Analysis of The Influence of Knowledge, Behavior of Pulmonary Tuberculosis Patients, and Health Facility Services On The Success of Tuberculosis Treatment In Manufahi Regency

Jermano Pinto[1]*, Indasah[2], Nurwijayanti[3]

[1,2,3]Ministry of Health Polytechnic of Health Semarang, Indonesia
*Corresponding author:
E-mail: Jermanopinto70@gmail.com

Abstract.
Tuberculosis (TB) remains a priority infectious disease for public health management in Timor-Leste. Treatment success is a key indicator in TB control programs, as it plays a crucial role in breaking the chain of transmission, preventing drug resistance, and reducing morbidity and mortality rates. However, treatment success is influenced by various factors, including patient knowledge, patient behavior during therapy, and the quality of health facility services. This study aimed to analyze the influence of knowledge, patient behavior, and health facility services on TB treatment success in Manufahi District. This study employed an analytical survey design with a cross-sectional approach. The study population consisted of all 178 tuberculosis patients undergoing treatment in Manufahi District; the entire population was included in the sample using a total sampling technique. Data were collected using a questionnaire that had undergone validity and reliability testing, and were subsequently analyzed using univariate analysis, the Chi-square test, and logistic regression at a significance level of $\alpha=0.05$. The results showed that 59.6% of respondents possessed good knowledge, 62.4% exhibited good behavior, 71.3% rated health facility services as good, and 70.8% successfully completed their TB treatment. Bivariate analysis indicated that knowledge ($p=0.012$), patient behavior ($p=0.011$), and health facility services ($p<0.05$) significantly influenced treatment success. Logistic regression analysis revealed that knowledge ($p=0.011$; $Exp(B)=1.132$), patient behavior ($p=0.036$; $Exp(B)=0.936$), and health facility services ($p=0.029$; $Exp(B)=0.758$) were significant factors influencing TB treatment success. Patient knowledge, the behavior of tuberculosis patients, and healthcare facility services significantly influence tuberculosis treatment success in Manufahi District. Efforts to enhance health education, strengthen patient adherence during therapy, and improve the quality of healthcare facility services must be sustained to increase treatment success rates and support the achievement of the tuberculosis elimination program in Timor-Leste.

Keywords: ***Treatment Success, Healthcare Facility Services, Knowledge, Behavior and Tuberculosis.***

I. INTRODUCTION

Tuberculosis (TB) is an infectious disease that remains a global public health problem. The World Health Organization (WHO) reports that in 2023 there will be approximately 10.8 million new cases of tuberculosis and 1.25 million deaths from this disease. Tuberculosis is one of the leading causes of death from infectious diseases and remains a challenge in achieving the End TB Strategy target by 2030. Treatment success is a crucial indicator in TB control programs because it plays a role in breaking the chain of transmission, preventing relapse, and reducing the risk of anti-tuberculosis drug resistance [1].

Timor-Leste is one of the countries with a high tuberculosis burden in Southeast Asia. The WHO estimates the tuberculosis incidence rate in Timor-Leste is around 498 cases per 100,000 population, significantly higher than the global average. The high TB incidence is influenced by various factors, such as poverty, malnutrition, high smoking prevalence, limited access to health services, and low public awareness of tuberculosis. These conditions result in low early case detection and potentially reduce the success of patient treatment [1].

In Manufahi Regency, tuberculosis remains a priority for health programs. Data from the Manufahi Regency Health Office shows that in 2022, 2023, 166 cases were detected, and in 2024, 74 cases were confirmed bacteriologically [2]. Although most patients successfully completed treatment, some patients died during therapy, thus limiting the target for successful treatment. Preliminary studies also indicate delays

in case detection, low public awareness of early screening, and suboptimal implementation of tuberculosis screening and referrals in healthcare facilities.

The success of tuberculosis treatment is influenced by various factors, both from the patient and the healthcare system. Individual factors include patient knowledge about tuberculosis and behavior during treatment. Good knowledge will increase patient understanding of the importance of adherence to complete medication, while positive behavior encourages patients to follow the entire course of therapy according to standards. Furthermore, healthcare facilities also play a crucial role through the availability of healthcare workers, easy access to services, the availability of anti-tuberculosis drugs, and the provision of education and support to patients during treatment. These three factors interact to determine the success of tuberculosis therapy [3], [4].

Various studies have reported a relationship between knowledge, patient behavior, and the quality of healthcare services with the success of tuberculosis treatment [5], [6]. However, based on the literature review conducted by researchers, there are not many studies that analyze these three factors simultaneously in tuberculosis patients in Manufahi Regency. Given the unique social, cultural, and healthcare system characteristics of Timor-Leste, scientific evidence tailored to local conditions is needed. Therefore, this study aims to analyze the influence of knowledge, behavior of pulmonary tuberculosis patients, and healthcare services on the success of tuberculosis treatment in Manufahi Regency. The results are expected to provide a basis for policymakers to improve the quality of tuberculosis services, strengthen patient education, and increase the success of the TB control program in Timor-Leste.

II. METHODS

This study used an observational analytical design with a cross-sectional approach. The study was conducted in Manufahi Regency, Timor-Leste, in 2025. The study population was all 178 pulmonary tuberculosis patients undergoing treatment, using a total sampling technique. The independent variables included knowledge, behavior of pulmonary tuberculosis patients, and health facility services, while the dependent variable was the success of tuberculosis treatment. Data were collected using a questionnaire and analyzed univariately, bivariately using the Chi-square test, and multivariately using logistic regression with a significance level of $\alpha = 0.05$.

III. RESULTS AND DISCUSSION

Respondent Characteristics

Table 1. Characteristics of Tuberculosis Patient Respondents in Manufahi Regency in 2025 (n=178)

Characteristics	n	%
Gender		
Man	130	73.0
Woman	48	27.0
Marital status		
Marry	131	73.6
Single	35	19.7
Widow	6	3.4
Widower	6	3.4
Work		
Farmer	59	33.1
Housewife	32	18.0
Businessman	30	16.9
Civil Servants (PNS)	29	16.3
Student	12	6.7
Company Workers	9	5.1
Fisherman	4	2.2
Unemployment	3	1.7
Monthly Income		
1-50 dollars per month	81	45.5
51-100 dollars per month	42	23.6

101-300 dollars per month	38	21.3
> 300 dollars per month	17	9.6
Total	**178**	**100.0**

Based on Table 1, the majority of respondents were male (130 people) (73.0%), while 48 respondents were female (27.0%). Based on marital status, the majority of respondents were married, namely 131 people (73.6%). Based on occupation, the majority of respondents worked as farmers, namely 59 people (33.1%), while based on monthly income, almost half of the respondents had an income of 1–50 dollars per month, namely 81 people (45.5%).

Frequency Distribution of Research Variables

Table 2. Frequency Distribution of Knowledge, Behavior of Tuberculosis Patients, Health Facility Services, and Treatment Successin Manufahi Regency in 2025 (n=178)

Variables	n	%
Knowledge		
Not good	72	40.4
Good	106	59.6
Behavior of Tuberculosis Patients		
Not good	67	37.6
Good	111	62.4
Health Facility Services		
Not good	51	28.7
Good	127	71.3
Tuberculosis Treatment Success		
Not successful	52	29.2
Succeed	126	70.8
Total	**178**	**100.0**

Based on Table 2, most respondents had good knowledge, namely 106 people (59.6%), while respondents with poor knowledge were 72 people (40.4%). Based on the behavior of tuberculosis sufferers, most respondents had good behavior, namely 111 people (62.4%), while 67 people (37.6%) had poor behavior. In the health facility service variable, most respondents rated the health facility service as good, namely 127 people (71.3%), while 51 people (28.7%) rated the health facility service as poor. As for the treatment success variable, most respondents successfully completed tuberculosis treatment, namely 126 people (70.8%), while 52 people (29.2%) did not successfully complete treatment.

The Influence of TB Patient Knowledge on the Success of Tuberculosis Treatment

Table 3. The Influence of TB Patient Knowledge on Treatment Success Tuberculosis in Manufahi Regency in 2025 (n=178)

Knowledge	Failed n(%)	Succeed n (%)	Total n (%)	*p-value*
Not good	20 (27.8)	52 (72.2)	72 (100.0)	
Good	32 (30.2)	74 (69.8)	106 (100.0)	0.012
Total	**52 (29.2)**	**126 (70.8)**	**178 (100.0)**	

Based on Table 3, respondents with poor knowledge were mostly successful in undergoing tuberculosis treatment, namely 52 people (72.2%), while those who were unsuccessful were 20 people (27.8%). Among respondents with good knowledge, 74 people (69.8%) were successful in undergoing tuberculosis treatment and 32 people (30.2%) were unsuccessful. The results of the Chi-square test showed a p value = 0.012 ($p < 0.05$), so it can be concluded that there is a significant influence between TB patient knowledge and the success of tuberculosis treatment in Manufahi Regency.

The Influence of Tuberculosis Patient Behavior on the Success of Tuberculosis Treatment

Table 4. The Influence of Tuberculosis Patient Behavior on the Success of Tuberculosis Treatment in Manufahi Regency in 2025 (n=178)

TB Patient Behavior	Not successful n (%)	Succeed n (%)	Total n (%)	*p-value*
Not good	20 (29.9)	47 (70.1)	67 (100.0)	
Good	32 (28.8)	79 (71.2)	111 (100.0)	0.011
Total	**52 (29.2)**	**126 (70.8)**	**178 (100.0)**	

Based on Table 4, respondents with poor behavior were mostly successful in undergoing tuberculosis treatment, namely 47 people (70.1%), while 20 people (29.9%) were unsuccessful in undergoing treatment. Meanwhile, among respondents with good behavior, 79 people (71.2%) were successful in undergoing tuberculosis treatment and 32 people (28.8%) were unsuccessful in undergoing treatment. The results of the Chi-square test showed a p value = 0.011 ($p < 0.05$), so it can be concluded that there is a significant influence between the behavior of tuberculosis patients on the success of tuberculosis treatment in Manufahi Regency.

The Influence of Health Facility Services on the Success of Tuberculosis Treatment

Table 5. Relationship between Health Facility Services and the Success of Tuberculosis Treatment in Manufahi Regency

Health Facility Services	Failed n (%)	Success n (%)	**Total**	***p-value***
Not good	17 (33.3)	34 (66.7)	51 (100.0)	
Good	35 (27.6)	92 (72.4)	127 (100.0)	0.029
Total	**52 (29.2)**	**126 (70.8)**	**178 (100.0)**	

Based on Table 5, respondents who received poor quality health facility services were mostly successful in undergoing tuberculosis treatment, namely 34 people (66.7%), while 17 people (33.3%) were unsuccessful in undergoing treatment. Meanwhile, among respondents who received good quality health facility services, 92 people (72.4%) were successful in undergoing tuberculosis treatment and 35 people (27.6%) were unsuccessful in undergoing treatment. The results of the Chi-square test showed a p value = 0.029 ($p < 0.05$), so it can be concluded that there is a significant influence between health facility services and the success of tuberculosis treatment in Manufahi Regency.

Discussion

1. Characteristics of Tuberculosis Patient Respondents in Manufahi Regency

Based on the results of a study of 178 tuberculosis patients in Manufahi Regency, the characteristics of the respondents showed that the majority of patients were male, namely 130 people (73.0%), with the largest age group being 51–60 years old, at 58 people (32.6%). The male dominance in this study indicates that tuberculosis incidence is more common in men than women. This may be related to social activity factors, mobility, environmental exposure, and health behaviors that can increase the risk of exposure to Mycobacterium tuberculosis. In addition, the adult to elderly age group is at greater risk due to the possibility of decreased immunity and a longer history of exposure to TB risk factors.

Based on socio-demographic characteristics, the majority of respondents came from the Centru Saude Same area (88 people (49.4%), were Catholic (148 people (83.1%), were married (131 people (73.6%), had no education/illiteracy (46 people (25.8%), and worked as farmers (59 people (31.1%). These characteristics reflect the condition of the Manufahi Regency community, which is mostly in the agricultural sector with limited educational and socio-economic levels. Low levels of education can affect patients' ability to understand health information, while employment and economic conditions can affect access to health services, nutritional fulfillment, and adherence to TB treatment.

Based on income characteristics, the majority of respondents had a low income, namely 1–50 dollars per month, as many as 81 people (45.5%). Economic conditions are one of the social factors that can affect the success of tuberculosis treatment even though TB drugs are provided free of charge by health programs. Economic limitations can be related to the ability to meet basic needs, transportation costs to health facilities, and support during the treatment process. Overall, the characteristics of respondents indicate that TB patients in Manufahi Regency are predominantly adult men, with educational backgrounds, occupations, and economic conditions that require attention in efforts to improve treatment success through health education, family support, and strengthening health services.

2. The Influence of Tuberculosis Patient Knowledge on the Success of Tuberculosis Treatment

The research results show a significant influence between tuberculosis patient knowledge and the success of tuberculosis treatment in Manufahi Regency, with a p-value of <0.05, which is 0.012. Patients with good knowledge are more likely to successfully undergo treatment than those with poor knowledge. This indicates that knowledge is a crucial factor in supporting the success of tuberculosis treatment, as

patients who understand their disease are better able to carry out therapy as recommended by healthcare professionals.

Good knowledge allows patients to better understand the causes of tuberculosis, how it is transmitted, the importance of adherence to taking Anti-Tuberculosis Drugs (OAT), the duration of treatment, and the risks of premature discontinuation. This finding aligns with Notoatmodjo's [3] theory, which states that knowledge is fundamental to shaping a person's health behavior. The better a person's knowledge, the more likely they are to take health actions that support the healing process.

The results of this study align with those of Gebreweld et al. [7], which showed that patient knowledge is one of the factors influencing adherence to tuberculosis treatment. The study also identified that family support, communication with healthcare professionals, medication side effects, stigma, and ease of access to healthcare services all play a role in patient adherence to therapy.

Based on the characteristics of the respondents in this study, patients with low educational levels were still found, with 46 respondents (25.8%) not attending school or being illiterate. This condition can be a barrier to receiving health information. However, this study also found that patients with good knowledge still experienced treatment failure. This can be caused by other factors such as drug side effects, drug-resistant TB, comorbidities, social stigma, lack of family support, and barriers to accessing health services. Therefore, increasing knowledge needs to be done continuously through education, counseling, and patient support during treatment.

3. The Influence of Tuberculosis Patient Behavior on the Success of Tuberculosis Treatment

The research results show a significant influence between the behavior of tuberculosis patients and the success of tuberculosis treatment in Manufahi Regency, with a p-value of 0.011, <0.05. Patients with good behavior have a greater chance of achieving treatment success than those with poor behavior. This indicates that patient behavior during therapy is a crucial factor in determining the success of tuberculosis treatment.

Behaviors that support successful tuberculosis treatment include adherence to medication schedules, regular check-ups and check-ups, following healthcare provider recommendations, and adopting a healthy lifestyle during therapy. Conversely, poor behaviors, such as irregular medication intake, prematurely stopping treatment, and not attending scheduled check-ups, can increase the risk of treatment failure, relapse, and the development of drug-resistant tuberculosis [4], [9], [10].

The results of this study align with those of Tola et al. [8], which showed that patient adherence to tuberculosis therapy is influenced by patient behavior and beliefs about the benefits of treatment. Patients who adhere to medication, undergo regular check-ups, and follow healthcare provider recommendations have a greater chance of completing treatment than non-compliant patients. This finding is also supported by research by Gebreweld et al. [7], which states that patient behavior, including adherence to therapy, is a critical factor influencing the success of tuberculosis treatment. Conversely, behaviors such as stopping therapy prematurely or irregular medication use can increase the risk of treatment failure and the development of drug-resistant tuberculosis [4], [9], [10].

In this study, the majority of respondents (59 people) worked as farmers. This condition is thought to have affected treatment adherence, as work demands and time constraints can hinder patients from regularly visiting healthcare facilities for check-ups. Therefore, in addition to individual behavior, socioeconomic factors and occupational characteristics also need to be considered in efforts to improve the success of tuberculosis treatment.

4. The Influence of Health Facility Services on the Success of Tuberculosis Treatment

The research results show a significant effect between health facility services and the success of tuberculosis treatment in Manufahi Regency, with a p-value of 0.029, <0.05. Patients who rated health facility services as good were more likely to achieve treatment success than those who rated them as poor. This indicates that the quality of health services is a crucial factor in supporting the success of tuberculosis treatment programs.

Good healthcare services can support successful tuberculosis treatment through the availability of anti-tuberculosis drugs, regular check-ups, health education, monitoring medication adherence, and support

from healthcare professionals during therapy. Ease of access to services is also a crucial factor, especially for patients living in rural areas who face distance and transportation barriers to healthcare facilities [4], [9], [10]. In this study, the majority of respondents (88 people or 49.4%) came from CS. Same, which is the center of Manufahi Regency, thus offering relatively easier access to healthcare services compared to other areas.

The results of this study align with those of Gebreweld et al. [7], which showed that quality healthcare services, good communication between healthcare professionals and patients, and support during treatment play a role in improving patient adherence to tuberculosis therapy. Patient-centered care, supported by effective communication, medication availability, and clear information, can increase patient motivation to complete treatment.

However, this study also found that some patients received good healthcare but did not complete their treatment. This situation suggests that the success of tuberculosis therapy is influenced not only by the quality of healthcare services but also by other factors such as patient compliance, drug-resistant tuberculosis, comorbidities, nutritional status, and the patient's biological condition [4].

5. The Influence of Knowledge, Behavior, and Health Facility Services on the Success of Tuberculosis Treatment

Based on the results of the logistic regression analysis, it shows that the variables of knowledge, behavior of tuberculosis patients, and health facility services together have a significant effect on the success of tuberculosis treatment in Manufahi Regency. The results of the Wald test show that the variable of knowledge has a p value of 0.011, patient behavior p = 0.036, and health facility services p = 0.029. All three variables have a significance value of <0.05, so it can be concluded that knowledge, behavior, and health facility services are factors that influence the success of tuberculosis treatment.

The results of this study indicate that successful tuberculosis treatment is the result of the interaction of various interrelated factors, including patient knowledge, adherence to therapy, and support from healthcare facilities. Good knowledge helps patients understand the importance of regular treatment, while supportive behaviors such as medication adherence and regular check-ups contribute to successful therapy. Furthermore, healthcare facilities play a crucial role through the provision of medication, health education, medical services, and monitoring during the treatment process. Respondent characteristics such as age, education, occupation, and income can also influence treatment success because they are related to access to healthcare, family support, and the patient's ability to maintain adherence during therapy [4], [9]–[11].

Based on the results of this study, the researchers argue that improving the success of tuberculosis treatment in Manufahi Regency requires a comprehensive strategy that includes improving health education, strengthening family and community support, improving the quality of health care services, and providing ongoing patient support. The tuberculosis control approach should not only focus on medical aspects but also consider social and behavioral factors. This aligns with WHO recommendations, which emphasize the importance of implementing patient-centered care in tuberculosis care to ensure patients receive appropriate support, enabling them to complete treatment and reduce the risk of therapy failure and drug resistance [9], [10].

IV. CONCLUSION

The results showed that the majority of tuberculosis patients in Manufahi Regency had good knowledge (59.6%), good treatment behavior (59.6%), and rated health facility services as good (59.6%). Furthermore, the majority of respondents successfully completed tuberculosis treatment, namely 126 respondents (70.8%), while 52 respondents (29.2%) had not yet completed treatment.

Bivariate analysis showed that patient knowledge, patient behavior, and health facility services each significantly influenced the success of tuberculosis treatment with a p value <0.05. Furthermore, the results of multivariate analysis showed that knowledge (p = 0.011), patient behavior (p = 0.036), and health facility services (p = 0.029) simultaneously influenced the success of tuberculosis treatment in Manufahi Regency. These findings indicate that the success of tuberculosis treatment is the result of an interaction between internal factors, namely patient knowledge and behavior, and external factors in the form of the quality of

health facility services. Therefore, increasing the success of tuberculosis treatment needs to be done through strengthening health education, increasing patient compliance during therapy, and improving the quality of health services supported by the ongoing involvement of families and health workers.

V. SUGGESTION

1. For tuberculosis patients, it is hoped that they can increase their knowledge about tuberculosis and comply with the treatment schedule, have regular check-ups, and follow all recommendations from health workers until treatment is declared complete.
2. For health care facilities in Manufahi Regency, it is recommended to continue improving the quality of tuberculosis services through providing ongoing education and counseling, monitoring patient compliance, and optimizing family involvement in supporting successful treatment.
3. For future researchers, it is recommended to examine other factors that may influence the success of tuberculosis treatment, such as medication adherence, family support, nutritional status, comorbidities, and access to health services, using more diverse research designs and larger sample sizes.

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