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Analysis of Factors Affecting Compliance Treatment of Pulmonary Tuberculosis Patients in the Work Area

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Abstract. *Pulmonary tuberculosis (TB) is a disease infectious direct and is threat big for development source Power man so that need get more attention Serious from all parties. As for objective in study This is for analyze factor affecting compliance treatment Pulmonary Tuberculosis Patients in the Work Area Service Health Regency South Nias 2024. Regency South Nias has amount cases of pulmonary TB that every the year experience improvement, so that own potential height non-compliance patient in run Pulmonary TB treatment. Type study This use design study quantitative with cross sectional study approach. Sample in study This totaling 72 respondents Pulmonary TB sufferers in the Work Area Service Health Regency South Nias 2024. Based on results analysis that knowledge (p=0.003), duration of treatment (p=0.000), supervisor swallow drug (PMO) (p=0.000) there is influence support family (p=0.000) has influence to compliance Pulmonary Tuberculosis Treatment in Work Areas Service Health Regency South Nias 2024. As for the suggestions in study This expected to officer health For give counseling to TB patients under surveillance family (PMO) towards compliance treatment patient Pulmonary tuberculosis is complete appropriate on time.*

Keywords: *Attitude, Knowledge, Belief, Duration of Treatment, Supervisor Swallow Drugs (PMO), Support Family*

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INTRODUCTION

According to Collins et al. (2017), Tuberculosis (TB) is a major health problem both globally and in Indonesia, with high case and death rates. Tuberculosis treatment typically requires months of treatment and strict adherence to medication to prevent antibiotic resistance (Nahid et al., 2019; Falzon et al., 2017; Zumla et al., 2015). TB cases occur in 30 countries, accounting for 87% of all new TB cases. Eight countries account for two-thirds of new TB cases: India, China, Indonesia, the Philippines, Pakistan, Nigeria, Bangladesh, and South Africa. Indonesia, along with 13 other countries, is on the HBC (high burden countries) list for three indicators: TB, TB/HIV, and MDR-TB.

According to WHO Global TB report data, Indonesia is ranked second in the cause of death in the world after Covid, with one and a half million deaths in 2020 (Surendra et al., 2023). Based on the national guidelines of the Minister of Health Regulation number 67 of 2016 concerning Tuberculosis Control and supported by Presidential Regulation number 67 of 2021 concerning Tuberculosis Control, where the elimination of TB until 2030 with a decrease in the incidence

rate of TB to 65 (sixty-five) per 100,000 (one hundred thousand) population and a decrease in the death rate due to TB to 6 (six) per 100,000 (one hundred thousand) population.

The number of TB cases is 969,000 cases or 354 per 100,000 population, and for North Sumatra Province it is in fourth place after West Java, Central Java and East Java with an estimated 83,949 cases. Based on World Health Organization (WHO) 2021 data, it reports that the estimated number of Globally, 10.6 million people have been diagnosed with TB, an increase of approximately 600,000 cases from the estimated 10 million cases in 2000 (Mobaderi et al., 2025). Of these 10.6 million cases, 6.4 million (60.3%) have been reported and are undergoing treatment, while 4.2 million (39.7%) have not been found or diagnosed and reported. Of the total 10.6 million cases in 2021, at least 6 million were adult men, 3.4 million were adult women, and 1.2 million were children.

The overall TB death rate is also very high, with at least 1.6 million people dying from TB, an increase from the previous year's 1.3 million (WHO, 2013). There are also 187,000 deaths from TB and Human Immunodeficiency Virus (HIV). 72% of TB sufferers with HIV are in Africa and 28% are in Africa. located in eight countries, namely India (27%), China (9%), Indonesia (8%), Philippines (6%), Pakistan (5%), Nigeria (4%), Bangladesh (4%) and South Africa (3%). Globally, the incidence of new TB cases per 100,000 people per year has decreased by approximately 2%, and the TB mortality rate among HIV-negative individuals per 100,000 people per year is approximately 3%.

It is estimated that TB cases decreased by 42% between 2000 and 2017. According to the WHO, in 2020, there were an estimated 369,000 new TB cases directly related to diabetes. The frequency of diabetes in TB patients is reported to be around 10-15%, and the prevalence of this infectious disease is 2-5 times higher in diabetic patients compared to non-diabetic controls (Swarna et al., 2017). One factor contributing to TB treatment failure is medication adherence. Several studies have shown that TB patient adherence is low in several countries, including India (50%), Ethiopia (24.5%), and Indonesia (24-38.1%). van et al. (2007) and Hevey (2007), treatment adherence is a person's behavior in accordance with the recommendations of healthcare providers regarding their treatment.

Compliance with TB treatment is a crucial factor in supporting successful therapy, preventing the risk of relapse and widespread TB resistance to anti-TB drugs, better known as Multi-Drug Resistance (MDR). MDR-TB patients are at risk of becoming a source of transmission of resistant bacteria in the community, complicating TB control and eradication. Furthermore, non-compliance can increase the risk of death (Hossain et al., 2023).

North Sumatra Health Profile Data: Number of Pulmonary TB Cases in 2023: The number of pulmonary TB cases in North Sumatra was 407,992. Based on gender, the number of pulmonary TB cases in men was 32,432 (66%), while the number of pulmonary TB cases in women was 16,993 (34%). In 2022, there were 10,600,000 cases, with an estimated incidence of 354/100,000. The mortality ratio was 52/100,000, and the estimated total mortality rate was over 1,400,000. Based on gender, the number of pulmonary TB cases in men is 6,600,000 cases, while in women the number of pulmonary TB cases is 4,000,000.

In 2021, the number of pulmonary TB patients in North Sumatra was 21,967 cases. Based on gender, the number of male cases was 11,678 cases, while in women the number of cases was 10,289 cases. In 2020, the number of pulmonary TB cases in North Sumatra was 20,246 cases. Based on gender, the number of male cases was 13,034 cases, while in women the number of cases was 7,212 cases. (North Sumatra Health Office Profile 2020-2023).

South Nias Regency is a regency in North Sumatra. According to the Tuberculosis Information System of the South Nias Regency Health Office, the number of pulmonary TB cases increases annually. In 2020, 86 cases were detected, with 66 treated. In 2021, the number of pulmonary TB cases increased to 126, with 118 treated. In 2022, the number increased to 213, with 261 treated. In 2023, the number of cases increased to 317, with 367 treated.

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Treatment for pulmonary TB involves taking several types of medication regularly for six months (Campbell & Bah-Sow, 2006; Conradie et al., 2020). A person with pulmonary TB must complete the treatment according to the doctor's recommended dosage (Uplekar & Shepard, 1991). Many patients with pulmonary TB forget or even neglect to take their medication and attend regular check-ups. As a result, the six-month treatment is ineffective, and the surviving TB bacteria develop resistance to the drugs. Treating drug-resistant pulmonary TB is more difficult and expensive (Caminero et al., 2010). Currently, there are still pulmonary TB patients in Indonesia who have not recovered.

This can be caused by non-compliance with medication. Non-compliance with medication can lead to the development of Multidrug-Resistant TB (MDR-TB). MDR-TB occurs when patients stop treatment before the treatment period is completed or when patients frequently stop taking their medication during TB treatment (Sari & Kamil, 2022; Kurnianingsih et al., 2020; Mukuka, 2024). TB treatment takes a long time (up to 6-8 months) to achieve healing and requires a combination of several drugs. Therefore, it is not uncommon for patients to stop taking their medication before the treatment period is completed, resulting in TB treatment failure.

A survey conducted by the South Nias Regency Health Office of 142 pulmonary TB patients revealed that 54 were non-compliant with their TB treatment due to the lack of family to accompany them, and 24 cited fatigue from taking medication and the absence of symptoms such as coughing and fever. Meanwhile, 64 patients were compliant with their TB treatment, stating that they regularly took their medication and underwent check-ups as recommended by the community health center. Patients who are not compliant in taking their TB medication at the age of over 40 years with limited knowledge and access to health services are also far away. In addition, the long duration of TB treatment makes patients feel bored and tied to TB medication.

METHODS

The research used was a quantitative cross-sectional study, a design in which the independent and dependent variables are measured and collected simultaneously. The population in this study was all AFB (positive) lung patients who completed six months of treatment in the South Nias District Health Office's work area, totaling 260 patients. The sampling technique used was stratified random sampling, a stratified sampling method in which simple random subsamples were drawn from each stratum with approximately the same characteristics. The total sample size was 72 respondents.

RESULT AND DISCUSSION

Based on the results of the study, the identity of the respondents and the distribution of their characteristics based on age, gender, education, and occupation in the South Nias District Health Office's work area in 2024 are shown in the table below:

Table 1 Distribution of Respondent Characteristics Based on Age, Gender, Education, and Occupation in the Work Area of the South Nias District Health Office in 2024

No	**Age**	**F**	**%**
1	21-25 Years	3	4,2
2	26-35 Years	17	23,6
3	36-45 Years	26	36,1
4	46-55 Years	26	36,1
No	**Gender**	**F**	**%**
1	Male	37	51,4
2	Female	35	48,6
No	**Education**	**f**	**%**
1	Elementary School	4	5,6
2	Junior High School	22	30,6
3	High School	24	33,3

4	Student	22	30,6
No	**Occupation**	**f**	**%**
1	Farmer	29	40,3
2	Self-Employed	33	45,8
3	Civil Servant	10	13,9
	Total	**72**	**100**

Based on Table 1 above, it is known that of the 72 respondents, the most common age groups were 36-45 years (26 respondents) (36.1%), and 46-55 years (26 respondents) (36.1%). The majority of respondents were male (37 respondents) (51.4%), and 35 female (48.6%). Most respondents were high school graduates (24 respondents) (33.3%). The majority of respondents were farmers (38 respondents) (52.8%).

In this study, univariate data analysis was conducted to distribute the analysis of factors influencing adherence to pulmonary tuberculosis treatment in the work area of the South Nias Regency Health Office in 2024. Distribution of Questions Based on the Attitudes of Pulmonary TB Patients that Influence Compliance with Pulmonary Tuberculosis Treatment in the Work Area of the South Nias District Health Office in 2024.

Table 2. Description of Attitude Variables of Pulmonary TB Patients

No	Attitude	Good		Enough		Not enough	
		F	%	F	%	F	%
1	Preventing transmission to others	37	51,4	30	41,7	5	6,9
2	Cover your mouth when coughing or sneezing	17	23,6	39	54,2	16	22,2
3	Do not spit carelessly	15	20,8	41	56,9	16	22,2
4	Provide a place to dispose of phlegm as recommended	16	22,2	34	47,2	22	30,6
5	Consume medication according to the recommended dosage	20	27,8	36	50	16	22,2
6	Maintain distance from infants and toddlers	18	25	35	48,6	19	26,4
7	Regularly take medication for 6 months	21	29,2	36	50	15	20,8
8	Regularly clean bedding	15	20,8	37	51,4	20	27,8
9	Size of house according to number of occupants	17	23,6	37	51,4	18	25
10	Do not drink alcoholic beverages such as palm wine	18	25	37	51,4	17	23,6

Based on the results of table 2, it shows that most respondents answered both positive and negative questions with appropriate answers, but many answered they did not know in several questions such as providing a place to dispose of phlegm as recommended. The distribution of attitudes of pulmonary TB patients towards the analysis of factors influencing adherence to pulmonary tuberculosis treatment in the work area of the South Nias Regency Health Office in 2024 can be seen in the table below:

Table 3. Distribution of Questions Based on the Attitudes of Pulmonary TB Patients that Influence Compliance with Pulmonary Tuberculosis Treatment in the Work Area of the South Nias District Health Office in 2024

No	Good Attitude	F	%
1	Poor	25	34,7
2	Good Attitude	47	65,3
	Total	**72**	**100**

Based on Table 3 above, it is known that of the 72 respondents, the majority (47 respondents) had poor knowledge, while 25 respondents (34.7%) had a good attitude. Distribution of Questions Based on Knowledge of Pulmonary TB Patients Affecting Pulmonary Tuberculosis Treatment Adherence in the Work Area of the South Nias Regency Health Office in 2024. Knowledge in this study refers to respondents' level of knowledge regarding treatment, including TB incidence, prevention efforts, and TB control. The following is a frequency distribution table.

Table 4 Description of Knowledge Variables

No	Knowledge	Correct		Wrong		Don't know	
		f	%	f	%	f	%
1	Causes of Pulmonary TB	42	58,3	28	38,9	2	2,8
2	Presence of Pulmonary TB germs	42	58,3	14	19,4	16	22,2
3	Organs attacked by Pulmonary TB germs	35	48,6	28	38,9	9	12,5
4	Symptoms of Pulmonary TB	46	63,9	10	13,9	16	22,2
5	TB Transmission	42	58,3	22	30,6	8	11,1
6	Symptoms in Pulmonary TB Patients	48	66,7	10	13,9	14	19,4
7	Prevention of Pulmonary TB	38	52,8	24	33,3	10	13,9
8	Treatment of Pulmonary TB	38	52,8	16	22,2	18	25
9	Nutritious Food for Pulmonary TB Patients	31	43,1	24	33,3	17	23,6
10	Treatment Failure	30	41,7	22	30,6	20	27,8

Based on the results of table 4, it shows that most respondents answered the good and bad questions with appropriate answers, but many answered they did not know when asked about treatment failure in Pulmonary Tuberculosis patients. The distribution of respondents based on the knowledge of Pulmonary Tuberculosis patients regarding adherence to Pulmonary Tuberculosis treatment in the work area of the South Nias Regency Health Office in 2024 can be seen in the table below:

Table 5. Distribution of Questions Based on Knowledge of Pulmonary TB Patients that Influence Compliance with Pulmonary Tuberculosis Treatment in the Work Area of the South Nias District Health Office in 2024

No	Knowledge	F	%
1	Good	26	36,1
2	Bad	46	63,9
	Total	**72**	**100**

Based on Table 5 above, it is known that of the 72 respondents, the majority (46 respondents (63.9%) had poor knowledge, while the remaining 26 (36.1%) had good knowledge. Distribution of Questions Based on Beliefs of Pulmonary TB Patients Affecting Pulmonary Tuberculosis Treatment Adherence in the South Nias Regency Health Office Work Area in 2024 Belief in this study refers to respondents' level of confidence in treatment, including TB incidence, prevention, and control efforts. The following is a frequency distribution table.

Table 6. Description of Trust Variables of Pulmonary TB Patients

No	Trust	Correct		Wrong	
		F	%	F	%
1	Pulmonary TB can be cured with regular treatment.	62	83,3	10	13,9
2	The transmission of pulmonary TB can be prevented with preventive measures.	49	66,7	23	31,9
3	Information received about pulmonary TB.	59	81,9	13	18,1
4	The TB treatment you undergo will be cured.	58	79,2	14	19,4
5	The healthcare professional treating you has sufficient knowledge about pulmonary TB.	58	60,6	14	19,4

6	The healthcare professional provides clear information.	57	73,6	15	20,8
7	Complete the entire course of treatment.	53	72,2	17	26,4
8	The healthcare professional pays attention to your needs and condition during treatment.	60	65,3	12	16,7
9	The healthcare professional provides support.	54	68,1	18	25
10	Diagnosis of Pulmonary TB	49	61,1	24	33,3

The distribution of Pulmonary TB Patients' Trust in the Analysis of Factors Influencing Pulmonary Tuberculosis Treatment Compliance in the Work Area of the South Nias District Health Office in 2024 can be seen in the table below:

Table 7. Distribution of Questions Based on the Beliefs of Pulmonary TB Patients Regarding Analysis of Factors Influencing Compliance with Pulmonary Tuberculosis Treatment in the Work Area of the South Nias District Health Office in 2024

No	Trust	F	%
1	Yes	50	69,4
2	No	22	30,6
	Total	**72**	**100**

Based on Table 4.7 above, it is known that of the 72 respondents, the majority (50 respondents) believed in adherence to treatment, with 69.4% believing in the cure of pulmonary TB. The remaining 22 respondents (30.6%) did not believe in the cure of pulmonary TB. Distribution of Questions Based on Length of Treatment for Pulmonary TB Patients Affecting Adherence to Pulmonary Tuberculosis Treatment in the Work Area of the South Nias Regency Health Office in 2024. In this study, duration of treatment refers to respondents' level of confidence in treatment, including TB incidence and TB prevention and control efforts. The following is a frequency distribution table:

Table 8. Description of the Variable of Treatment Duration

No	Treatment Duration	Yes		No	
		F	%	F	%
1	Pulmonary TB treatment lasts 6 months	72	100	0	0
2	Currently undergoing pulmonary TB treatment	72	100	0	0
3	Pulmonary TB treatment before the prescribed time	38	52,8	34	47,2
4	Difficulty completing pulmonary TB treatment due to the long duration	35	48,6	37	51,4
5	Stopping pulmonary TB treatment early can lead to drug resistance	44	61,1	28	38,9
6	Health workers explain the importance of completing TB treatment	72	100	0	0
7	Support from family or community to complete pulmonary TB treatment	72	100	0	0
8	Missing TB medication schedule during treatment	40	55,6	32	44,4
9	Pulmonary TB treatment must be carried out consistently without interruption	51	70,8	21	29.2
10	Incomplete pulmonary TB treatment can worsen your health condition	49	68,1	23	31,9

The results in Table 8 show that the majority of respondents answered both positive and negative questions with appropriate answers. Regarding the question from health workers explaining the importance of completing TB treatment and gaining family support for TB treatment completion, all 72 respondents agreed.

Table 9. Distribution of Questions Based on the Length of Treatment of Pulmonary TB Patients Regarding the Analysis of Factors Influencing Compliance with Pulmonary Tuberculosis Treatment in the Work Area of the South Nias District Health Office in 2024

No	Treatment Duration	F	%
1	Appropriate	56	77,8
2	Not Appropriate	16	22,2
	Total	**72**	**100**

Based on Table 9 above, it is known that of the 72 respondents, the majority of respondents (56 respondents (77.8%) were knowledgeable about the duration of treatment, while the remaining 16 (22.2%) respondents were knowledgeable about the duration of treatment. Distribution of Questions Based on Medication Supervisors (PMO) of Pulmonary TB Patients Affecting Pulmonary Tuberculosis Treatment Adherence in the South Nias Regency Health Office Work Area in 2024. In this study, Medication Supervisors (PMO) refers to respondents' level of trust in treatment, including TB incidence and TB prevention and control efforts. The following is a frequency distribution table:

Table 10. Description of Medication Supervisor Variables (PMO)

No	Medication Supervisor (PMO)	Yes		No	
		F	%	F	%
1	Monitoring when taking medication	72	100	0	0
2	Monitoring when taking medication				
3	Taking medication according to the prescribed schedule	72	100	0	0
4	Examining sputum according to the schedule	38	52,8	34	47,2
5	Advising if you neglect to take medication	35	48,6	37	51,4
6	Encouraging you to seek treatment	44	61,1	28	38,9
7	The PMO is from a healthcare professional	72	100	0	0
8	The PMO records every time you take medication	40	55,6	32	44,4
9	The PMO keeps the medication blister	51	70,8	21	29,2
10	The PMO forgets to remind you to take medication	49	68,1	23	31,9

Based on the results of Table 10, it shows that most respondents answered the positive and negative questions with appropriate answers, but many answered no to the question regarding PMO always reprimanding patients if they do not or are negligent in taking medication.

Table 11 Distribution of Questions Based on Drug Swallowing Supervisors (PMO) of Pulmonary TB Patients that Influence Compliance with Pulmonary Tuberculosis Treatment in the Work Area of the South Nias District Health Office in 2024

No	Medication Supervisor	F	%
1	Good	30	41,7
2	Poor	42	58,3
	Total	**72**	**100**

Based on Table 11 above, it is known that of the 72 respondents, the majority of respondents had inadequate medication monitoring (PMO), amounting to 42 (58.3%), while the remaining respondents had a good treatment duration, amounting to 30 (41.7%). Distribution of Questions Based on Family Support of Pulmonary TB Patients Affecting Pulmonary Tuberculosis Treatment Adherence in the South Nias Regency Health Office Work Area in 2024. Family support in this study refers to respondents' level of trust in treatment, including TB incidence and TB prevention and control efforts. The following is a frequency distribution table:

Table 12. Description of Family Support Variables

No	Family Support	Yes		No	
		F	%	F	%
1	The family reminds the patient to take their medication	60	82,3	12	16,7
2	Accompanies the patient to the community health center	54	75	18	25
3	Assists with the patient's needs	58	80,6	14	19,4
4	Reminds the patient to follow the healthcare provider's recommendations	50	69,4	22	30,6
5	Cares for the patient carefully	58	80,6	14	19,4
6	Makes time to help prepare meals	52	72,2	20	27,8
7	Assists the patient in maintaining a clean environment	59	81,9	13	18,1
8	Provides a comfortable room	53	73,6	19	26,4
9	Helps tidy up clutter	60	83,3	12	16,7
10	Finds difficulty quitting smoking despite symptoms of respiratory problems	54	75	18	25

The results of Table 12 show that the majority of respondents answered both positive and negative questions with appropriate answers, but many answered no to the question regarding family support always reminding patients to follow the recommendations of healthcare professionals. Based on the analysis, the knowledge variable was divided into two categories: poor and good. The results of the analysis are presented in the following table: The distribution of family support for pulmonary tuberculosis patients regarding the analysis of factors influencing adherence to pulmonary tuberculosis treatment in the South Nias Regency Health Office work area in 2024 can be seen in the table below:

Table 13. Distribution of Questions Based on Family Support of Pulmonary TB Patients Regarding Analysis of Factors Influencing Compliance with Pulmonary Tuberculosis Treatment in the Work Area of the South Nias District Health Office in 2024

No	Family Support	F	%
1	Good	54	75
2	Poor	18	25
	Total	**72**	**100**

Based on table 13 above, it is known that of the 72 respondents, the majority of respondents received family support, namely 54 people (75%) respondents, while other respondents received less family support, namely 18 people (25%).

Pulmonary tuberculosis tends to be more prevalent in men than in women, as smoking and drinking alcohol can weaken the immune system, making them more susceptible to the causative agent. The study revealed that of the 72 respondents, 37 (61.67%) were male, and 23 (38.33%) were female. Men were more likely to suffer from pulmonary tuberculosis than women, who primarily engage in household chores. Cross-tabulation results indicate that male patients tended to be less compliant with anti-tuberculosis medication than female respondents. Age is an important variable in studying a health problem because it is related to immune system health, health threats, and lifestyle habits. This study also examined the relationship between age and adherence. The results showed that of the 72 respondents, the majority were 36-45 years old (25 respondents, 41.67%). Three (5.00%) were aged 21-25, 17 (28.33%) were aged 26-35, and 15 (25.00%) were aged 46-55. Age was also found to influence adherence.

Furthermore, employed patients tended to have lower adherence levels. The results showed that of the 72 respondents, 29 (48.33%) were farmers, 21 (35.00%) were self-employed, and 10 (16.67%) were civil servants. This means that even though TB patients are engaged in work, they are motivated within themselves, and this motivation arises when there is a need that cannot be postponed. According to WHO (2015), TB eradication can be achieved by routinely using anti-tuberculosis medication. The success of the program is determined by adherence to

taking the full course of medication. Therefore, the involvement of various parties and sectors in society, including the private sector, professional organizations, social organizations, and NGOs, is essential. This is especially true for pharmacists, hospital pharmacy units, and other institutions that serve the community in meeting their TB medication needs (Atif et al., 2022)

Based on the researcher's assumption, the characteristics of respondents are crucial for a person's behavior. Achieving understanding and awareness in taking action is not easy. One factor is gender, which determines lifestyle habits. These lifestyle habits differ between men and women. Education is a teaching and learning process that develops a set of behaviors, activities, and actions. By learning both formally and informally, humans will be able to increase intellectual maturity and have a biological basis that allows the two sexes to develop different behaviors. In addition, education, environmental situations and conditions will also determine the influence on the formation of attitudes and behavior. With the knowledge gained, I will know the benefits of the advice or suggestions of health workers so that I will be motivated to be more obedient in undergoing the treatment recommended by health workers. The following are several scientific journals that support research analysis on factors influencing medication adherence in patients with pulmonary tuberculosis, namely:

According to previous research at the Rangas Community Health Center in Mamuju Regency, this study identified that knowledge, motivation, and family support (PMO) were significant factors influencing adherence to pulmonary tuberculosis treatment. Meanwhile, support from healthcare workers and access to health facilities did not significantly influence patient adherence. According to previous research on the Analysis of Factors Associated with Adherence to Anti-Tuberculosis Medication in Pulmonary TB Patients at the Samuda and Bapinang Community Health Centers in East Kotawaringin, this study found that patient motivation and the role of the Medication Supervisor (PMO) were significantly associated with medication adherence. Conversely, education, employment, and distance to health facilities did not show a significant relationship. This study showed that education, knowledge, family income, disease duration, and drug side effects significantly influenced non-adherence to medication in patients with pulmonary tuberculosis. Education was found to be the most dominant factor (Nezenega et al., 2020).

According to research at the Sambirejo Community Health Center in Sragen Regency, the results of this study indicate that motivation and family support have a significant influence on medication adherence in pulmonary TB patients. Meanwhile, knowledge, access to health facilities, and support from health workers did not show a significant influence (Jonas et al., 2017). According to previous research at the dr. Lapalaloi Regional Hospital in Maros, Factors Associated with Medication Adherence in Pulmonary TB Patients showed a relationship between knowledge, drug side effects, family support, and the role of the PMO with medication adherence in pulmonary TB patients. However, patient attitudes did not show a significant relationship. Furthermore, based on the results of the study, knowledge and attitude significantly correlated with patient adherence in taking anti-TB medication. Conversely, the role of the PMO and patient motivation were found to influence medication adherence. Support from Health Workers Was Not Associated with Medication Adherence.

This study aligns with research on the Aisyiyah "Community TB Care" program in Makassar City, which showed that support from health workers did not significantly correlate with medication adherence in TB patients. Conversely, knowledge, trust, and family support were found to be associated with medication adherence. A literature review analyzing several studies found that factors such as age, gender, education, occupation, attitudes, behavioral control, distance to health services, and duration of treatment did not significantly influence TB treatment adherence. Conversely, family support, positive self-efficacy, subjective norms, drug side effects, and PMO support significantly influenced patients' desire for recovery, their mindset, and their knowledge of TB.

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CONCLUSION

Based on the results of research that has been conducted, a person's knowledge and attitude factors influence their actions. Lack of knowledge about pulmonary TB disease will give rise to bad behavior, including the habit of sufferers not taking medication, and irregular treatment, as well as various other factors. Lack of knowledge will lead to less action in preventing pulmonary TB disease and cause an increase in pulmonary TB patients. Medication Supervisors play an important role in adherence to treatment in sufferers. Family is the closest relationship with TB sufferers. Emotional support provided by the family greatly influences patient healing, so it will encourage patients to be able to undergo treatment regularly, this is because the support provided is used as a driving force for patients in carrying out a therapy program.

SUGGESTION

The results of this study are expected to lead to the development of an outreach program on factors influencing adherence to treatment for pulmonary tuberculosis patients, both for families and for patients themselves. Families are expected to actively encourage medication adherence in patients to prevent treatment resistance.

REFERENCES

Atif, M., Munir, K., Malik, I., Al-Worafi, Y. M., Mushtaq, I., & Ahmad, N. (2022). Perceptions of healthcare professionals and patients on the role of the pharmacist in TB management in Pakistan: A qualitative study. *Frontiers in Pharmacology*, *13*, 965806. https://doi.org/10.3389/fphar.2022.965806

Caminero, J. A., Sotgiu, G., Zumla, A., & Migliori, G. B. (2010). Best drug treatment for multidrug-resistant and extensively drug-resistant tuberculosis. *The Lancet infectious diseases*, *10*(9), 621-629.

Campbell, I. A., & Bah-Sow, O. (2006). Pulmonary tuberculosis: diagnosis and treatment. *Bmj*, *332*(7551), 1194-1197. https://doi.org/10.1136/bmj.332.7551.1194

Collins, D., Hafidz, F., & Mustikawati, D. (2017). The economic burden of tuberculosis in Indonesia. *The International Journal of Tuberculosis and Lung Disease*, *21*(9), 1041-1048. https://doi.org/10.5588/ijtld.16.0898

Conradie, F., Diacon, A. H., Ngubane, N., Howell, P., Everitt, D., Crook, A. M., ... & Spigelman, M. (2020). Treatment of highly drug-resistant pulmonary tuberculosis. *New England Journal of Medicine*, *382*(10), 893-902. https://doi.org/10.1056/NEJMoa1901814

Falzon, D., Schünemann, H. J., Harausz, E., González-Angulo, L., Lienhardt, C., Jaramillo, E., & Weyer, K. (2017). World Health Organization treatment guidelines for drug-resistant tuberculosis, 2016 update. *European Respiratory Journal*, *49*(3). https://doi.org/10.1183/13993003.02308-2016

Hevey, D. (2007). Adherence to health recommendations. In *Cardiovascular prevention and rehabilitation* (pp. 293-300). London: Springer London. https://doi.org/10.1007/978-1-84628-502-8_35

Hossain, M. R., Islam, M. S., Akter, S., Anisuzzaman, A. H. M., Abdullah-Al-Maruf, M., & Mohammed, N. (2023). Impact of education on non-compliance and MDR TB risk: specialized hospital study. *Saudi J Med*, *8*(12), 659-663. https://doi.org/10.36348/sjm.2023.v08i12.007

Jonas, K., Crutzen, R., van den Borne, B., & Reddy, P. (2017). Healthcare workers' behaviors and personal determinants associated with providing adequate sexual and reproductive healthcare services in sub-Saharan Africa: a systematic review. *BMC pregnancy and childbirth*, *17*(1), 86. https://doi.org/10.1186/s12884-017-1268-x

Kurnianingsih, W., Tamtomo, D. G., & Murti, B. (2020). The effect of non-compliance with medication on multidrug resistant of tuberculosis. *Journal of Epidemiology and Public*

Health, *5*(4), 442-450.

Mobaderi, T., Kazemnejad, A., & Salehi, M. (2025). Clustering and modeling joint-trajectories of HIV/AIDS and tuberculosis mortality rates using bayesian multi-process latent growth model: A global study from 1990 to 2021. *BMC Infectious Diseases*, *25*(1), 330. https://doi.org/10.1186/s12879-025-10715-x

Mukuka, B. (2024). A Study to Assess Anti-TB Treatment Compliance, Factors Predictive for Poor Adherence and Perpetual Defaulting among Patient Living with TB in Namuseche Chipata Eastern Province–Zambia. *Mukuka Brian*. https://doi.org/10.38124/ijisrt/IJISRT24OCT005

Nahid, P., Mase, S. R., Migliori, G. B., Sotgiu, G., Bothamley, G. H., Brozek, J. L., ... & Seaworth, B. (2019). Treatment of drug-resistant tuberculosis. An official ATS/CDC/ERS/IDSA clinical practice guideline. *American journal of respiratory and critical care medicine*, *200*(10), e93-e142. https://doi.org/10.1164/rccm.201909-1874ST

Nezenega, Z. S., Perimal-Lewis, L., & Maeder, A. J. (2020). Factors influencing patient adherence to tuberculosis treatment in Ethiopia: a literature review. *International journal of environmental research and public health*, *17*(15), 5626. https://doi.org/10.3390/ijerph17155626

Sari, Y. S., & Kamil, H. (2022). The patient with multi-drug resistant–pulmonary tuberculosis adherence to treatment: a qualitative study. *Enfermería clínica*, *32*, S58-S61. https://doi.org/10.1016/j.enfcli.2022.03.019

Surendra, H., Elyazar, I. R., Puspaningrum, E., Darmawan, D., Pakasi, T. T., Lukitosari, E., ... & Hamers, R. L. (2023). Impact of the COVID-19 pandemic on tuberculosis control in Indonesia: a nationwide analysis of programme data and health system vulnerabilities. *medRxiv*, 2023-02. https://doi.org/10.1101/2023.02.09.23285740

Swarna Nantha, Y., Puri, A., Mohamad Ali, S. Z., Suppiah, P., Che Ali, S. A., Ramasamy, B., & Ibrahim, I. M. (2017). Epidemiology of latent tuberculosis infection among patients with and without diabetes mellitus. *Family practice*, *34*(5), 532-538. https://doi.org/10.1093/fampra/cmx017

Uplekar, M. W., & Shepard, D. S. (1991). Treatment of tuberculosis by private general practitioners in India. *Tubercle*, *72*(4), 284-290. https://doi.org/10.1016/0041-3879(91)90055-W

van Dulmen, S., Sluijs, E., Van Dijk, L., de Ridder, D., Heerdink, R., & Bensing, J. (2007). Patient adherence to medical treatment: a review of reviews. *BMC health services research*, *7*(1), 55. https://doi.org/10.1186/1472-6963-7-55

World Health Organization, & World Health Organization Staff. (2013). *Global tuberculosis report 2013*. Switzerland: World health organization.

Zumla, A., Chakaya, J., Centis, R., D'Ambrosio, L., Mwaba, P., Bates, M., ... & Migliori, G. B. (2015). Tuberculosis treatment and management—an update on treatment regimens, trials, new drugs, and adjunct therapies. *The Lancet Respiratory Medicine*, *3*(3), 220-234.

