



The relationship between compliance in the treatment of pulmonary TB to lung function in Humbang Hasundutan district

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ABSTRACT

Pulmonary TB is one of the ten causes of death and the main cause of infectious agents. Pulmonary TB germs that occur due to splashes of saliva when talking, sneezing, coughing are related to behavior and closest contacts, for example a family living in the same household is twice as likely to be at risk than regular contact or not living in the same house. Prevention it becomes very important to break the chain of transmission by knowing the factors that influence pulmonary TB disease. Pulmonary TB treatment which takes 6-8 months often causes drug withdrawal which can lead to resistance to Anti Tuberculosis Drugs (OAT). This study aims to determine the effect of compliance with pulmonary TB patients in treatment on lung function of respondents in Humbang Hasundutan District. This type of *quasi-experimental* research with a *cross-sectional* research design. The study population of pulmonary TB patients was 60 people. Sampling by *purposive sampling*. *Univariate* and *bivariate* data analysis with Test *Chi Square* $CI\ 95\% \alpha < 0.05$. The results of the study based on the characteristics of the majority of respondents aged at intervals >35 years were 43 respondents (71.7%), with gender majority 45 respondents (75%) were male, 39 respondents (65%) were in high school, the majority of respondents were engaged in farming, 44 respondents were employed (73, 3%) and for income majority at intervals of 1 million to 3 million as many as 36 respondents (60%). 54 people (90%) comply, and 45 people (75%) have adequate lung function. The chi-square test showed that compliance respondents in pulmonary TB therapy affect lung function with a p-value of 0.003 (p 0.05).

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INTRODUCTION

The case of Tuberculosis or Pulmonary TB has until now become a top priority for health problems in the world, especially Indonesia and is one of the goals in the SDGs (Sustainability Development Goals). Pulmonary TB is one of the 10 causes of death and the main cause of infectious agents. Facts about global health In 2016, there were 10.4 million cases of lung TB around the world. India, Indonesia, China, the Philippines, and Pakistan had 56 percent of these cases. In 2016, pulmonary tuberculosis killed about 1.3 million people around the world. In Indonesia, there were 298 thousand cases of pulmonary TB and 156 thousand positive tests, based on the coverage of pulmonary TB cases (WHO, 2018). Indonesia had 10 million lung TB cases in 2017–133 per 100,000. TB killed 1.3 million HIV-negative

and 300,000 HIV-positive pulmonary TB patients (RI Ministry of Health, 2018).

According to the Ministry of Health of Indonesia, clinical pulmonary TB was 1.0% in 2018. Aceh Province, DKI Jakarta, Yogyakarta Special Region, West Sumatra, Riau Islands, West and East Nusa Tenggara, South and Central Sulawesi, and eastern Indonesia have prevalence rates above the national average (Basic Health Research, 2018). Most people with pulmonary TB feel ashamed and don't know how to prevent it. Patients quit taking their medicine and rely on health personnel because they cannot care for family members with pulmonary TB and lack understanding about its causes and transmission.

The transmission of tuberculosis (TB) bacteria occurs when the patient splatters secretions or speaks, which is related to the patient's behavior in implementing transmission prevention measures. This rapid transmission is

responsible for the high prevalence of pulmonary tuberculosis. The family plays a crucial role in the recovery of pulmonary TB patients. Knowledge, attitudes, beliefs, and traditions influence a person's health-related behavior as predisposing factors, in addition to the physical environment, infrastructure, and driving factors, namely the attitudes and behaviors of health professionals. There is a 17% chance that each contact will contract tuberculosis if every AFB-positive individual infects 10 to 15 others. According to the findings of other studies, the nearest contact (such as a family member) will be twice as likely to be a contact as usual or not in the same residence (Kunoli, 2013). Indonesia will eliminate pulmonary TB as a public health issue by cutting the transmission chain. Know the causes of TB to stop its spread (RI Ministry of Health, 2018).

Obtained Treatment Short-course therapies prioritize finding and treating infectious-type TB patients and are the most cost-effective. This technique will minimize community TB by limiting transmission. Finding and treating patients is the best way to stop pulmonary TB transmission (Ministry of Health RI, 2018). In order to reduce the incidence and dissemination of pulmonary TB, prevention of disease transmission needs to be done by providing education to increase public awareness about the significance of regularity and adherence to taking medication. The results of research at the Delanggu Klaten Health Center on pulmonary TB patients indicated that most of them adhered to taking medication, with as many as 25 respondents (65.8%), and the majority of positive smear TB patients recovered, with as many as 32 respondents (84.2%). There is a significant relationship between adherence to taking medication and the recovery of positive smear TB patients, with a value of $p = 0.006$ (Widiyanto, 2017). TB DOTS Program policy support from health services, regular counseling, the availability of drugs, the existence of a Drug Ingestion Supervisor (PMO), and regular recording and reporting will increase pulmonary TB patients' medication adherence (Wulandari, 2015).

Ludyaningrum research results (2016) regarding the relationship between the phases of TB treatment and knowledge about MDR TB with adherence to treatment of TB patients at the East Perak Health Center said that *there* was a relationship between the treatment phase and adherence to treatment of pulmonary TB patients ($p = 0.03$) and there was a relationship between knowledge about *multi - drug TB resistance* with TB patient treatment adherence ($p = 0.039$). Other factors that may affect adherence to successful pulmonary TB treatment are motivation to recover as many as 73 people (97.3%), family role as many as 60 people (80%) and role of PMO as many as 25 people (33.3%) (Gunawan et al., 2017).

One of the determinants of successful management of pulmonary TB therapy is patient adherence to treatment. Patient noncompliance with treatment can cause recurrence or failure. This effect can result in pathogen resistance and continuous disease transmission from person to person. Long-term, daily noncompliance with treatment can exacerbate health conditions and increase the cost of treatment. Noncompliance with treatment for pulmonary TB patients has an effect on low healing, resistance of tuberculosis bacteria to OAT or multidrug resistance (MDR), an increase in recurrence, and high mortality, making it difficult to achieve a cure for the disease (Ministry of Health RI, 2018).

The number of pulmonary TB cases in the Humbang Hasundutan Regency is 128 per 100,000 people, according to the available data. 75% of novel instances of pulmonary TB (AFB-positive) have been identified. 75% of newly diagnosed

cases of pulmonary TB (AFB-positive) have been cured. In data control and management of TB/BTA patients, from 75% to 82%. The availability of reagents, community empowerment, and anti-tuberculosis drugs (OAT) at the primary care level are among the measures taken by the government of Humbang Hasundutan Regency for the prevention of tuberculosis. Counseling is a means of empowering the community. This study seeks to determine the impact of education on pulmonary tuberculosis patients' adherence to lung function testing in the district of Humbang Hasundutan.

METHODS

Participant characteristics and research design

This study is quasi-experimental and employs a cross-sectional research design. To determine pulmonary TB patients' conformance with pulmonary function. All variables, including dependent variables and independent variables, were measured simultaneously during the course of the study, which was conducted with laboratory and supplementary examinations and questionnaires. The following variables were examined in this study: This study's independent variables were compliance and non-adherence. This study's dependent variable was lung function.

Sampling procedures

Sixty pulmonary TB patients who were treated as outpatients in the working areas of the Matiti Health Center and Saitnihuta Health Center comprised the population of this investigation. Using the technique of purposive sampling, 60 individuals comprised the total population of this investigation. (Notoadmojo, 2012). The inclusion criteria are families (mother or wife, adult children) with members who have been educated and have pulmonary tuberculosis; respondents who reside in the working area of the Matiti Health Center and Saitnihuta Health Center; and respondents who are willing to participate.

Measures and covariates

Conducting initial data collection, using a questionnaire on the characteristics of the respondents. Characteristics of respondents include: age, education, occupation, gender, monthly income, health insurance and duration of suffering from pulmonary TB. And measuring the level of compliance using a questionnaire, carrying out laboratory examinations: Sputum, supporting examinations: Thoracic X-ray photos, measurement of oxygen saturation and medication taking schedule. Compliance is measured using a personal compliance questionnaire refers to research conducted by Trisnawati (2020) consisting of 20 questions that have been tested for validity and reliability. All question items are legitimate since r count > 0.361 is larger than the r table. Correct answers were scored 1, and wrong answers were scored 0. The researcher examined and processed the data. Additionally, variables are processed. The data that has been collected, checked and completed is then entered using a computer. Data analysis was performed by computer. A statistical test was used with a significance degree of 95% and $p < 0.05$. The steps of analysis carried out are: Univariate analysis by calculating frequency distribution analyzed was used to determine the proportion of the characteristics of the

research subjects then bivariate analysis to see the relationship of adherence to lung function in pulmonary tuberculosis patients was carried out statistical tests, namely *Chi Square* (X²)

RESULTS AND DISCUSSION

Characteristics of Respondents

Table 1 . Distribution of Respondent Characteristics

No	Variable	Amount	Percentage (%)
1.	Age		
	<20	5	8,3
	20-35	12	20
	>35	43	71.7
	Total	60	100
2.	Gender		
	Man	45	75
	Woman	15	25
	Total	60	100
3.	Education		
	SD	5	8,3
	Junior High School	1	1,7
	Senior High School	39	65
	PT	15	25
	Total	60	100
4.	Work		
	Doesn't work	6	10
	Farmer	44	73,3
	Self-employed	7	11,7
	ASN	3	5
	Total	60	100
5	Income		
	< 1 million	22	36,7
	1 million to 3 million	36	60
	3 million- 5 million	2	3,3
	Total	60	100

From table 1 it can be seen that the respondents were generally aged at intervals >35 years 71.7%, with the sex of mostly male 75%. In terms of education, most of the respondents had high school education 65%, with the respondent's occupation, most of them were farming 73.3% and for the income of most of the respondents in the interval 1 million to 3 million 60%.

The results of the study from 60 respondents showed that most were aged > 35 years, according to the researchers from the age of the respondents it could be seen that the groups that were susceptible to infectious diseases were children and the elderly group, in this group the condition was more susceptible to infection when exposed to infectious agents. infection. Age over 35 years is a productive age. Productive age is an age that is active in activities outside the home environment so that it is more at risk of transmitting pulmonary TB disease, especially in dense

environments (Gunawan et al., 2017) . This study also shows the results that there are more men than women. These results are in agreement The pattern of distribution of pulmonary TB disease epidemiology based on the WHO report is that in countries with a high prevalence of pulmonary TB , more men suffer from pulmonary TB than women (*World Health Organization. Global Tuberculosis Report, 2015*) . The results of this study are in accordance with research (Andayani, 2020) In Ponorogo Regency in 2018, the maximum number of cases was found in males, with a total of 222 cases. Outside of the house, masculine genitalia are more active. As the leader of the family, it is the man's responsibility to provide for his family's requirements. Patients who work from morning to night and have physically demanding occupations, such as construction workers or truck drivers fleeing the city or province, are at high risk of contracting pulmonary tuberculosis. As a result, patients are prone to contracting pulmonary tuberculosis because they lack rest, pay little heed to consuming nutritious foods, are under excessive stress, and fatigue easily. This investigation revealed that 73.3% of respondents were employed as cultivators. The findings of this investigation are consistent with Kolewora (2023) obtained 20% of respondents suffering from pulmonary TB working as farmers.

Table 2. Distribution of Respondents' Characteristics Based on Compliance and Lung Function

No	Variable	Amount	Percentage (%)
1.	Obedience		
	obey	54	90
	Not obey	6	10
	Total	60	100
2.	Lung Function		
	Good	45	75
	Not good	15	25
	Total	60	100

Based on the table above, it can be seen that out of 60 respondents, the majority had compliance (obedient) as many as 54 people (90 %) and a small number were disobedient as many as 6 people (10 %) . Based on the lung function variable, out of 60 respondents, 45 people (75 %) had good lung function and 15 people (25%) had poor lung function. According to Ngamelubun et al., (2022) Low respondent adherence to pulmonary TB treatment as many as 74 respondents (79.5%) According to Acosta et al., (2022) In the DOT group, seven of the forty-six respondents missed a dose if the patient missed primary care and could not be reached on the day of treatment or if the pillbox was not opened. People with TB could find lesion on their lungs. A study about pulmonary tuberculosis at community hospital in Thailand found that 142 (18.07%) patient with TB have multiple lesion in their lungs (Charoensakulchai et al., 2020).

Table 3. Compliance of Pulmonary TB Patients Taking OAT on Lung Function

Obedience	Lung Function				Amount		P Value	CI
	Good		Not good		n	%		
	n	%	n	%				
obey	44	81.5	10	18.5	54	100	0.003 _	95%
Not obey	1	16.7	5	83.3	6	100		

Based on the table above, it is known that of the 54 obedient respondents, 44 respondents (81.5%) had good lung function and 10 respondents (18.5%) had poor lung function. Of the 6 non-compliant respondents who had good lung function, there was 1 respondent (16.7%) and 5 respondents (83.3%) who had poor lung function. The results of the analysis using the *chi-square* test showed that the p -value $< \alpha$ or $0.003 < 0.05$ means that there is a relationship between compliance in the treatment of pulmonary tuberculosis on lung function.

In the study it was found that the p -value $< \alpha$ or $0.003 < 0.05$ means that there is a relationship between compliance with lung function. From the distribution of 54 respondents whose adherence to drug consumption was good, 18.5% had poor lung function, this was due to the ongoing treatment of pulmonary TB. A simple assessment is carried out by the researcher on the respondent by demonstrating a deep breath and then seeing how long (seconds) the patient is able to exhale slowly. Some patients say it is still difficult to hold their breath for a long time and get tired easily. This simple breathing exercise gives researchers and patients an overview of the impact of a lung infection.

In the study there were also 10% of respondents who were not compliant in taking the drug, data obtained from the puskesmas staff, these patients were not compliant when taking the drug and their current status had been declared finished with treatment and recovered. Compliance in an attitude that is the only response when the individual is confronted with a stimulus that requires individual reactions. Obedience is an attitude someone will show up which is a reaction to something that is in that rule must run (Notoadmodjo, 2018). Compliance with pulmonary TB patients in taking TB drugs is influenced by many factors, one of which is the length of treatment, based on a literature review the researchers found that length of treatment is one of the obstacles in adherence to treatment of pulmonary TB patients, it will make a person feel bored and bored. There are some sufferers who even believe that treatment worsens their condition because of side effects (Gebreweld et al., 2018).

Pulmonary TB patients can change due to physical changes, including decreased tolerance to activity, problems with the respiratory system, decreased appetite, chest pain (Bachtiyar et al., 2015). The changes experienced will affect the life satisfaction and feelings of TB patients (Rachmawati et al., 2021). The results of assessing the impact of pulmonary TB on patients during visits and interviews were respiratory disorders. Respondents said they were easily tired, short of breath and unable to do more strenuous physical activity. This study is in accordance with the theory that former pulmonary TB patients will show a lower quality of life compared to the healthy general population without a history of pulmonary TB, even though they have been declared microbiologically cured. Therefore, long-term evaluation is needed for former pulmonary TB patients who have completed their treatment, especially to anticipate decreased lung function and the impact on quality of life (Daniels et al., 2019); (Aggarwal et al., 2013).

LIMITATION OF THE STUDY

The limitation of this study is to only relate the compliance variable to the adherent and non-adherent categories of lung function, without connecting other variables that can affect pulmonary function in pulmonary

TB patients. It has not yet been connected to what extent the level of adherence to treatment of TB sufferers can affect the lung function of pulmonary TB sufferers.

CONCLUSIONS AND SUGGESTIONS

There is a relationship between medication adherence and lung function. There were 18.5% of participants whose lung function was not good, this happened due to the ongoing treatment of pulmonary TB. Compliance in an attitude that is the only response when the individual is confronted with a stimulus that requires individual reactions. Obedience is an attitude someone will show up which is a reaction to something that is in that rule must run (Notoadmodjo, 2018). Compliance with pulmonary TB patients in taking TB drugs is influenced by many factors, one of which is the length of treatment, based on a literature review the researchers found that length of treatment is one of the obstacles in adherence to treatment of pulmonary TB patients, it will make a person feel bored and bored.

ETHICAL CONSIDERATIONS

This research has been approved by the Health Research Ethics Commission Number 01.1525/KEPK/ POLTEKKES KEMENKES MEDAN 2021.

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Conflict of Interest Statements

Manurung stated that there was no conflict of interest in this research.

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