

**THE RELATIONSHIP BETWEEN TREATMENT ADHERENCE AND
KNOWLEDGE WITH THE RECOVERY LEVEL OF TUBERCULOSIS
PATIENTS AT LAWAWOI PUBLIC HEALTH CENTER
SIDENRENG RAPPANG REGENCY**

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ABSTRACT

*Tuberculosis (TB), an infection produced by *Mycobacterium tuberculosis*, continues to pose a substantial public health concern. The World Health Organization estimated that 10.7 million individuals developed TB globally in 2024, and Indonesia remained among the countries carrying the greatest disease burden. At primary-care facilities, the proportion of patients who recover has also not consistently met the national minimum standard of 90%. This research examined whether treatment adherence and patient knowledge were related to the recovery level of TB patients at Lawawoi Public Health Center in Sidenreng Rappang Regency. A quantitative, observational-analytic study with a cross-sectional design was applied. The study population included 115 patients listed in the center's TB register, from whom 89 respondents were selected by simple random sampling. Information was gathered through observation, structured questionnaires, and document review, then tested with chi-square analysis at a 0.05 significance level. Treatment adherence was significantly associated with recovery ($p = 0.033$), whereas knowledge showed no significant association ($p = 0.108$). The results suggest that consistently completing therapy is a central behavioral element of TB recovery, while knowledge by itself is inadequate when it is not followed by sustained treatment practices and supporting systems. Ongoing counseling, participation of family members, supervision of therapy, and regular patient monitoring are therefore required to reinforce adherence and optimize treatment success. In this context, recovery was treated as the principal outcome of the complete course of care, rather than as a consequence of knowledge alone. The analysis therefore distinguished what patients knew from what they consistently practiced throughout treatment.*

Keywords: *Treatment adherence, knowledge, recovery level, tuberculosis, public health center.*

INTRODUCTION

Tuberculosis (TB) continues to represent a major public health burden worldwide, including in Indonesia. The illness results from infection with *Mycobacterium tuberculosis*, a bacterium that most often affects the lungs but can also involve the bones, lymph nodes, brain, kidneys, and other organs. Transmission occurs through airborne droplets expelled by an infected person while coughing or sneezing, so the risk is especially high in crowded settings with inadequate ventilation. As a directly communicable disease, TB produces broad consequences for population health as well as social and economic development (Meyrisca et al., 2022).

The World Health Organization estimated that 10.7 million people developed TB across the world in 2024, confirming its continuing status as a priority infectious disease

(World Health Organization, 2026). Indonesia is included among nations with the heaviest TB burden. National information estimates approximately 1,090,000 cases and 125,000 TB-related deaths each year, while about 885,000 cases were identified during 2024 (Kementerian Kesehatan RI, 2025). Taken together, these statistics show that tuberculosis remains a major obstacle to attaining an optimal level of public health.

International evidence indicates that successful tuberculosis treatment is more frequently attained when adherence among patients is strong. To support adherence and favorable outcomes, the World Health Organization recommends patient-centered services, counseling, social assistance, and systematic monitoring throughout therapy (World Health Organization, 2025). Within primary healthcare, poor adherence can weaken TB-control performance by increasing interruption of treatment, slowing bacteriological conversion, encouraging drug resistance, and allowing continued transmission in families and communities. Adherence should therefore be viewed not merely as a matter of individual behavior, but also as an important program indicator for assessing the quality of TB services delivered by public health centers.

Tuberculosis is managed as a priority program within Indonesia's national control strategy. The Ministry of Health seeks to eliminate TB by 2030 through lower incidence, prompt diagnosis, completion of therapy, and suitable follow-up care. Nevertheless, program achievement is still restricted by late case detection, adverse treatment effects, inadequate support from families, and irregular patient compliance. Findings from primary-care settings further indicate that possessing information does not necessarily produce preventive attitudes, because social surroundings and environmental conditions may influence TB-related behavior beyond knowledge itself (Armanda et al., 2024).

Treatment for tuberculosis differs from therapy for many acute infections because it must be continued over an extended period. Drug-sensitive TB generally requires about six months of medication, whereas drug-resistant disease demands a longer course. Therapy is divided into an intensive stage and a continuation stage. During the intensive stage, medicine is taken daily to substantially reduce the bacterial load; the continuation stage then targets organisms that remain in the body. Across both stages, patients must follow the prescribed schedule and attend routine evaluations at health facilities. Completing every component of this regimen is regarded as essential to recovery (Pratiwi & Syafina, 2025; World Health Organization, 2025).

Failure to comply with tuberculosis (TB) therapy can result in treatment failure, recurrence of disease, resistance to anti-tuberculosis medicines, and further spread to other people. Drug-resistant TB is an especially serious public health concern because management takes longer, costs more, and commonly causes more severe adverse effects. Incomplete adherence also contributes to higher levels of illness and death attributable to tuberculosis (Pratiwi & Syafina, 2025).

For tuberculosis patients, adherence covers more than the regular consumption of prescribed drugs. It also requires scheduled follow-up sputum testing, obedience to instructions from health personnel, and continuation of therapy until medical staff confirm that the patient has recovered. A stronger level of adherence increases the

likelihood that treatment will succeed. Conversely, even limited lapses may elevate the possibility of drug resistance, relapse, and transmission to people in the patient's surroundings (Adhanty & Syarif, 2023; Mahartati & Syarif, 2024).

Knowledge held by patients is another relevant component of tuberculosis care. Understanding the cause and transmission of TB, the required duration of therapy, the value of taking medicine routinely, the consequences of stopping treatment, and methods for dealing with side effects can shape decisions made during treatment. Well-informed patients may be better prepared for adverse effects and more willing to communicate with healthcare providers. Even so, information must be converted into stable treatment practices through counseling, encouragement, support from the family, and continuous supervision (Fatmawati et al., 2025; Martini et al., 2024; Safitri et al., 2024).

Sidenreng Rappang Regency, located in South Sulawesi Province, continues to record a comparatively large number of tuberculosis (TB) cases. Reports from the district Health Office suggest that the annual number has remained relatively constant rather than declining substantially. Within the service area of Lawawoi Public Health Center, 66 confirmed cases and 653 suspected cases were documented in 2022. The figures rose in 2023 to 72 confirmed cases and 784 suspected cases. In 2024, confirmed cases returned to 66, while the number of people suspected of having TB increased sharply to 982. For 2025, the center set an examination target of 858 individuals to broaden early case-detection coverage across its working area (Lawawoi Public Health Center, 2025). This pattern shows that the burden did not decline in a consistent manner and that the demand for screening continued to expand. The growing number of suspected cases also increased the importance of systematic examination and prompt follow-up by the health center.

The 2024 health profile for the Lawawoi Public Health Center service area recorded 85 patients receiving TB treatment, but only 78% achieved recovery, considerably below the national minimum target of 90%. Of these 85 patients, 15 individuals (17.6%) defaulted from therapy or experienced treatment failure, and 12 individuals (14.1%) were classified as not cured even after completing the regimen. An evaluation of the center's TB Control Program also found weak treatment compliance, with non-adherence reaching 35%. Assessment of patient knowledge likewise showed that only 45% adequately understood tuberculosis and the need to take medication regularly (Lawawoi Public Health Center, 2025). These program figures indicate that a considerable proportion of patients had not yet obtained the expected therapeutic outcome. They also show that limitations in adherence and understanding occurred alongside the shortfall in the recorded recovery rate.

The difference between the observed recovery rate of 78% and the national target of 90%, together with 35% non-adherence and only 45% of patients demonstrating good knowledge, provides a clear reason to investigate how adherence and knowledge relate to recovery among TB patients at Lawawoi Public Health Center. A low recovery rate can sustain transmission, add to the workload of healthcare personnel, and hinder achievement of program indicators at the primary-care level. Evidence from this analysis is expected to guide stronger health education, closer treatment supervision, and

interventions that specifically promote adherence (Adhanty & Syarif, 2023; Safitri et al., 2024; Wisesa et al., 2023).

The contribution of this research arises from the difference between available evidence and the circumstances of local service delivery. Earlier investigations have commonly linked treatment adherence with therapeutic success (Meyrisca et al., 2022; Pratiwi & Syafina, 2025), or examined patient knowledge in relation to medicine-taking behavior and recovery (Fatmawati et al., 2025; Safitri et al., 2024; Wisesa et al., 2023). The present study instead evaluates adherence and knowledge together against recovery by using local TB-program information from a primary healthcare facility whose recovery performance remains below the national standard. This local comparison seeks to determine which changeable factor has the closer connection with recovery and should consequently receive greater attention in service improvement. On that basis, the study analyzes the association of treatment adherence and patient knowledge with the recovery level of tuberculosis patients at Lawawoi Public Health Center, Sidenreng Rappang Regency.

RESEARCH METHOD

A quantitative observational-analytic design with a cross-sectional approach was used in this study. The cross-sectional method was chosen because adherence, knowledge, and recovery were assessed at the same period, allowing their relationships to be examined simultaneously. Treatment adherence and patient knowledge served as the independent variables, whereas the recovery level of tuberculosis patients was designated as the dependent variable. Research activities took place at UPT Puskesmas Lawawoi in Sidenreng Rappang Regency, and field information was collected between February and March 2026. Before recruitment began, formal authorization was obtained from the health center together with ethical clearance from the responsible institutional ethics committee. Every respondent received an explanation of the research objectives and gave consent prior to participation. The design allowed the variables to be measured without manipulating patient care and provided a snapshot of their statistical relationship under routine service conditions. Participation remained voluntary throughout the collection process.

The research population comprised all 115 tuberculosis (TB) patients entered in the TB register of UPT Puskesmas Lawawoi. A sample was regarded as the part of that population capable of representing the broader group. Using the Slovin equation with a 5% error tolerance, the minimum required sample was calculated as 89 respondents. Simple random sampling was then used so that each eligible person had an equal chance of inclusion. Participants met the inclusion requirements when they were willing to join and had been registered as TB patients from 2024 through November 2025. Exclusion applied to patients whose medical records were incomplete, who had transferred to another facility before cure was established, who died prior to finishing therapy, or who declined permission for their information to be included. This procedure was intended to preserve representativeness while limiting selection bias in the recruitment process. The

criteria also ensured that recovery status and treatment information could be evaluated from sufficiently complete records.

Both primary and secondary information was used. Primary data were collected from respondents through interviews supported by a structured questionnaire after the public health center issued formal approval. Questionnaire items covered treatment adherence, patient knowledge, and recovery level. Adherence was represented by regular medicine use, observance of the treatment timetable, attendance at follow-up appointments, completion of therapy, and compliance with directions from healthcare workers. Knowledge was assessed through understanding of TB causes, routes of transmission, symptoms, duration of therapy, advantages of routine medication, possible side effects, and prevention of further spread. Secondary material came from patient reports, the TB registers maintained by Lawawoi Public Health Center, relevant scientific articles, earlier research, and other references connected with the study variables.

A structured questionnaire prepared from the study variables and supporting literature served as the research instrument. The treatment-adherence section examined how consistently patients took medication, followed the prescribed schedule, and observed instructions provided by health personnel during therapy. The knowledge section evaluated understanding of tuberculosis causes, transmission pathways, treatment length, the benefits of regular medicine use, and measures for preventing transmission. Recovery, as the dependent variable, was evaluated through improvement in general condition, decreased symptoms, findings from follow-up examinations, and treatment outcomes recorded during the course of therapy.

SPSS and Microsoft Excel were used to manage the collected information. Prior to statistical testing, the dataset was cleaned, coded, and tabulated to confirm that entries were complete, consistent, and accurate. Analysis included univariate and bivariate procedures. Frequencies and percentages were generated in the univariate stage to describe respondent characteristics and the distribution of each variable. The bivariate stage assessed the relationships of adherence and knowledge with the recovery level of TB patients. Chi-square testing was appropriate because adherence, knowledge, and recovery were each expressed as categorical variables. Alpha was established at 0.05; consequently, a p-value lower than 0.05 was interpreted as evidence of a statistically significant association.

Instrument quality was evaluated through validity and reliability testing before the questionnaire was administered in the principal study. The validity assessment established whether individual questions represented the variable they were intended to measure, while internal consistency was examined through the Cronbach's Alpha coefficient. Items satisfying the validity standard were maintained, and the questionnaire was accepted when its reliability reached the required minimum level. The study's theoretical basis was the Health Belief Model (HBM), which proposes that perceptions, beliefs, and understanding related to tuberculosis therapy can affect patient adherence and eventual recovery (Rosenstock et al., 1988). These preliminary tests reduced the likelihood that weak or inconsistent questionnaire items would affect the main findings.

The framework was selected because it connects cognitive factors with the behaviors that patients perform during long-term treatment.

Figure 1 depicts treatment adherence (X1) and patient knowledge (X2) as the independent variables, with the recovery level of tuberculosis patients (Y) positioned as the dependent variable. The model was constructed from the Health Belief Model, which describes how beliefs, perceptions, and treatment practices can shape health results. Patients who combine sufficient knowledge with steady adherence are expected to have a greater probability of completing therapy and recovering successfully.

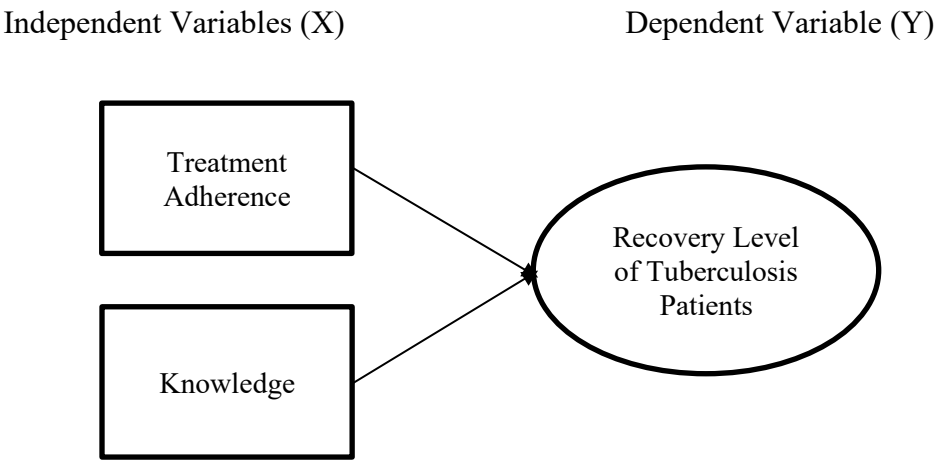


Figure 1. Conceptual Framework

This study uses two independent variables (X): treatment adherence (X1) and patient knowledge (X2). The dependent variable (Y) is the recovery level of patients with tuberculosis. Recovery represents improvement in the patient's health, relief of symptoms, and successful completion of the prescribed TB regimen at UPT Puskesmas Lawawoi.

RESULTS AND DISCUSSION

Results

Respondent Characteristics

Fieldwork was undertaken at UPT Puskesmas Lawawoi from February through March 2026. The research primarily sought to assess how treatment adherence and patient knowledge were related to the recovery level of tuberculosis patients. Results for every variable are displayed in tables containing frequencies and percentages, after which they are analyzed and interpreted to clarify the observed relationships. Chi-square analysis with a criterion of $p < 0.05$ was applied to identify associations that were statistically significant. The sequence of presentation was intended to move from a description of the sample toward statistical assessment of the proposed relationships. All interpretations were based on the values generated from the collected dataset.

Table 1 summarizes the profile of all 89 participants according to sex, age group, education, and occupation. These background characteristics assist in interpreting

patterns of adherence, knowledge, and recovery.

Table 1. Respondent Profile

Characteristic	Category	n	%
Gender	Male	50	56.2
	Female	39	43.8
	Total	89	100.0
Age	18-25 years	10	11.2
	26-35 years	10	11.2
	36-45 years	11	12.4
	46-55 years	27	30.3
	56-65 years	17	19.1
	>65 years	14	15.7
	Total	89	100.0
Education Level	Elementary school	17	19.1
	Junior high school	33	37.1
	Senior high school	27	30.3
	Diploma / Bachelor	10	11.2
	Not completed elementary school	2	2.2
	Total	89	100.0
Occupation	Self-employed	30	33.7
	Housewife	18	20.2
	Civil servant	9	10.1
	Farmer / laborer	22	24.7
	Retired	1	1.1
	Student	9	10.1
	Total	89	100.0

Source: Primary Data Processed, 2026.

Respondent demographics offer useful context for understanding the TB patients included in the analysis and for interpreting associations among treatment adherence, knowledge, and recovery at UPT Puskesmas Lawawoi. The sample comprised 89 patients receiving tuberculosis therapy at the facility. Men formed the larger group, with 50 respondents (56.2%), compared with 39 women (43.8%). Thus, male patients predominated in the study population. Their greater representation may be connected with relatively high mobility and exposure to TB-related risks, including smoking, workplace conditions, and environmental influences. The comparison by sex is descriptive and does not by itself establish the cause of the greater number of male respondents. Nevertheless, it provides relevant background for considering differences in exposure, behavior, and access to treatment.

The largest age category was 46-55 years, consisting of 27 respondents (30.3%). Patients aged 56-65 years numbered 17 (19.1%), and 14 respondents (15.7%) were older than 65 years. Another 11 participants (12.4%) were 36-45 years old, while the 18-25 and 26-35 year groups each included 10 people (11.2%). Overall, most respondents were adults or older adults. Individuals in these stages of life may face greater susceptibility to TB because of declining physical resistance, coexisting chronic conditions, and cumulative exposure to environmental hazards. The concentration of respondents in later adulthood is also relevant because treatment routines may be affected by age-related limitations and other health problems. These conditions can influence both the ability to attend care and the response to prolonged therapy.

Educational data showed that 33 respondents (37.1%) had completed junior high school, making this the most frequent category, followed by 27 respondents (30.3%) with senior high school education. Elementary school graduates numbered 17 (19.1%), whereas 10 respondents (11.2%) held a diploma or bachelor's qualification. Two participants (2.2%) had not finished elementary school. The predominance of middle-level schooling may shape how patients understand tuberculosis, follow treatment procedures, and recognize the importance of adhering to medication. Educational attainment does not automatically determine behavior, but it may affect how easily information from health personnel is interpreted and applied. This profile was therefore considered when discussing patient knowledge and compliance.

Regarding occupation, self-employment was the most common, reported by 30 respondents (33.7%). Farmers or laborers comprised 22 participants (24.7%), and 18 respondents (20.2%) were housewives. Civil servants and students each accounted for 9 people (10.1%), while only 1 respondent (1.1%) was retired. Most participants therefore belonged to working-age, economically active groups, a condition that may influence access to services, regular medicine use, and attendance at scheduled examinations throughout TB treatment. Employment obligations may compete with treatment schedules or travel to the health facility, particularly when patients must continue earning an income. Occupational background was consequently relevant to the interpretation of regular follow-up behavior.

Taken together, the demographic findings are consistent with the Health Belief Model (HBM) applied in this research, which holds that perceptions, comprehension, and treatment-related behavior can affect adherence and recovery among tuberculosis patients. Patients are expected to have better recovery prospects when they understand their condition, comply with therapy, and participate actively in the treatment process.

Hypothesis Testing

The hypotheses were evaluated with a chi-square test because both predictors and the outcome were expressed as categories. Treatment adherence was grouped according to compliance with TB-management procedures, knowledge was classified from questionnaire scores, and recovery was categorized by treatment outcome. Decisions were made from the resulting p-values at an alpha level of 0.05. A value below 0.05 was

taken to indicate a statistically meaningful relationship with TB recovery, whereas a value above 0.05 was interpreted as not statistically significant. The same decision rule was applied consistently to both proposed relationships. This approach allowed acceptance or rejection of each hypothesis to be based on a uniform statistical criterion.

Bivariate Analysis Results

Bivariate testing assessed treatment adherence and patient knowledge as predictors of the recovery level of tuberculosis patients. The analysis examined whether patients in different adherence and knowledge categories also differed in their recovery outcomes at UPT Puskesmas Lawawoi. Table 2 displays the findings from this test. In this analysis, the categories were compared directly rather than interpreted only from their separate frequency distributions. The purpose was to identify whether variation in the predictors corresponded with variation in treatment outcome.

Table 2. Bivariate Analysis Results

Variable	<i>p-value</i>	Interpretation
Treatment Adherence → Recovery Level of Tuberculosis Patients	0.033	Significant
Patient Knowledge → Recovery Level of Tuberculosis Patients	0.108	Not Significant

Source: Primary Data Processed, 2026.

The chi-square findings in Table 2 describe the associations of treatment adherence and knowledge with recovery among tuberculosis patients at UPT Puskesmas Lawawoi. Adherence was significantly related to recovery, with $p = 0.033$. Since this value was lower than 0.05, H1 was accepted. In practical terms, patients who complied more consistently with treatment had a greater likelihood of recovering successfully than those whose adherence was poor. The statistical decision also indicates that the observed difference was unlikely to be explained only by random variation under the selected significance criterion. Adherence therefore received support as the principal behavioral factor examined in H1.

Patient knowledge, however, was not significantly associated with the recovery level ($p = 0.108$). Because the obtained value exceeded 0.05, H2 was rejected. This result should not be interpreted as proof that knowledge has no value; instead, it indicates that information alone did not directly predict recovery in this group. Outcomes may depend more strongly on regular medication use, attendance at follow-up examinations, completion of therapy, and continuing assistance from relatives and healthcare workers.

In summary, recovery was more closely connected with treatment adherence, whereas knowledge appeared to operate as a supporting rather than a direct factor. This pattern is compatible with the Health Belief Model, which emphasizes that health outcomes are influenced by patient behavior, particularly the actual performance of treatment recommendations (Rosenstock et al., 1988).

Research Hypothesis Testing

Chi-square analysis was again used to test the proposed relationships between the independent variables and tuberculosis recovery as the dependent variable. Interpretation relied on the p-value generated for each comparison. Table 3 presents the relationships of treatment adherence and patient knowledge with recovery among patients treated at UPT Puskesmas Lawawoi. The table provides the numerical basis for the hypothesis decisions and enables the two independent variables to be compared using the same significance standard.

Table 3. Results of Hypothesis Testing

Variable	<i>p-value</i>
Treatment Adherence → Recovery Level of Tuberculosis Patients	0.033
Patient Knowledge → Recovery Level of Tuberculosis Patients	0.108

Source: Primary Data Processed, 2026.

As reported in Table 3, chi-square testing was used to assess the links of adherence and knowledge with the recovery level of tuberculosis patients at UPT Puskesmas Lawawoi. Treatment adherence produced a p-value of 0.033, which was below the 0.05 criterion and therefore represented a significant association. Patients who followed therapy more consistently were consequently more likely to reach a successful recovery outcome. Maintaining adherence supports uninterrupted therapy, helps prevent failure and relapse, and decreases the potential for continued transmission and resistance to TB drugs. This relationship is clinically relevant because interruptions can reduce the effectiveness of the regimen even when patients have already received information about TB. Sustained compliance is consequently needed across the complete treatment period.

By contrast, the relationship between patient knowledge and recovery was not statistically significant because $p = 0.108$, a value above 0.05. Patients may understand tuberculosis, the required length of therapy, and the importance of taking drugs regularly, yet such understanding alone does not ensure recovery. Knowledge needs to be accompanied by actual compliant behavior, routine evaluation, support from family, and accessible care before it can contribute to measurable outcomes. Table 4 provides the direct-effect decisions for both hypotheses.

Table 4. Results of the Direct Effect Hypothesis Test

Hypothesis	Relationship Between Variables	<i>p-value</i>	Information
H1	Treatment Adherence → Recovery Level of Tuberculosis Patients	0.033	Significant
H2	Patient Knowledge → Recovery Level of Tuberculosis Patients	0.108	Not Significant

Source: Primary Data Processed, 2026.

Table 4 reports the hypothesis-test results for adherence, knowledge, and tuberculosis recovery at UPT Puskesmas Lawawoi. Treatment adherence had a p-value of 0.033 and was therefore significant because the value fell below 0.05. Patient knowledge yielded $p = 0.108$, which exceeded the threshold and indicated no significant association. These results demonstrate that recovery was linked more directly with adherence behavior than with knowledge considered alone. Knowledge may still encourage good treatment practices, but any effect on recovery depends on its translation into regular medication use and attendance at follow-up care. Table 5 presents the final decisions to accept or reject the hypotheses. The comparison therefore confirms that the two variables did not contribute in the same statistical manner. It also supports the need to assess behavioral implementation separately from cognitive understanding when evaluating TB-program performance.

Table 5. Hypothesis Testing Results

Hypothesis	Statement	Result
H1	Treatment Adherence → Recovery Level of Tuberculosis Patients	Accepted
H2	Patient Knowledge → Recovery Level of Tuberculosis Patients	Rejected

Source: Primary Data Processed, 2026.

The hypothesis decisions are summarized in Table 5. H1 was accepted because treatment adherence showed a significant relationship with the recovery level of TB patients at UPT Puskesmas Lawawoi. Patients with stronger adherence are therefore more likely to take therapy as scheduled, complete the regimen, and attain a successful outcome. H2 was rejected because knowledge was not significantly related to recovery. This finding indicates that information by itself cannot ensure successful treatment unless it is accompanied by compliance, adequate supervision, and social support.

Discussion

Hypothesis 1: Treatment Adherence Has a Significant Relationship with the Recovery Level of Tuberculosis Patients

Study results demonstrate a significant association between treatment adherence and recovery among tuberculosis patients. Chi-square testing produced $p = 0.033$, confirming that adherence and recovery were statistically related at UPT Puskesmas Lawawoi. Patients who maintained a higher degree of compliance were more likely to recover successfully than those with lower compliance. The finding reinforces the importance of adherence for sustaining effective TB therapy and improving the probability of a favorable patient outcome. The result is particularly relevant in long-term therapy, where repeated missed doses can accumulate and reduce the effectiveness of otherwise appropriate treatment. Consistency across the regimen is therefore essential, not merely adherence during its initial stage.

Within the Health Belief Model (HBM), adherence represents an important behavioral expression because perceptions and beliefs affect what patients actually do during treatment. Individuals who recognize why the complete TB regimen is necessary

are more inclined to take medication on schedule, attend periodic examinations, and follow instructions from healthcare personnel. Consistent use allows anti-tuberculosis medicines to suppress and eliminate bacteria effectively, while also limiting relapse and the emergence of drug resistance. Patients who comply well with treatment consequently have a greater opportunity to recover.

These results correspond with earlier evidence that links adherence to the success of TB therapy. Pratiwi and Syafina (2025) identified a significant connection between compliance with anti-tuberculosis medication and recovery, while Meyrisca et al. (2022) also associated regular medicine use with successful treatment. The WHO similarly recommends patient-centered assistance, counseling, and follow-up as means of maintaining adherence and improving outcomes (World Health Organization, 2025). The consistency of these findings supports adherence as a practical determinant of recovery because tuberculosis medication must be taken regularly for a prolonged duration.

A range of measures can be used to strengthen adherence, including counseling, patient education, participation of family members, supervision by health staff, scheduled follow-up, and reminders delivered digitally or by telephone. Such interventions can reduce forgotten doses, reinforce motivation, assist patients in managing adverse effects, and provide support across both intensive and continuation treatment stages. Research has found that counseling and health-coaching approaches can improve understanding, self-management, and medication compliance among people with TB (Elanda et al., 2025; Rasdianah et al., 2024; Setiyowati & Subairi, 2024). UPT Puskesmas Lawawoi should therefore maintain and strengthen education and patient-assistance programs so that adherence improves and successful recovery becomes more likely.

Hypothesis 2: Patient Knowledge Has No Significant Relationship with the Recovery Level of Tuberculosis Patients

The analysis found no significant relationship between patient knowledge and the recovery level of tuberculosis patients, as shown by $p = 0.108$. Patients with greater knowledge may better understand the disease, how long therapy lasts, and why medication must be taken regularly; however, the statistical result indicates that knowledge did not independently determine recovery in this sample.

In the Health Belief Model, knowledge is relevant because it contributes to a patient's awareness, perceptions, and understanding of tuberculosis and its treatment. Well-informed patients usually know why therapy must be completed, how transmission can be prevented, and why routine health checks are necessary. In the present research, however, knowledge on its own did not significantly affect recovery. This suggests that adequate understanding may still be outweighed by other determinants, particularly actual adherence, support from relatives, supervision of medication, and the patient's ability to reach healthcare services.

A plausible reason for this result is that recovery from tuberculosis depends strongly on behavioral and contextual conditions, including adherence, family assistance, motivation, nutritional condition, and regular oversight by healthcare staff. A

knowledgeable patient may nevertheless fail to recover when doses are repeatedly missed or therapy is stopped prematurely. Conversely, an individual with limited information may recover when relatives, providers, and treatment supervisors offer strong and continuous support. Knowledge must therefore interact with other enabling factors before it can be converted into a successful outcome.

The present finding is not identical to research that has connected knowledge with medication compliance or recovery. Fatmawati et al. (2025) reported an association between knowledge and adherence, while Wisesa et al. (2023) observed a relationship between knowledge and recovery in pulmonary TB patients. Differences may arise from the research location, participant profile, sample size, indicators, accessibility of services, family assistance, or methods used to document treatment outcomes. At Lawawoi Public Health Center, information may have little direct effect when it is not followed by regular drug use, attendance at follow-up care, and sufficient support.

The practical value of this research is its use of local statistical results to establish program priorities. Because adherence had the stronger relationship with recovery, educational activities should be combined with patient-centered support rather than delivered as a stand-alone intervention. Relevant components include counseling, supervision of medication, family participation, reminder mechanisms, and continuous follow-up. This direction agrees with reviews, intervention studies, and guidance indicating that counseling, health coaching, monitoring, and social support improve adherence to TB medication and strengthen treatment outcomes (Adhanty & Syarif, 2023; Rasdianah et al., 2024; Setiyowati & Subairi, 2024; World Health Organization, 2025). Lawawoi Public Health Center and comparable primary facilities can use these findings to focus limited resources on adherence monitoring while continuing to provide patient education.

CONCLUSION

At UPT Puskesmas Lawawoi, treatment adherence was significantly related to tuberculosis recovery ($p = 0.033$), while patient knowledge did not show an independent association ($p = 0.108$). The findings demonstrate that information must be transformed into sustained medicine-taking and follow-up practices through supervision, family participation, counseling, and routine monitoring. Primary healthcare services should consequently give priority to systems that support adherence while retaining education for patients, thereby improving treatment success and limiting failure, relapse, and resistance to anti-tuberculosis drugs.

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