of the behavior of pulmonary TB sufferers and as a basis for more effective prevention efforts at the family and community levels.

3. Results And Discussion

Sibolahotang SAS Village consists of 4 (four) hamlets, namely: Sibolahotang Hamlet, Sibulele Hamlet, Aritonang Hamlet and Sitappuk Hamlet. Sibolahotang SAS Village has a total of 495 families with 1809 souls. Sibolahotang SAS Village has an area of 81 hectares with the following boundaries: The north is bordered by Sibulele-Situmpak, the east by Saribu Raja Janji Maria, the west by Lake Toba, and the south by Lumban Bul-Bul.

3.1 Univariate Analysis Results

Table 1. Frequency Distribution of Respondents Based on Age , Education in Sibolahotang SAS Village, Balige District, 2025

Age	**Amount**	
	N	**%**
15-58 years	13	51.3
<15 years >58 years	11	48.7
Amount	**24**	**100**
Gender	**Amount**	
	N	**%**
Man	16	60.00
Woman	8	40.00
Amount	**24**	**100**

Source: data processed by the author, 2025

Based on table 1, it shows that of the 24 respondents, the majority of respondents were aged 15-58 years as much as 51.3% and aged <15 years> 58 years as much as 48.7%. Based on table 1. shows that the majority of respondents with pulmonary TB were male 60.00% and female 40.00%.

Table 2. Frequency Distribution of Respondents Based on Residential Density and the Role of Health Workers in Sibolahotang SAS Village, Balige District, Toba City Regency in 2025.

Residential Density	**Amount**	
	N	**%**
Not Solid	8	33.8
Congested	16	66.2
Amount	**24**	**100**
Role of Health Workers Respondents	**Amount**	
	N	**%**
There is	18	51.2
There isn't any	6	48.8
Amount	**24**	**100**

Source: data processed by the author, 2025

Based on table 2. shows that the respondents with Pulmonary TB mostly have a dense housing density of 66.2% and not dense 33.8%. Based on table 2. shows that the

respondents with Pulmonary TB who received guidance from Health Officers were mostly 51.2% and those who did not receive guidance from health officers were 48.8%.

3.2 Bivariate Analysis

3.2.1 Relationship Between Age and Behavior of Pulmonary TB Patients

The relationship between the age of respondents and the behavior of pulmonary TB sufferers in preventing transmission to the family can be seen in Table 2.

Table 3. Relationship between Age and Behavior of Pulmonary TB Patients in Preventing Transmission to Families in Sibolahotang SAS Village, Balige District Toba Regency in 2025.

Age	Behavior of Pulmonary TB Patients				Amount		Pvalue
	Good		Not good				
	n	%	N	%	N	%	
Productive	8	28.8%	5	22.5%	13	51.2	0.002
Non-productive	4	11.3%	7	37.5%	11	48.8	
Gender	**Behavior of Pulmonary TB Patients**				**Amount**		**Pvalue**
	Good		**Not good**				
	N	**%**	**N**	**%**	**N**	**%**	
Woman	6	31.3	2	8.8	8	40.0	0,000
Man	2	8.8	14	51.3	16	60.0	

Source: data processed by the author, 2025

From the results of the study in table 3. that the majority of respondents who are non-productive age show poor behavior in preventing transmission of pulmonary TB in families as much as 37.5% and the majority of respondents who are productive age show good behavior in preventing transmission of pulmonary TB in families as much as 28.8%. Based on the results of the analysis, the proportion coefficient (p) of 0.002 is obtained, which is smaller than the error rate used at the $\alpha = 0.05$ level, so it can be concluded that there is a relationship between age and the behavior of pulmonary TB sufferers in preventing transmission in families.

From the results of the study in table 3. that the majority of female respondents showed good behavior in preventing transmission of pulmonary TB in families as much as 31.3% and the majority of male respondents with poor behavior in preventing transmission of pulmonary TB in families as much as 51.3%. Based on the results of the analysis, the proportion coefficient (p) of 0.000 was obtained, which was smaller than the error rate used at the level of $\alpha = 0.05$, so it can be concluded that there is a relationship between gender and the behavior of pulmonary TB sufferers in preventing transmission in families.

3.3 Multivariate Analysis

In this study, multivariate analysis is an analysis to determine the relationship between independent variables, namely: age, education, occupation, gender, nutritional status, knowledge, residential density, the role of health workers, and to determine the

most dominant independent variables. Based on the *Chi-Square test* , 8 (eight) variables are known, namely age, education, occupation, gender, nutritional status, knowledge, residential density, the role of health workers in Sibolahotang SAS Village, Balige District, Toba Regency. These variables can be included in the multivariate analysis because the value of *the p value* is < 0.25 . Furthermore, multivariate analysis was carried out with a multiple logistic regression test in stages. The results of the multiple logistic regression analysis can be seen in the following table:

Table 4. Results of Bivariate Tests Included in Multiple Logistic Regression Analysis

Variables	B	*p.value*	Exp(B)
Age	0.364	0.671	1,458
Education	-2.255	0.004	0.105
Work	3.222	0.001	25,000
Gender	4,670	0.001	106,648
Nutritional status	1,333	0.002	3,793
Knowledge	1,270	0.212	3,560
Residential density	2.392	0.000	10,934
Role of Health Workers	1,241	0.190	3.459
Constant	**-20,356**	**.000**	**,000**

Source: data processed by the author, 2025

Based on table 4. the results of the multiple logistic regression test analysis above, it is known that the variables of age, education, occupation, gender, nutritional status, knowledge, residential density, the role of health workers are significantly related to the behavior of pulmonary TB patients in preventing transmission to families in Sibolahotang SAS Village, Balige District, Toba Regency and the most dominant one related to the behavior of pulmonary TB patients in preventing transmission to families is gender with Exp (B) 106.648 .

3.4 Discussion

3.4.1 Relationship between Age and Behavior in Preventing Pulmonary TB Transmission

Active pulmonary TB infection increases significantly with age, the highest incidence of pulmonary TB usually affects young adults. In Indonesia, it is estimated that 75% of pulmonary TB sufferers are in the productive age group, namely 15-50 years (Ministry of Health, 2020). From the results of the study, it was found that out of 24 respondents, it was found that those of non-productive age showed poor prevention of pulmonary TB transmission as much as 37.5% and the majority of respondents of productive age showed good prevention of pulmonary TB transmission as much as 28.8%. Based on the results of the analysis, the proportion coefficient (p) of 0.002 was obtained , which was smaller than the error rate used at the $\alpha = 0.05$ level, so it can be concluded that there is a relationship between age and the behavior of pulmonary TB sufferers in preventing pulmonary TB transmission in the family. This can happen because age is a predisposing factor for behavioral changes that are associated with the physical and psychological maturity of pulmonary TB sufferers. Meanwhile, based on age, it is seen

moving to a non-productive age because of resignation to the disease suffered (Ratnawati , 2000).

3.4.2 Relationship between Education and Behavior to Prevent Transmission of Pulmonary TB

From the results of the study it can be seen that a person's level of knowledge will affect him/her in preventing the transmission of pulmonary TB. This can be shown by the higher the level of education of family members of respondents regarding the prevention of pulmonary TB transmission, the respondents will realize and understand the importance of preventing transmission. So that respondents with a high level of education influence the prevention of pulmonary TB transmission. The level of education greatly influences thinking patterns. A person's level of education will affect a person's knowledge, including regarding houses that meet health requirements and knowledge of pulmonary TB disease so that with sufficient knowledge, a person will try to have a clean and healthy lifestyle. In addition, a person's level of education will affect the type of work. The better the level of formal education in the community will indirectly reduce the number of illnesses and deaths because with a good level of education they are able to absorb information and increase public awareness to live healthier and actively participate in maintaining their health (Rukmini, 2011).

From the results of the study it is known that from 24 respondents it was found that the majority of respondents who had higher education showed good prevention of pulmonary TB transmission as much as 13.1% and the majority of respondents who had low education with poor prevention of pulmonary TB transmission as much as 55.0%. Based on the results of the analysis, the proportion coefficient (p) of 0.004 was obtained, which was smaller than the error rate used at the $\alpha = 0.05$ level, so it can be concluded that there is a relationship between education and the behavior of pulmonary TB sufferers in preventing pulmonary TB transmission in the family. Based on the multiple logistic regression statistical test, it is known that education is significantly related to the behavior of preventing pulmonary TB transmission. This can be explained even though education describes a person's behavior in preventing pulmonary TB transmission, not being a dominant factor in a person's behavior. The lower the education, the less knowledge in the field of health. Both directly and indirectly can affect the physical, biological and social environment that is detrimental to health (Wirdani, 2000).

3.4.3 Relationship between Work and Prevention Behavior of Pulmonary TB Patients

The type of work determines the risk factors that each individual must face. If workers work in a dusty environment. Exposure to dust particles will affect the occurrence of disorders in the respiratory tract. Chronic exposure to polluted air can increase morbidity, especially the occurrence of respiratory diseases and especially pulmonary TB. From the results of the study it is known that from 24 respondents it was found that the

majority of respondents who worked showed good prevention of pulmonary TB transmission as much as 32.5% and the majority of respondents who did not work with poor prevention of pulmonary TB transmission as much as 52.5%. Based on the results of the analysis, the proportion coefficient (p) of 0.001 was obtained, which is smaller than the error rate used at the $\alpha = 0.05$ level, so it can be concluded that there is a relationship between work and the behavior of pulmonary TB sufferers in preventing pulmonary TB transmission in the family.

This is in accordance with research presented by Jaiz Pribadi (2009) namely that respondents who have good preventive behavior are mostly respondents who have jobs compared to those who are not working and research conducted by Zuliana (2009) which states that work will affect the use of health services, in addition a person's work will reflect the amount of information received, including information about health services.

3.4.4 Relationship between Gender and Behavior to Prevent Transmission of Pulmonary TB

Gender is a term that refers to a person's biological status. Consists of physical appearance that distinguishes between women and men (Henderson, 2006) Hiswani (2009) said that exposure to TB infection in a person is influenced by several factors, including: social status, economy, nutritional status, age, gender, and other social factors. The gender of pulmonary TB patients tends to be higher in men than women.

From the results of the study, it is known that out of 24 respondents , the majority of female respondents showed good prevention of pulmonary TB transmission as much as 31.3% and the majority of male respondents with poor prevention of pulmonary TB transmission as much as 51.3%. This happens because men have a lower level of awareness than women in terms of maintaining health, especially in terms of preventing transmission of pulmonary TB disease. Based on the results of the analysis, the proportion coefficient (p) of 0.000 is smaller than the error rate used at the α level = 0.05, so it can be concluded that there is a relationship between gender and the behavior of pulmonary TB sufferers in preventing transmission of pulmonary TB in the family. This is in line with the research of Julia, Katharina, Hans (2017) which states that in general the tendency of women to be more aware of health and involved in preventive behavior is seen in most subgroups. According to research by Gustafon (2004), it was proven that men have a 2.58 times risk of suffering from tuberculosis compared to women. This is also supported by a report from WHO which explains that in Africa, TB disease mostly attacks men, with the number of pulmonary TB sufferers almost twice as many as the number of pulmonary TB sufferers in women, namely 42.34% in men and 28.92% in women.

3.4.5 Relationship between Nutritional Status and Behavior to Prevent Transmission of Pulmonary TB

From the results of the study it is known that from 24 respondents it was found that the majority of respondents who had a thin nutritional status showed poor prevention of pulmonary TB transmission as much as 51.3% and the majority of respondents who had an obese nutritional status with poor prevention of pulmonary TB transmission as much as 16.3%. Based on the results of the analysis, the proportion coefficient (p) of 0.000 was obtained, which was smaller than the error rate used at the $\alpha = 0.05$ level, so it can be concluded that there is a relationship between nutritional status and the behavior of pulmonary TB sufferers in preventing pulmonary TB transmission in families, where the nutritional status of pulmonary TB sufferers is poor, it will affect the level of intelligence of pulmonary TB sufferers, especially knowledge about the transmission of pulmonary TB disease is not good, so that the behavior of preventing the transmission of pulmonary TB disease is not good in families of pulmonary TB sufferers. This is in line with the research of Sumiaty , Ikhram Hardi (2018) which states that status affects a person's level of intelligence.

3.4.6 Relationship between Knowledge and Behavior in Preventing Pulmonary TB Transmission

From the results of the study it is known that from 24 respondents it was found that the majority of respondents who had good knowledge showed good prevention of pulmonary TB transmission as much as 18.8% and the majority of respondents who had moderate knowledge with poor prevention of pulmonary TB transmission as much as 56.3%. Based on the results of the analysis, the proportion coefficient (p) of 0.000 was obtained, which was smaller than the error rate used at the level of $\alpha = 0.05$, so it can be concluded that there is a relationship between knowledge and the behavior of pulmonary TB sufferers in preventing pulmonary TB transmission in the family. This is because knowledge is the basic capital for someone to behave. People who have a good understanding of TB disease, then this will be a reference for them to try to prevent the disease. Because they already understand the dangers and transmission of pulmonary TB disease.

With knowledge, TB patients can know about the dangers of transmission caused by the sputum droplets they expel. Lack of motivation of TB patients due to low education, knowledge, so that TB patients can act to determine their actions in conducting examinations. The motivation of TB patients to undergo examinations is an encouragement that arises from within themselves to treat the TB disease they suffer from. Knowledge as a basic capital for someone to behave. People who have a good understanding of TB disease, then this will be a reference for them to try to prevent the disease, because they already understand the dangers and transmission of TB disease.

3.4.7 Relationship between Residential Density and Prevention of Pulmonary TB Transmission

Occupant density is 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. The density of occupants in a house will have an impact on its occupants. The area of the house is not comparable to the number of occupants. From the results of the study, it was found that from 24 respondents, it was found that the majority of respondents who had non-dense housing showed good prevention of pulmonary TB transmission as much as 21.2% and respondents who had dense housing with poor prevention of pulmonary TB transmission as much as 47.5%.

Based on the results of the analysis, the proportion coefficient (p) of 0.003 is smaller than the error rate used at the $\alpha = 0.05$ level, so it can be concluded that there is a relationship between housing density and the behavior of pulmonary TB sufferers in preventing the transmission of pulmonary TB in families, where the more housing in a narrow house, the more dominant the occurrence of physical contact between residents in one house so that it is difficult to maintain distance, and the behavior of preventing pulmonary TB disease is difficult to do. The results of this study are in line with research conducted by Rusnoto, showing that there is a significant relationship between housing density and the incidence of pulmonary tuberculosis.

3.4.8 Relationship between the Role of Health Workers and Prevention of Pulmonary TB Transmission

The role of health workers in serving pulmonary TB patients is expected to build a good relationship with patients. The performance element of health workers has an influence on the quality of health services, including health services, including health services for Pulmonary Tuberculosis patients which directly or indirectly will affect the regularity of patient treatment which ultimately also determines the results of treatment. From the results of the study it is known that from 24 respondents it was found that the majority of respondents who had a good role of Health workers in preventing the transmission of pulmonary TB were 27.5% and the majority of respondents who did not have a role of Health workers with preventing the transmission of pulmonary TB were 36.3%. Based on the results of the analysis, the proportion coefficient (p) of 0.010 was obtained, which was smaller than the error rate used at the $\alpha = 0.05$ level, so it can be concluded that there is a relationship between the role of health workers and the behavior of pulmonary TB patients in preventing the transmission of pulmonary TB in the family.

The results of this study are in line with research conducted by Perdana (2008) which stated that the role of health workers in providing services is related to compliance with treatment for pulmonary TB patients. A mutually supportive relationship between health services is an important factor for patients to complete their treatment (Rahmat, 2012). The role of health workers is the activity of officers when communicating directly, communicating verbally and using signs. Providing health information about prevention, treatment and the dangers of pulmonary TB through health education activities not only by using education media in the form of distributing leaflets, or brochures but with education media in the form of short videos about pulmonary TB disease to pulmonary TB patients so that patients really understand about pulmonary TB disease and can minimize transmission to others and pulmonary TB patients can easily understand and health information is conveyed to pulmonary TB patients.

4. Conclusion And Suggestions

Based on the results of the study, it can be concluded that: The relationship between gender and the behavior of pulmonary TB patients in preventing transmission to families in Sibolahotang SAS Village, Balige District, Toba Regency is related to a P-value of 0.000. The relationship between education and the behavior of pulmonary TB patients in preventing transmission to families in Sibolahotang SAS Village, Balige District, Toba Regency is related to a P-value of 0.004. The relationship between age and the behavior of pulmonary TB patients in preventing transmission to families in Sibolahotang SAS Village, Balige District, Toba Regency is related to a P-value of 0.002. The relationship between work and the behavior of pulmonary TB patients in preventing transmission to families in Sibolahotang SAS Village, Balige District, Toba Regency is related to a P-value of 0.000. The relationship between knowledge and the behavior of pulmonary TB patients in preventing transmission to families in Sibolahotang SAS Village, Balige District, Toba Regency is related to a P-value of 0.000. The relationship between nutritional status and the behavior of pulmonary TB patients in preventing transmission to families in Sibolahotang SAS Village, Balige District, Toba Regency is related to a P-value of 0.000. The relationship between the role of health workers and the behavior of pulmonary TB patients in preventing transmission to families in Sibolahotang SAS Village, Balige District, Toba Regency is related to a P-value of 0.010. The most dominant factor related is gender with Exp (B) 106.648 in preventing transmission of pulmonary TB to families in Sibolahotang SAS Village, Balige District, Toba Regency.

4.1 Recommendation

a. For Health Workers

   Health workers must be more active in providing counseling to TB sufferers by playing videos, providing leaflets or brochures about preventing the transmission of TB.

b. For Respondents

Pulmonary TB sufferers, especially in densely populated areas, should always maintain distance and wear masks during treatment to prevent transmission to their families. Pulmonary TB sufferers should also cover their mouths with a handkerchief or tissue when sneezing or coughing and always spit in a dry place exposed to direct sunlight or a special container. Pulmonary TB sufferers need to improve their nutrition to increase their concentration and intelligence levels in preventing the transmission of pulmonary TB to their families.

c. For Health Center Institutions

There needs to be cooperation between Community Health Centers and cross-sectors, especially health cadres , to assist health workers in providing education to patients, families and the community about preventing the transmission of pulmonary TB.

d. For the Community

Women (mothers/wives) suffering from pulmonary TB need to be empowered to influence the behavior of pulmonary TB sufferers in preventing transmission to their families by providing special education on preventing transmission of pulmonary TB.

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