
Analysis Of Factors Associated With The Treatment Success Of Tuberculosis Patients Based On Tuberculosis Register Data At Mabuun Community Health Center, Tabalong Regency, From January To July 2026

Adisty Puspitasari¹⁾, Dewi Purnamawati²⁾

^{1,2)} Master of Public Health, Faculty of Public Health, Universitas Muhammadiyah Jakarta

*Corresponding Author

E-mail: adistypuspitasari58@gmail.com

Abstract

Tuberculosis (TB) remains a communicable infectious disease and continues to pose a significant challenge to infectious disease control. Successful TB treatment is an essential component of disease control, as treatment failure may increase the risk of relapse, transmission, and drug resistance. This study aimed to analyze the factors associated with successful treatment among tuberculosis patients based on TB Register data from Mabuun Community Health Center, Tabalong Regency, for the period January–July 2026. This study employed a quantitative approach with an analytical observational design and a cross-sectional approach. The study sample consisted of 38 TB patients selected using a total sampling technique. The independent variables included age, sex, employment status, case type, and patient category, while the dependent variable was treatment success. Data were analyzed using univariate and bivariate analyses with the Pearson Chi-Square test at a significance level of $\alpha = 0.05$. The results showed that 13 patients (34.2%) achieved successful treatment, while 25 patients (65.8%) did not. There were significant associations between employment status and treatment success ($p = 0.035$) and between case type and treatment success ($p = 0.034$). The proportion of treatment success among employed patients was 57.1%, compared with 20.8% among unemployed patients. Based on case type, the treatment success rate among patients with pulmonary TB was 43.3%, whereas it was 0.0% among patients with extrapulmonary TB. Meanwhile, age ($p = 0.051$), sex ($p = 0.307$), and patient category ($p = 1.000$) were not significantly associated with treatment success. It was concluded that the TB treatment success rate at Mabuun Community Health Center remains low, with employment status and case type being significantly associated factors. Strengthening monitoring and patient support should be prioritized for unemployed patients and those with extrapulmonary TB to improve TB treatment success at the primary healthcare level.

Keywords: *Tuberculosis, Treatment Success, Employment Status, Case Type, Community Health Center, TB Register.*

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis* that primarily affects the lungs, although it can also affect other organs of the body. TB remains a major global public health concern. The World Health Organization (WHO) reported that in 2024, an estimated 10.7 million people developed TB and 1.23 million people died from the disease. Indonesia is among the countries with the highest TB burden worldwide, accounting for approximately 10% of global TB cases in 2024. This condition indicates that TB control still requires strengthening in the areas of case detection, access to treatment, and treatment success (WHO, 2025). TB is primarily transmitted through the air when individuals with active TB release particles containing *Mycobacterium tuberculosis* through coughing, sneezing, speaking, or other activities. These particles can remain suspended in the air, particularly in environments with inadequate ventilation, thereby increasing the risk of transmission. Murray et al. (2022) explained that the course of TB infection is influenced by the ability of the bacteria to persist in the body and by the individual's immune response. Therefore, TB control requires not only appropriate detection and treatment but also the continuation of therapy until patients achieve the established treatment outcomes. WHO (2025) reported that the global treatment success rate for drug-susceptible TB treated with first-line regimens reached 88% in the 2023 cohort. This treatment success rate indicates that TB treatment is effective when patients receive appropriate diagnosis and therapy and are able to complete the treatment regimen.

TB treatment success is influenced by various patient characteristics and conditions associated with the treatment process. The Gordon Epidemiological Model explains that disease occurrence and health outcomes result from interactions among the *host*, *agent*, and *environment*. In this study, *host* characteristics are the primary focus because age, sex, employment status, patient category, and case type may be associated with patients' ability to respond to therapy and achieve successful treatment outcomes (Gordis, 2024).

Age may be associated with changes in immune system function, comorbid conditions, and the body's response to therapy. Sex may be associated with biological differences, health behaviors, and patterns of healthcare utilization. Employment status may reflect socioeconomic conditions and may be associated with patients' ability to access healthcare services, meet their needs during treatment, and maintain treatment continuity. Meanwhile, patient category and case type may indicate differences in clinical characteristics, treatment history, monitoring requirements, and prognosis (Gordis, 2024). This perspective is consistent with Blum's Theory of Health Determinants, which states that health status is influenced by the environment, behavior or lifestyle, healthcare services, and hereditary factors (Blum, 1974).

In the context of TB, this theory emphasizes that treatment success is determined not only by medical therapy but is also influenced by individual characteristics, behavior, social and environmental conditions, as well as the quality of and access to healthcare services. Recent evidence from Indonesia also indicates that treatment continuity remains a challenge. The Health Development Policy Agency of the Ministry of Health of the Republic of Indonesia, based on the 2023 Indonesian Health Survey (SKI), reported that 37.5% of patients with pulmonary TB did not complete six months of treatment, with several reasons including the availability of medicines at healthcare facilities and patients feeling healthy before completing treatment (BKPK Kemenkes RI, 2026). This condition further highlights the importance of identifying patient characteristics associated with treatment outcomes.

The utilization of routine TB program data at the primary healthcare level can provide empirical information for evaluating treatment success and identifying groups of patients who require further attention.

The TB Register is one source of data that can be used to describe patient characteristics and treatment outcomes at the healthcare facility level. In this study, data from the TB Register of Mabuun Community Health Center, Tabalong Regency, in 2026 showed that, of the 38 TB patients analyzed, only 13 patients (34.2%) achieved successful treatment, while 25 patients (65.8%) did not achieve treatment success. The bivariate analysis showed that employment status was significantly associated with treatment success ($p = 0.035$), with a treatment success rate of 57.1% among employed patients and 20.8% among unemployed patients. Case type was also significantly associated with treatment success ($p = 0.034$), with a treatment success rate of 43.3% among patients with pulmonary TB and 0% among those with extrapulmonary TB. In contrast, age ($p = 0.051$), sex ($p = 0.307$), and patient category ($p = 1.000$) were not statistically significantly associated with treatment success.

These findings indicate that certain patient characteristics require attention in efforts to improve treatment success at the primary healthcare level. Although studies examining factors associated with TB treatment outcomes have been conducted in various regions, empirical evidence specifically utilizing routine TB Register data at the community health center level in Tabalong Regency remains limited. Therefore, this study has practical relevance because it utilizes local data to identify patient characteristics associated with treatment success.

The use of routine program data can also support evidence-based decision-making and the evaluation of the implementation of the Tuberculosis Control Program at the community health center level. Based on the above description, this study aims to analyze the factors associated with successful tuberculosis treatment based on TB Register data at Mabuun Community Health Center, Tabalong Regency, in 2026.

RESEARCH METHODS

Research Design

This study employed a quantitative approach with an analytical observational design and a *cross-sectional* approach. This design was used to analyze the association between patient characteristics, including age, sex, employment status, case type, and patient category, and tuberculosis treatment success. All variables were analyzed based on data recorded in the TB Register of Mabuun Community Health Center, Tabalong Regency, in 2026.

Research Location and Period

The study was conducted at Mabuun Community Health Center, Tabalong Regency, South Kalimantan Province. The data analyzed consisted of tuberculosis patient data recorded in the TB Register of Mabuun Community Health Center for the period January–July 2026.

Population and Sample

The study population consisted of all tuberculosis patients recorded in the TB Register of Mabuun Community Health Center, Tabalong Regency, in 2026 who met the study criteria. Sampling was conducted using a *total sampling* technique, in which all population members who met the inclusion criteria were included as research samples. Based on the reviewed TB Register data, a total of 38 patients were included in the study sample. The use of *total sampling* was intended to ensure that all available patient data during the study period could be analyzed and provide an overview of the TB treatment situation at the study site.

Research Variables

The dependent variable in this study was tuberculosis treatment success. The independent variables included age, sex, employment status, case type, and patient category. The selection of these variables was based on the patient characteristics available in the TB Register and the objective of the study, which was to analyze factors associated with treatment success.

Operational Definitions

The operational definitions were established based on the information available in the TB Register of Mabuun Community Health Center. Treatment success was determined based on the patient's final treatment status recorded in the register. The successful treatment category included patients with treatment outcomes classified as *cured* or *treatment completed*. Meanwhile, the unsuccessful treatment category included outcomes recorded as death, treatment failure, loss to follow-up, transfer, or treatment outcomes that did not fall into the successful treatment category.

Table 1. Operational Definition

Variable	Operational Definition	Measurement	Scale
Treatment Success	Final treatment status of TB patients based on data recorded in the TB Register	1 = Successful; 0 = Unsuccessful	Nominal
Age	Age of TB patients at the time of registration in the TB Register, calculated in years	1 = <15 years; 2 = 15–24 years; 3 = 25–44 years; 4 = 45–64 years; 5 = ≥65 years	Ordinal
Sex	Sex of the patient as recorded in the TB Register	1 = Male; 2 = Female	Nominal
Employment Status	Patient's employment status based on data recorded in the TB Register	1 = Employed; 2 = Unemployed	Nominal
Case Type	Classification of tuberculosis cases based on data recorded in the TB Register	1 = Pulmonary TB; 2 = Extrapulmonary TB	Nominal
Patient Category	Patient status based on treatment history recorded in the TB Register	1 = New Case; 2 = Relapse	Nominal

The age categories in this study followed the classification used in the research data, namely <15 years, 15–24 years, 25–44 years, 45–64 years, and ≥65 years. All variables were measured based on the information available in the TB Register; therefore, no additional variables outside the research data source were included.

Data Sources and Data Collection Techniques

This study used secondary data obtained from the TB Register of Mabuun Community Health Center, Tabalong Regency, for the period January–July 2026. Data collection was conducted through a document review of the TB Register. Data relevant to the research variables were recorded using a data collection form or *checklist* and subsequently checked for completeness and consistency before data processing and analysis.

Data Analysis

Data analysis was conducted using univariate and bivariate analyses. Univariate analysis was used to describe the distribution of each research variable in terms of frequencies and percentages, including age, sex, employment status, case type, patient category, and treatment success.

Bivariate analysis was conducted to determine the association between each independent variable and tuberculosis treatment success. The statistical test used was the *Pearson Chi-Square* test at a 95% confidence level with a significance level of $\alpha = 0.05$. If the assumptions for the *Chi-Square* test were not met, the *Fisher's Exact Test* was used. Statistical decisions were based on the *p*-value, with a significant association determined when $p < 0.05$ and no significant association when $p \geq 0.05$.

Research Ethics

This study used secondary data obtained from the TB Register of Mabuun Community Health Center. The use of the data was conducted while maintaining the confidentiality of patient information, and no personal patient identifiers were included in the presentation or publication of the research findings. The data were used solely for scientific and research purposes. The implementation of the study also complied with the requirements and data-use authorization from the relevant institution in accordance with applicable procedures. The ethical principles applied included respect for research subjects, beneficence, justice, and protection of patient data confidentiality.

RESULTS AND DISCUSSION

Results

Patient Characteristics

This study involved 38 tuberculosis patients recorded in the TB registry of the Mabuun Community Health Center (Puskesmas), Tabalong Regency, in 2026, who met the study criteria. The patient characteristics analyzed included age, gender, occupation, case type, and patient category. The distribution of patient characteristics is presented in Table 2.

Table 2. Distribution of Tuberculosis Patient Characteristics at Mabuun Community Health Center, Tabalong Regency, 2026

Characteristics	Frequency (n)	Percentage (%)
Age		
<15 years	10	26.3
15–24 years	7	18.4
25–44 years	10	26.3
45–64 years	10	26.3
>64 years	1	2.6
Sex		
Male	17	44.7
Female	21	55.3
Employment Status		
Employed	14	36.8
Unemployed	24	63.2
Case Type		

Pulmonary TB	30	78.9
Extrapulmonary TB	8	21.1
Patient Category		
New	36	94.7
Relapse	2	5.3
Total	38	100.0

Source: Tuberculosis Registry Data from Mabuun Community Health Center (Puskesmas), Tabalong Regency, for the period of January–July 2026 (processed, 2026).

Based on Table 2, the age groups <15 years, 25–44 years, and 45–64 years each comprised 10 patients (26.3%). The 15–24 age group consisted of 7 patients (18.4%), while the >64 age group had the fewest patients, with 1 patient (2.6%). Regarding gender, 21 patients (55.3%) were female and 17 patients (44.7%) were male.

Regarding occupation, 24 patients (63.2%) were unemployed, and 14 patients (36.8%) were employed. Regarding case type, the majority were pulmonary TB patients (30 patients or 78.9%), while extrapulmonary TB patients numbered 8 (21.1%). Regarding patient category, 36 patients (94.7%) were new cases, and 2 patients (5.3%) were relapse cases. No patients falling into the categories of "after loss to follow-up" or "after treatment failure" were found in the analyzed TB registry data.

Distribution of Treatment Success

Treatment success is the dependent variable in this study. Based on the TB registry data, treatment outcomes were categorized as successful or unsuccessful. The successful category includes patients with a status of "cured" or "treatment completed," while the unsuccessful category includes patients with outcomes of treatment failure, loss to follow-up, death, or not evaluated.

Table 3. Distribution of Treatment Success among Tuberculosis Patients at Mabuun Community Health Center, Tabalong Regency, for the Period of January–July 2026

Treatment Success	Frequency (n)	Percentage (%)
Successful	13	34.2
Unsuccessful	25	65.8
Total	38	100.0

Source: Tuberculosis Registry Data from Mabuun Community Health Center, Tabalong Regency, for the period of January–July 2026 (processed, 2026).

Based on Table 3, out of the 38 tuberculosis patients analyzed, 13 patients (34.2%) achieved treatment success, while 25 patients (65.8%) were categorized as unsuccessful. Thus, the proportion of patients with unsuccessful treatment outcomes was higher than that of patients with successful outcomes.

Bivariate Analysis

Bivariate analysis was conducted to determine the relationship between age, gender, occupation, case type, and patient category and treatment success among tuberculosis patients at Mabuun Community Health Center, Tabalong Regency, in 2026. The analysis utilized the Pearson Chi-Square test with a significance level of $\alpha=0.05$. The analysis results are presented in Table 4.

Table 4. Relationship between Patient Characteristics and Treatment Success among Tuberculosis Patients at Mabuun Community Health Center, Tabalong Regency, in 2026

Variable	Successful n (%)	Unsuccessful n (%)	Total n (%)	p-value
Age				0.051
<15 years	0 (0.0)	10 (100.0)	10 (100.0)	
15–24 years	2 (28.6)	5 (71.4)	7 (100.0)	
25–44 years	5 (50.0)	5 (50.0)	10 (100.0)	
45–64 years	5 (50.0)	5 (50.0)	10 (100.0)	
>64 years	1 (100.0)	0 (0.0)	1 (100.0)	
Sex				0.307
Male	4 (23.5)	13 (76.5)	17 (100.0)	
Female	9 (42.9)	12 (57.1)	21 (100.0)	
Employment Status				0.035
Employed	8 (57.1)	6 (42.9)	14 (100.0)	

Unemployed	5 (20.8)	19 (79.2)	24 (100.0)	
Case Type				0.034
Pulmonary TB	13 (43.3)	17 (56.7)	30 (100.0)	
Extrapulmonary TB	0 (0.0)	8 (100.0)	8 (100.0)	
Patient Category				1.000
New	12 (33.3)	24 (66.7)	36 (100.0)	
Relapse	1 (50.0)	1 (50.0)	2 (100.0)	
Total	13 (34.2)	25 (65.8)	38 (100.0)	

Source: Tuberculosis Register Data of Mabuun Community Health Center, Tabalong Regency, January–July 2026 (processed, 2026).

Based on Table 4, age was not significantly associated with treatment success ($p = 0.051$). Descriptively, a treatment success rate of 50.0% was found among patients aged 25–44 years and 45–64 years. In the <15-year age group, all patients were classified as unsuccessful, whereas the >64-year age group consisted of only one patient, who was classified as successful.

Sex was also not significantly associated with treatment success ($p = 0.307$). The treatment success rate among females was 42.9%, compared with 23.5% among males. Although there was a descriptive difference in proportions, the difference was not statistically significant at $\alpha = 0.05$.

Employment status showed a significant association with treatment success ($p = 0.035$). Among employed patients, 8 of 14 patients (57.1%) successfully completed treatment, whereas among unemployed patients, only 5 of 24 patients (20.8%) achieved treatment success.

Case type was significantly associated with treatment success ($p = 0.034$). Among patients with pulmonary TB, 13 of 30 patients (43.3%) successfully completed treatment. Meanwhile, all patients with extrapulmonary TB, comprising 8 patients (100.0%), were classified as unsuccessful.

Patient category was not significantly associated with treatment success ($p = 1.000$). Among new patients, 12 of 36 patients (33.3%) successfully completed treatment, whereas among relapse patients, 1 of 2 patients (50.0%) achieved treatment success. This difference should be interpreted cautiously because there were only two relapse patients.

Overall, of the five variables analyzed, employment status and case type were significantly associated with tuberculosis treatment success, whereas age, sex, and patient category were not statistically significantly associated with treatment success.

Discussion

Tuberculosis Treatment Success

The results showed that among 38 tuberculosis patients recorded in the TB Register of Mabuun Community Health Center, Tabalong Regency, in 2026, 13 patients (34.2%) achieved treatment success, while 25 patients (65.8%) were classified as unsuccessful. This finding indicates that the proportion of patients with unsuccessful treatment outcomes was higher than that of patients who achieved treatment success. This condition is an important concern in the implementation of TB control programs because treatment success is one of the key indicators for assessing the continuity of care and effectiveness of TB management.

Globally, WHO reported that the treatment success rate among patients with drug-susceptible TB receiving first-line regimens reached 88% in the 2023 cohort. This treatment success rate indicates that most TB patients can achieve favorable treatment outcomes when they receive appropriate diagnosis, therapy, monitoring, and treatment support (WHO, 2025). Thus, the treatment success rate of 34.2% in this study was considerably lower than the global figure. However, this comparison should be made cautiously because this study involved a small sample and only covered patients at a single community health center, whereas the WHO figure represents a much larger population and is based on national reporting systems from various countries.

The findings of this study also differ from those of Meiyanti et al. (2024) in West Nusa Tenggara, which used data from the Tuberculosis Information System and involved 2,225 patients. That study found that 92.1% of patients achieved treatment success. It also showed that older age and a higher number of acid-fast bacilli were associated with unfavorable treatment outcomes. The difference in

treatment success rates between that study and the study at Mabuun Community Health Center may be related to differences in sample size, patient characteristics, clinical conditions, observation periods, and healthcare service contexts. A multicenter study in Indonesia by Sugiyono et al. (2025) also found a treatment success rate of 72.3% among patients with bacteriologically confirmed TB, with success rates of 81.6% among patients with drug-susceptible TB and 60.1% among patients with drug-resistant TB.

The high proportion of unsuccessful outcomes in this study should be viewed as a signal for program evaluation at the primary healthcare level. WHO emphasizes that TB treatment success is not only related to the administration of medication but also requires patient support and healthcare system support throughout the treatment process. WHO guidelines on TB treatment and care identify patient support, treatment monitoring, and continuity of care as important components of TB management. Therefore, the findings of this study can serve as a basis for Mabuun Community Health Center to strengthen patient monitoring, particularly by identifying patients at risk of unsuccessful outcomes, ensuring continuity of treatment, and improving the accuracy of treatment outcome recording in the TB Register.

However, the treatment success rate of 34.2% cannot be directly interpreted as representing the overall success of the TB program in Tabalong Regency. This study involved only 38 patients and was conducted at a single healthcare facility. In addition, the TB Register data used in this study did not include all factors potentially associated with treatment outcomes, such as nutritional status, comorbidities, HIV status, medication adherence, family support, and treatment regimen characteristics. Therefore, these findings are more appropriately used as a local description and as a basis for further evaluation of TB program implementation at Mabuun Community Health Center.

Association Between Age and Treatment Success

The analysis showed that age was not significantly associated with TB treatment success among patients at Mabuun Community Health Center, Tabalong Regency, in 2026, with a p -value of 0.051. Based on the significance threshold of $\alpha = 0.05$, this value indicates that there was no statistically significant association between age group and treatment success. Nevertheless, because the p -value was very close to the significance threshold, the distribution of treatment outcomes across age groups should still be considered descriptively and should not be overlooked in program evaluation.

Biologically, age may be associated with the body's response to TB infection and treatment. Changes in immune system function with increasing age may affect the body's ability to control infection. Among older adults, an increased prevalence of comorbidities and physiological changes may also worsen the patient's condition and affect tolerance to treatment. Conversely, among children and adolescents, disease characteristics, diagnosis, support requirements, and dependence on family members may differ from those of adult patients. Thus, age is theoretically a relevant characteristic in TB patient management, although its statistical association may differ across populations.

The findings of this study differ from those of Meiyanti et al. (2024) in West Nusa Tenggara. Their study found that older age was associated with unfavorable TB treatment outcomes. Univariate analysis showed that older age was associated with a lower likelihood of treatment success (OR 0.47; 95% CI 0.28–0.78). This finding was also consistent with the multicenter Indonesian study by Sugiyono et al. (2025), which found that patients aged ≥ 50 years had a higher risk of unfavorable treatment outcomes compared with younger patients (aOR 2.54; 95% CI 1.11–5.95).

The differences in findings may be influenced by the characteristics of the study sample. The study at Mabuun Community Health Center included only 38 patients, with unequal distributions across age groups. The <15, 25–44, and 45–64-year groups each consisted of 10 patients, the 15–24-year group consisted of 7 patients, while the >64-year group consisted of only 1 patient. This condition limits comparisons between age groups, particularly the oldest age group. The small number of patients in certain categories may also result in less stable estimates of the association.

In addition to sample size, TB treatment outcomes may be influenced by other factors that were not analyzed in this study. Meiyanti et al. (2024), for example, found that treatment outcomes were

also associated with HIV status, the number of bacilli detected in sputum examination, and treatment duration. Sugiyono et al. (2025) also found associations between treatment outcomes and nutritional status, acid-fast bacilli examination results, and treatment regimen type. Therefore, the absence of a significant association between age and treatment success in this study does not mean that age has no clinical relevance; rather, it indicates that within the sample and variables analyzed, there was insufficient statistical evidence to establish an association.

The implication of these findings is that TB patient monitoring at Mabuun Community Health Center should not be based solely on age groups. Age may still be used as one characteristic for monitoring purposes, but it should be combined with clinical conditions, nutritional status, comorbidities, treatment adherence, family support, and healthcare-related factors. This approach is more appropriate because TB treatment success is a multifactorial outcome. Future studies using larger sample sizes and incorporating additional clinical and social variables may provide a more comprehensive understanding of the factors associated with TB treatment success.

Association Between Sex and Treatment Success

The analysis showed that sex was not significantly associated with tuberculosis treatment success among patients at Mabuun Community Health Center, Tabalong Regency, in 2026 ($p = 0.307$). Descriptively, the treatment success rate among female patients was 42.9%, compared with 23.5% among male patients. Although there was a difference in treatment success proportions between the two groups, the difference did not reach statistical significance at $\alpha = 0.05$.

Sex may be associated with treatment outcomes through biological characteristics, health behaviors, and patterns of healthcare utilization. Differences in immune responses between males and females may play a role in the course of infection and disease response. In addition to biological factors, health-seeking behavior, treatment adherence, family support, and patterns of visits to healthcare facilities may also differ according to the social characteristics of males and females. However, sex is not always a dominant factor in determining treatment success because TB outcomes are influenced by various clinical, social, and healthcare-related factors.

The findings of this study are consistent with the observation that demographic factors do not always show consistent associations with TB treatment outcomes across different populations. Differences between studies may occur due to variations in patient characteristics, sample size, clinical conditions, and healthcare systems. In studies involving larger sample sizes, the effect of sex may also interact with other factors such as age, nutritional status, comorbidities, case type, and treatment characteristics.

The absence of a significant association in this study indicates that sex cannot be considered a primary distinguishing factor in determining treatment success among the population of Mabuun Community Health Center. Therefore, treatment monitoring should not be based solely on sex but should also consider other factors more closely related to treatment continuity, such as medication adherence, healthcare access, family support, clinical conditions, and patients' social characteristics. Accordingly, an individualized monitoring approach is more appropriate than providing different treatment based solely on sex.

Association Between Employment Status and Treatment Success

Employment status was one of the variables that showed a significant association with tuberculosis treatment success at Mabuun Community Health Center ($p = 0.035$). Employed patients had a treatment success rate of 57.1%, whereas unemployed patients had a treatment success rate of 20.8%. Of the 14 employed patients, 8 achieved treatment success, while among the 24 unemployed patients, only 5 achieved treatment success. This finding indicates a substantial difference in treatment success proportions between the two groups.

The association between employment status and treatment success can be explained through several social and economic aspects. Employment may be related to patients' economic capacity to meet their needs during treatment, including transportation costs and other supporting needs. Economic conditions may also affect patients' ability to access healthcare facilities on a continuous

basis. In addition, employment may be associated with social support and daily activity structures that can influence patients' regularity in undergoing treatment.

However, employment may also become a barrier to treatment when patients have long working hours, work in distant locations, high mobility, or difficulty obtaining permission to visit healthcare facilities. Therefore, the relationship between employment and treatment success cannot be understood solely based on whether a patient is employed or unemployed. Type of occupation, working hours, workplace location, income, and schedule flexibility may also determine patients' ability to maintain treatment continuity.

In this study, employed patients showed a higher treatment success rate than unemployed patients. This finding suggests that, in the Mabuun Community Health Center population, employment status may be related to socioeconomic conditions and patients' access to resources supporting treatment. Employed patients may have greater capacity to meet transportation and other needs during therapy. However, this interpretation is conceptual because the study did not measure income, occupation type, distance from the patient's residence to the community health center, or treatment-related expenses.

The findings also highlight the importance of considering social factors in TB patient management. Treatment success depends not only on medication administration but also on the patient's ability to maintain access to and engagement with healthcare services throughout the treatment period. WHO identifies patient support and continuity of care as important components of TB management. Therefore, unemployed patients may represent a group requiring further assessment regarding socioeconomic conditions, family support, healthcare access, and other barriers that may affect treatment continuity.

The implication for Mabuun Community Health Center is the need to strengthen social monitoring of patients in a more structured manner. Employment status can be used as part of initial screening to identify potential barriers during treatment. However, interventions should not be based solely on whether patients are employed or unemployed. Healthcare workers should assess patients individually, including their ability to access healthcare, family support, daily activities, and barriers to treatment adherence. Through this approach, monitoring can be directed toward patients' actual needs rather than merely their demographic characteristics.

Association Between Case Type and Treatment Success

Case type showed a significant association with tuberculosis treatment success at Mabuun Community Health Center, with a p -value of 0.034. Patients with pulmonary TB had a treatment success rate of 43.3%, whereas none of the patients with extrapulmonary TB achieved treatment success. Of the 30 patients with pulmonary TB, 13 were successful and 17 were unsuccessful. Meanwhile, all 8 patients with extrapulmonary TB were classified as unsuccessful. These findings indicate a difference in treatment outcomes between patients with pulmonary and extrapulmonary TB within the study population.

Differences in the clinical characteristics of pulmonary and extrapulmonary TB provide one context for understanding this finding. Pulmonary TB primarily affects lung tissue and is generally the main focus of TB case detection and monitoring activities. In contrast, extrapulmonary TB may affect various organs, such as the lymph nodes, bones, joints, meninges, and other organs. The clinical manifestations of extrapulmonary TB may vary depending on the affected organ. This condition may result in differences in the diagnostic process, supporting examinations, clinical monitoring, and evaluation of treatment response.

Differences in the diagnostic process are an important aspect. The diagnosis of pulmonary TB can be supported by bacteriological examinations and other diagnostic tests available within the TB program. In extrapulmonary TB, diagnosis may require examinations according to the location of the disease and the patient's clinical condition. Variations in clinical manifestations may affect monitoring and assessment of treatment response. Thus, case type may be a relevant characteristic in patient

management, although this study did not provide sufficient clinical data to directly explain the underlying mechanism.

The findings of this study show a pattern that requires attention because all extrapulmonary TB patients in the sample were classified as unsuccessful. However, this finding must be interpreted cautiously because there were only 8 extrapulmonary TB patients. The relatively small group size may cause the 0% treatment success rate to appear disproportionately large and may result in an unstable estimate of the association. Furthermore, this study did not analyze the anatomical site of extrapulmonary TB, disease severity, comorbidities, treatment regimen, patient adherence, or treatment duration. Therefore, this study cannot establish the specific clinical factors responsible for the unsuccessful outcomes among all extrapulmonary TB patients.

Nevertheless, the significant association between case type and treatment success has implications for TB program monitoring at Mabuun Community Health Center. Patients with extrapulmonary TB may constitute a group requiring more intensive monitoring of treatment continuity and outcome evaluation. Monitoring should be adjusted according to the location and clinical characteristics of the disease. In addition, complete recording of treatment status in the TB Register is important to ensure that every patient can be followed up until the final treatment outcome.

Association Between Patient Category and Treatment Success

The analysis showed that patient category was not significantly associated with treatment success ($p = 1.000$). Among new patients, 12 of 36 patients (33.3%) successfully completed treatment, whereas among relapse patients, 1 of 2 patients (50.0%) achieved treatment success. Thus, statistically, no association was found between patient category and treatment success in this study.

Conceptually, treatment history may be associated with TB outcomes because new patients and patients with a previous treatment history may have different clinical characteristics and treatment experiences. Relapse patients may have a history of previous therapy and require closer monitoring of treatment continuity. However, such an association may not be detectable in studies with small sample sizes.

The absence of a significant association in this study needs to be understood in light of the highly imbalanced distribution of patient categories. A total of 36 of 38 patients (94.7%) were new patients, whereas only 2 patients (5.3%) were classified as relapse cases. This difference in numbers limits the ability to adequately compare treatment outcomes between the two groups. The 50.0% treatment success rate among relapse patients was also based on only one successful and one unsuccessful patient. Therefore, this proportion cannot be used to describe the general treatment success pattern among relapse patients.

These findings indicate that a p -value of 1.000 should not be interpreted as meaning that patient category has absolutely no relationship with treatment outcomes. Rather, it indicates that, given the sample size and distribution in this study, there was insufficient statistical evidence to establish an association between patient category and treatment success. Studies involving larger numbers of patients and more balanced category distributions are needed to assess this association more robustly.

In the context of the TB program, treatment history remains important to record and use in determining monitoring strategies. Both new and relapse patients require monitoring according to their respective conditions. However, based on the findings of this study, patient category cannot be used as the sole basis for predicting treatment success. Monitoring should consider a combination of patient characteristics, clinical conditions, adherence, social support, and healthcare-related factors.

Research Implications

The findings of this study have implications for Mabuun Community Health Center in strengthening patient identification and monitoring from the beginning of treatment. Employment status and case type were significantly associated with treatment success; therefore, these characteristics can be considered when determining patients' monitoring needs. Unemployed patients require attention through the identification of social and economic barriers, healthcare access, family support, and treatment continuity. Patients with extrapulmonary TB also require more targeted

monitoring, particularly to ensure treatment continuity, clinical evaluation, and accurate recording of treatment outcomes.

The community health center needs to strengthen education for patients and families regarding the importance of completing treatment, adhering to treatment and examination schedules, and providing family support throughout the treatment process. Education should be tailored to patients' conditions and needs. In addition, the TB Register should be optimally utilized as a data source to identify patient characteristics, monitor treatment progress, and identify groups of patients requiring follow-up. Completeness and accuracy of recording are important to ensure that the data can be used as a basis for patient monitoring and service evaluation.

At the TB Program level, TB Register data can be utilized for regular monitoring and evaluation. Interventions can be directed based on patient characteristics and outcome patterns identified at the primary healthcare level. Evaluation should not only focus on the percentage of treatment success but also on the characteristics of patients with unsuccessful outcomes so that appropriate follow-up actions can be determined. Continuous utilization of data can support data-driven decision-making and provide a basis for strengthening TB control strategies at Mabuun Community Health Center.

CONCLUSION

This study showed that the treatment success rate among tuberculosis patients at Mabuun Community Health Center, Tabalong Regency, in 2026 was 34.2%, while 65.8% of patients did not achieve treatment success. The bivariate analysis showed that employment status and case type were significantly associated with tuberculosis treatment success. Employed patients had a higher treatment success rate than unemployed patients, while patients with pulmonary TB had a higher treatment success rate than those with extrapulmonary TB.

Meanwhile, age, sex, and patient category were not significantly associated with treatment success. Thus, the objective of the study, which was to analyze the factors associated with tuberculosis treatment success based on TB Register data at Mabuun Community Health Center, Tabalong Regency, in 2026, has been achieved. The findings indicate that employment status and case type should be considered in TB treatment monitoring at the primary healthcare level, while taking into account the limitations of the sample size and the distribution of patient characteristics in the study.

REFERENCES

- Abdelwahab, M. A., et al. (2024). Predictors of tuberculosis treatment outcomes among adult patients: A multicenter cohort study. *BMC Pulmonary Medicine*, 24, 312.
- Blum, H. L. (1974). *Planning for health: Development and application of social change theory*. Human Sciences Press.
- Gordis, L. (2024). *Epidemiology* (6th ed.). Elsevier.
- Kementerian Kesehatan Republik Indonesia. (2023). *Petunjuk teknis penatalaksanaan tuberkulosis*. Kementerian Kesehatan Republik Indonesia.
- Kim, Y., Park, S., Lee, H., et al. (2023). Sex differences in tuberculosis treatment outcomes: A systematic review and meta-analysis. *PLOS ONE*, 18(9), e0291024.
- Lee, J. Y., Myong, J. P., Kim, Y., et al. (2024). Identifying predictors of unfavorable treatment outcomes in tuberculosis patients. *International Journal of Environmental Research and Public Health*, 21(11), 1454. <https://doi.org/10.3390/ijerph21111454>
- Linh, N. N., Viney, K., Gegia, M., et al. (2021). World Health Organization treatment outcome definitions for tuberculosis: 2021 update. *European Respiratory Journal*, 58(2), 2100804. <https://doi.org/10.1183/13993003.00804-2021>

- Limenh, M. A., et al. (2024). Tuberculosis treatment outcomes and associated factors among tuberculosis patients treated at healthcare facilities of Motta Town, Northwest Ethiopia. *Scientific Reports*, 14, 7695.
- Macedo, L. R., et al. (2022). Tuberculosis treatment outcomes in Brazil: Different predictors for each type of unsuccessful outcome. *Clinical Infectious Diseases*.
- Ramadhan, S., Subroto, Y. W., & Probandari, A. (2019). Identifikasi faktor yang mempengaruhi keberhasilan pengobatan penderita tuberkulosis di Kabupaten Bima 2014–2016. *Media Penelitian dan Pengembangan Kesehatan*, 29(2). <https://doi.org/10.22435/mpk.v29i2.542>
- Ryuk, D. K., Pelissari, D. M., Alves, K., et al. (2024). Predictors of unsuccessful tuberculosis treatment outcomes in Brazil: An analysis of 259,484 patient records. *BMC Infectious Diseases*, 24, 531.
- Sarkar, S., Das, M., & Roy, A. (2022). Socioeconomic determinants of tuberculosis treatment outcomes: A prospective cohort study. *BMC Infectious Diseases*, 22, 873.
- Shailaja, et al. (2024). Factors affecting tuberculosis treatment outcome among newly diagnosed tuberculosis patients: A longitudinal study. *Indian Journal of Tuberculosis*, 71(3), 337–343. <https://doi.org/10.1016/j.ijtb.2023.06.007>
- Shankar, et al. (2024). Factors determining successful treatment outcome among notified tuberculosis patients in Belagavi district of North Karnataka. *Clinical Epidemiology and Global Health*, 25, 101505. <https://doi.org/10.1016/j.cegh.2024.101505>
- World Health Organization. (2021). *Meeting report of the WHO expert consultation on drug-resistant tuberculosis treatment outcome definitions*. World Health Organization.
- World Health Organization. (2023). *WHO operational handbook on tuberculosis: Module 4: Treatment: Drug-susceptible tuberculosis treatment*. World Health Organization.
- World Health Organization. (2024a). *Global tuberculosis report 2024*. World Health Organization.
- World Health Organization. (2024b). *WHO operational handbook on tuberculosis: Module 4: Treatment: Drug-susceptible tuberculosis treatment*. World Health Organization.
- World Health Organization. (2025). *Global tuberculosis report: TB treatment coverage and outcomes*. World Health Organization.
- Zhang, X., et al. (2025). A multilevel analysis on spatiotemporal and individual-level determinants of tuberculosis treatment failure in China. *Scientific Reports*.