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FACTORS ASSOCIATED WITH MEDICATION ADHERENCE IN PATIENTS WITH TUBERCULOSIS YEAR 2024

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Abstract
Tuberculosis (TB) is an infectious disease caused by the Mycobacterium Tuberculosis (MTB) germ. Tuberculosis is transmitted through the air from infectious tuberculosis patients to those around them. One bacteriologically confirmed tuberculosis patient who is not properly and qualitatively treated can infect about 10 people per year (Ministry of Internal Affairs RI, 2019). Banten is one of the provinces with a high number of tuberculosis sufferers on the island of Java. According to the Ministry of Internal Affairs of RI in 2019, 223 people were infected with tuberculosis per 100,000 inhabitants, above the national average of 203 people per 100,000 population (Kemenkes RI, 2019). However, of the total number of Tuberculosis sufferers in Banten Province, only 58.3% take the drug regularly (Kemenkes RI, 2018). The causative factors of the disease include nutritional status, age, gender, environmental factors, and social factors. This type of study is an analytical study with a cross-sectional study design. to 52 samples. The results of the Chi Square test show that there is a meaningful relationship between age, level of knowledge, attitude to treatment, history of drug side effects, role of health care workers, access to health services, and family support with the level of drug adherence in TB patients.

Keywords: Tuberculosis, Tuberculosis Patient, Tuberculosis Causative Factors, Behavioral Factors

1. Introduction

Tuberculosis (TB) is an infectious disease caused by the germ Mycobacterium Tuberculosis (MTB). Tuberculosis is transmitted through the air from an infectious TB patient to those around him. One bacteriological confirmed TB patient who is not treated appropriately and with quality can infect around 10 people per year (Ministry of Health RI, 2019). Tuberculosis bacteria will mostly attack the lungs, but can also attack other organs in the human body. The source of transmission is phlegm that comes directly from patients affected by TB with positive BTA which if not treated immediately can be fatal for patients until finally death. Handling TB cases in Indonesia is carried out early on in toddlers, namely by immunizing BCG.

Data from the World Health Organization (WHO), in Indonesia is on the list of 30 countries with the highest burden of Tuberculosis (TB) in the world and ranks third highest in the world regarding the incidence of tuberculosis. In 2019 WHO stated that it is estimated that around 845,000 Indonesians suffer from tuberculosis with 24,000 of them being Drug Resistant Tuberculosis (RO TB). In addition, about 92,700 people die from tuberculosis in Indonesia per year, or about 11 people per hour. The incidence of pulmonary TB is quite high found in densely populated and slum environments. This is because pulmonary TB can be transmitted through the air if people who have pulmonary TB disease cough and spread germs through sputum splashes (Sreeramareddy, C. T., Kumar, H. N. H., & Arokiasamy, 2013).

Banten is one of the provinces with a high number of tuberculosis sufferers on the island of Java. According to the Indonesian Ministry of Health in 2019, there were 223 tuberculosis sufferers per 100,000 population, above the national average of 203 tuberculosis sufferers per 100,000 population (Ministry of Health, 2019). However, of the total number of tuberculosis patients in Banten Province, only 58.3% take drugs regularly (Ministry of Health RI, 2018).

The case of pulmonary TB in Indonesia is still a public health problem with one-third of the population in the world infected with mycobacterium tuberculosis which has not been resolved optimally, due to lack of awareness of adherence to taking TB drugs, it needs an action that can motivate correctly and consistently. National TB Control with Anti-Tuberculosis Drugs is given to patients free of charge and guaranteed availability. Indonesia's geographical conditions should be more than enough to kill the bacteria that cause pulmonary TB. The incidence of pulmonary TB is quite high found in densely populated and slum environments. This is because pulmonary TB can be transmitted through the air if people who have pulmonary TB disease cough and spread germs through sputum splashes. This causes pulmonary TB to be easily transmitted to the surrounding environment, especially the family (Sreeramareddy, C. T., Kumar, H. N. H., & Arokiasamy, 2013).

Obedience is a person's behavior according to rules and discipline. Bacteriological inspection compliance at refillable drinking water depots is included in health behavior because the activities or actions carried out by refillable drinking water depot owners are related to maintaining and improving health, especially the health of consumers who consume their products. Health behavior is influenced by 3 (three) main factors, namely predisposing factors manifested in knowledge, attitudes, beliefs, perceptions, beliefs, values, socio-economic and others, enabling factors manifested in the physical environment, costs, facilities and infrastructure and reinforcing factors manifested in officer attitudes and behavior (Purwitasari, 2017)

TB treatment is given in the form of a combination of several types, in sufficient quantities and appropriate doses for 6-8 months, so that all germs can be killed. If the drug alloy is dug

If inadequate (type, dose, and duration of treatment), TB germs will develop into drug-resistant germs. Although there has been a way of treating tuberculosis with high effectiveness, the cure rate is still lower than expected. The main cause of this occurrence is that patients do not comply with the provisions and duration of treatment regularly to achieve recovery as a result of low public knowledge level (Fitria CN, 2018)

Based on the explanation above, researchers are interested in examining the factors associated with medication adherence in tuberculosis patients in 2024.

2. Theoretical Background

Theories discuss the adherence of TB patients to take medications such as Lawrence Green's Precede and Proceed theory, Anderson's theory, Health Belief Model theory. In Lawrence Green's Precede and Proceed theory the factors that influence compliance are predisposing, enabling and reinforcing. Some influential factors in the compliance of pulmonary tuberculosis patients in taking medication, including knowledge, attitudes, family support, motivation, side effects, the role of health workers, and perceived stigma.

The purpose of adherence to taking TB drugs, it is necessary to get used to being a norm of life and culture of TB sufferers so that they are aware and independent to live healthy. However, raising awareness of adherence to taking TB drugs requires an action

that can motivate correctly and consistently. National TB control with Anti-Tuberculosis Drugs (OAT) is given to patients free of charge and guaranteed availability. The time used for therapy is 6-8 months. This often results in patients being less compliant and taking irregular medications. Irregular treatment and incomplete combinations are thought to have resulted in the dual immunity of TB germs to Anti-Tuberculosis Drugs. Therefore, it is very important for patients to complete the therapy program well, in other words, patient compliance for TB disease recovery.

Patient adherence to medication is an important factor in the success of a treatment. Non-compliance of pulmonary TB patients is the most important cause of tuberculosis treatment failure which is an obstacle to achieving recovery. Long treatment of pulmonary TB often bores patients and causes patient non-compliance in taking medication (Pasek MS, Suryani N, 2018).

Behavioral factors are very influential on healing and prevention to avoid TB infection. Starting from healthy living behaviors (eating a nutritious and balanced diet, getting enough rest, getting enough exercise, avoiding cigarettes, alcohol, anesthetics, avoiding stress), immunizing from an early age, especially toddlers. Patients with behavior do not spit carelessly, cover the mouth when coughing or sneezing, and especially adherence to taking medication and regular checks to monitor the progress of treatment and side effects. In addition, it is necessary to control yourself to be in a condition to avoid air pollution during healing.

The success of the TB treatment program is determined from the patient's adherence to taking a complete drug to completion, to achieve the treatment target, actions are needed that are able to encourage patients to comply with treatment (Gunawan, A., Simbolon, R., &; Fauzia, 2017). In 2019, the compliance rate of TB patients reported to be complete following treatment was 85%. The reasons why patients do not routinely take medication are, often forget to take medicine, unavailability of drugs in health services, cannot stand the side effects of TB drugs, cannot afford to buy TB drugs regularly, do not routinely seek treatment and the last reason patients feel cured even though they have not completed treatment completely (Ministry of Health RI, 2018).

3. Methods

This research is analytical research with a cross-sectional study design. This study aims to look at factors related to medication adherence in tuberculosis patients by 2024. Data collection was carried out using questionnaires through interviews with respondents. This research will be carried out in January 2024 in the working area of the Kilasah Health Center.

A population is a set of individuals who have the same characteristics who are the center of attention and become a source of research data to solve problems in research. The population in this study is TB patients who are examined at the Kilasah Health Center until July 2023. The population in this study amounted to 107 people.

A sample is a portion of the population that is taken according to a certain procedure so that it can be representative of its population. In determining the size of the sample to be studied, in this study sampling was calculated using the Slovin formula and obtained samples of 52 patients / respondents.

4. Results and Discussion

4.1 Univariate Analysis Results

Table 1. Frequency distribution of factors related to the level of adherence to taking medication in tuberculosis patients

Variable	Sum	(%)
Age of Respondents		
Children < 20 years old	32	61,5%
Adults ≥ 20-45 years	20	38,5%
Education Level		
Lower education (< high school)	21	40,4%
Higher Education (> High School)	31	59,6%
Employment Status		
Not Working	31	59,6%
Work	21	40,4%
Knowledge Level		
Not good	32	61,5%
Good	20	38,5%
Attitude to treatment		
Not Positive	32	61,5%
Positive	20	38,5%
History of Drug Side Effects		
Exist	22	42,3%
None	30	57,7%
The Role of Health Workers		
Not Good	31	59,6%
Good	21	40,4%
Access to Health Services		
Far > 10 km	32	61,5%
Near ≤ 10 km	20	38,5%
Family Support		
Less Support	40	76,9%
Support	12	23,1%
Adherence Rate of Taking Medication		
Disobedient	32	61,5%
Obedient	20	38,5%

Based on the table above, it is known from 52 respondents who stated that those who have the age of children < 20 years are 32 (61.5%). Higher education level of 31 (59.6%). The status of respondents who did not work was 31 (59.6%). The level of knowledge is not good as much as 32 (61.5%). Attitudes towards treatment were not positive as much as 32 (61.5%). Respondents who had no history of drug side effects as many as 30

(57.7%). The role of health workers is not good as much as 31 (59.6%). Access to health services is far > 10 km as much as 32 (61.5%). Family support of respondents who are less supportive as much as 40 (76.9%). As well as the adherence rate of taking non-adherent medication as much as 32 (61.5%).

4.2 Results of Bivariate Analysis

Table 2. Factors related to the level of adherence to taking medication in tuberculosis patients

Variable	Behaviour				n	Value
	Disobedient		Obedient			
	f	%	f	%	f	
Age Child <20 years old Productive Adults ≥ 20-45 years	 32 0	 100 0	 0 20	 0 100	 32 20	0,000
Sum	32		20		52	
Education Level Lower Education (< High School) Higher Education (> High School)	 16 16	 50 50	 5 15	 25 75	 21 31	0,074
Sum	32		20		52	
Employment Status Not Working Work	 16 16	 50 50	 15 5	 75 25	 31 21	0,074
Sum	32		20		52	
Knowledge Level Less Good	 32 0	 100 0	 0 20	 0 100	 32 20	0,000
Sum	32		20		52	
Attitude to treatment Not Positive Positive	 32 0	 100 0	 0 20	 0 100	 32 20	0,000
Sum	32		20		52	
History of Drug Side Effects						0,000

Exist None	2 30	6,3 93,7	20 0	100 0	22 30	
	32		20		52	
The Role of Health Workers Less Good	 23 9	 71,9 28,1	 8 12	 40 60	 31 21	0,023
Sum	31		20			
Access to Health Services Far Near	 26 6	 81,3 18,7	 6 14	 30 70	 32 20	0,000
Sum	32		20			
Family Support Less Support Support	 29 3	 90,6 9,4	 11 9	 55 45	 40 12	0,003
Sum	32		20		52	

Based on the table above, it shows that of the 52 respondents, the most aged < 20 years, which is 32 people, and most are not compliant in taking medicine, which is 32 people (100%). The results of the chi square test show that age obtained p-value = 0.000 < 0.05 means that there is a significant relationship between age and the level of adherence to taking drugs in TB patients. Based on the table above, it shows that of the 52 respondents with a higher education level of 21 people and most of them stated that they were obedient to taking medicine, namely 15 people (75%). The results of the chi square test showed that age obtained p-value = 0.074 < 0.05 means that there is no significant relationship between education level and the level of adherence to taking TB drugs. Based on the table above, the respondents who had the most non-working status were 31 people and most were not compliant with taking TB drugs by 32 people (100%). The results of the chi square test showed that age obtained p-value = 0.074 < 0.05 means that there is no significant relationship between employment status and the level of adherence to taking TB drugs. Based on the table above, the level of knowledge is more or less than the level of knowledge is good, which is 32 people and most state that respondents with low education levels are not obedient in taking TB drugs, which is 32 (100%). The results of the chi square test showed that age obtained p-value = 0.000 < 0.05 means that there is a significant relationship between the level of knowledge and the level of adherence to taking medication in TB patients. Based on the table above, the attitude towards treatment, respondents who were most on non-positive attitudes were 32 people and most respondents who had attitudes towards treatment that were not positive were not adherent to taking TB drugs, which was 32 people (100%). The results of the chi square test show that age obtained p-value = 0.000 < 0.05 means that there is a significant relationship

between attitudes towards treatment and the level of adherence to taking medication in TB patients. Based on the table above, the most respondents who did not have a history of drug side effects were 31 people and most respondents who did not have a history of drug side effects had the highest score for not adhering to taking TB drugs, which was 30 people (93.7%). The results of the chi square test show that age obtained p-value = 0.000 < 0.05 means that there is a significant relationship between the history of drug side effects on treatment with the level of adherence to taking drugs in TB patients. Based on the table above, the role of poor officers dominates by 31 people and most of whom are not obedient to taking TB drugs by 23 people (71.9%). The results of the chi square test showed that age obtained p-value = 0.023 < 0.05 means that there is a significant relationship between the role of health workers on treatment with the level of adherence to taking medication in TB patients. Based on the table above, most respondents who have access to health services are far away, amounting to 32 people, and most are non-compliant, which is as many as 26 people (81.3%). The results of the chi square test show that age obtained p-value = 0.000 < 0.05 means that there is a significant relationship between access to health services for treatment with the level of adherence to taking medication in TB patients. Based on the table above, the largest family support factor is not supportive, which is 40 people and most are not adherent to taking medication, which is 29 people (90.6). The results of the chi square test showed that age obtained p-value = 0.000 < 0.05 means that there is a significant relationship between family support for treatment and the level of adherence to taking medication in TB patients.

4.3 Discussion

4.3.1 The Relationship Between Age and the Level of Adherence to Taking Medication in TB Patients

The results showed that respondents aged < 20 years who were not obedient to taking medication by 100%, respondents aged Adult ≥20 - 45 years who were not obedient to taking medication by 0% While respondents aged Children< 20 years who were obedient to taking medication by 0%, respondents aged Adult ≥20 - 45 years who were obedient to taking medicine by 100%. The results of the Chi Square test showed a significant relationship between age and the level of adherence to taking medication in TB patients because it had a P-Value of 0.00 (≤0.05).

This study is in line with research conducted by (Apri, et al in 2014) which states that the results of statistical tests obtained p value 0.004≤ a 0.05, OR value obtained 36,000 can be concluded there is a significant relationship between age and adherence to taking medication in patients with pulmonary TB at the Pringsewu Inpatient Health Center in 2014. However, in a study conducted by Ulfah, et al stated that factors that were not related to adherence to pulmonary TB treatment were income (P Value = 0.164) and age (P Value = 0.535).

4.3.2 The Relationship Between Education Level and Medication Adherence Rate in TB Patients

The results showed that respondents with low education (< high school) who were not compliant took drugs by 50%, respondents with higher education (> high school) who were not compliant took drugs by 50% while respondents with low education (< high school) who were obedient to taking drugs by 25%, respondents with higher education (>high school) who were obedient to taking drugs by 75%. The results of the Chi Square

test showed no significant relationship between the level of education and the level of adherence to taking medication in TB patients because it had a P-Value of 0.074 (>0.05).

The results of the study are not in line with research conducted by Eny Suswati in 2016 which stated that the most pulmonary tuberculosis sufferers in the elementary school educated group as much as 43%, 76% of half-life sufferers were adherent to taking medication, and there was no relationship between the level of education and adherence to taking medication in patients with pulmonary tuberculosis (X2: 0.306, dk: 4, : 0.01)

Relationship of Employment Status with Adherence Rate of Taking Medication in TB Patients

The results showed that respondents who did not work and did not comply took medication by 50%, respondents who worked and did not comply took medication by 50% while respondents who did not work and were obedient to taking medicine by 75%, respondents who worked and adherently took medicine by 25%. The results of the Chi Square test showed no significant relationship between employment status and the level of adherence to taking medication in TB patients because it had a P-Value of 0.074 (>0.05).

The results of this study are not in line with research conducted by Ulfah, et al which states that factors related to pulmonary TB treatment adherence are occupational (P Value = 0.043; OR=1.989).

4.3.3 The Relationship Between the Level of Knowledge of Respondents and the Level of Adherence to Taking Medication in TB Patients

The results showed that respondents who had a level of knowledge were less and did not comply with taking medicine by 100%, respondents who had a good level of knowledge and were not obedient to taking medicine by 0% while respondents who had less knowledge and were obedient to taking medicine by 0%, respondents who had good knowledge and were obedient to taking medicine by 100%. The results of the Chi Square test showed a significant relationship between the level of knowledge and the level of adherence to taking medication in TB patients because it had a P-Value of 0.00 (≤0.05).

The results of this study are in line with research conducted by Ulfah et al, which states that factors related to pulmonary TB treatment adherence are knowledge (P Value = 0.005; OR= 2.529).

4.3.4 The relationship between attitudes towards treatment and the level of adherence to taking drugs in TB patients

The results showed that respondents who had a non-positive attitude and were not obedient to taking medication by 100%, respondents who had a positive attitude and non-adherence took medication by 0% while respondents who had a non-positive attitude and were obedient to taking medication by 0%, respondents who had a positive attitude and were obedient to taking medication by 100%. The results of the Chi Square test showed a significant relationship between attitudes towards treatment and the level of adherence to taking medication in TB patients because it had a P-Value of 0.00 (≤0.05).

The results of the study are in line with research conducted by Sirait, et al in 2020, which stated that 54.3% of positive patient attitudes were obedient to taking antituberculosis drugs in an obtained 17.1% non-compliance. Furthermore, 11.5% of patients had a negative attitude of adherence to taking anti-tuberculosis drugs and 17.1% did not comply with taking anti-tuberculosis drugs. Based on the results of statistical tests, it obtained a value of P = 0.043, which means that there is a significant relationship

between attitude and the presence of taking anti-TB drugs in Pulmonary TB patients at the Teladan Medan Health Center in 2019.

4.3.5 The relationship between the history of drug side effects with the level of adherence to taking drugs in TB patients

The results showed that respondents who experienced drug side effects and were not adherent to taking medication by 6.3%, respondents who did not experience drug side effects and were not adherent to taking medication by 93.7% While respondents who experienced drug side effects and were adherent to taking medication by 20%, respondents did not experience drug side effects and were obedient to taking medication by 0%. Chi Square test results show a significant relationship between the history of drug side effects and the level of adherence to taking drugs in TB patients because it has a P-Value of 0.00 (≤0.05).

This study is in line with research conducted by Ulfah, et al which states that factors related to pulmonary TB treatment adherence are drug side effects (P Value = 0.045; OR=1.961).

4.3.6 The Relationship between the Role of Health Workers and Adherence to Taking Medication in TB Patients

The results showed that the role of health workers was less with respondents who were not obedient to taking medication by 71.9%, the role of good health workers with respondents who were not obedient to taking medication by 28.1% While the role of health workers was less with respondents who were obedient to taking medicine by 40%, the role of health workers with respondents who were obedient to taking medicine by 60%. The results of the Chi Square test showed a significant relationship between the role of health workers and the level of adherence to taking medication in TB patients because it had a P-Value of 0.023 (≤0.05).

The results of this study are in line with research conducted by Ulfah, et al which stated that the factor associated with adherence to pulmonary TB treatment was the attitude of officers (P Value = 0.020; OR=2,172).

4.3.7 The Relationship of Access to Health Services with the Level of Adherence to Taking Medication in TB Patients

The results showed respondents who had access to health services that were far away and not adherent to taking medication by 81.3%, respondents who had access to health services were close and not adherent to taking medicine by 18.7% while respondents who had access to health services that were far away and obedient to taking medicine by 30%, respondents who had access to health services that were close and adherent to taking medicine by 70%. The results of the Chi Square test showed a significant relationship between access to health services and the level of adherence to taking medication in TB patients because it had a P-Value of 0.000 (≤0.05).

The results of this study are in line with research conducted by Ulfah, et al which stated that the factor associated with pulmonary TB treatment adherence was the distance of health facilities (P Value = 0.044; OR= 1.967).

4.3.8 The Relationship of Family Support with the Rate of Adherence to Taking Medication in TB Patients

The results showed respondents who had less family support and were not obedient to taking medication by 90.6%, respondents who had family support and were not obedient to taking medication by 9.4% While respondents who had less family support and adherence to taking medication by 55%, respondents who had family support and adherence to taking medication by 45%. The results of the Chi Square test showed a significant relationship between family support and the level of adherence to taking medication in TB patients because it had a P-Value of 0.003 (≤0.05).

5. Conclusion

Factors related to adherence to taking medication in tuberculosis patients in the Kilasah Health Center work area are age, knowledge, attitude towards treatment, history of drug side effects, the role of health workers, access to health services, and family support. However, on the factors of education and employment status there was no significant relationship.

It is expected for Puskesmas to be able to improve coordination with provincial and district / city health offices, patient supporters, communities and cadres in assisting tuberculosis patients from the beginning of being confirmed positive until completing complete treatment and recovering

It is expected for future researchers to conduct and develop similar research using new and more diverse variables.

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