

Effect of self-efficacy and social support on medication compliance for tuberculosis patients

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ABSTRACT

Introduction: Tuberculosis remains a major public health problem, and medication non-adherence continues to hinder treatment success despite the implementation of the Directly Observed Treatment Short-course (DOTS) strategy. Psychological and social factors, particularly self-efficacy and social support, play an important role in determining patients' adherence to long-term tuberculosis treatment. This study aimed to analyze the influence of self-efficacy and social support on medication adherence among tuberculosis patients in Palu City.

Research Methodology: This study employed a quantitative, comparative, analytical design with a non-experimental, cross-sectional approach. The study population consisted of 489 registered tuberculosis patients in Palu City in 2025. A total of 83 respondents were selected using probability sampling with a cluster random sampling technique from seven public health centers. Data were collected using the Morisky Medication Adherence Scale (MMAS-8), the Tuberculosis Self-Efficacy Scale (TBSES), and the Multidimensional Scale of Perceived Social Support (MSPSS). Data analysis included univariate analysis and bivariate analysis using independent t-tests with a significance level of $p < 0.05$.

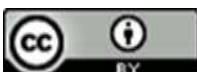
Results: Medical care management ($p = 0.003$), support seeking ($p = 0.047$), and psychological adjustment ($p = 0.038$) were significantly associated with medication adherence, whereas transmission management was not ($p = 0.993$). All dimensions of social support, instrumental ($p = 0.031$), informational ($p = 0.045$), appraisal ($p = 0.011$), and emotional support ($p = 0.015$), demonstrated significant associations with medication adherence.

Conclusion: These findings indicate that medication adherence among tuberculosis patients is strongly influenced by both self-efficacy and social support. Strengthening patients' confidence in managing treatment and enhancing family and social support are essential to improve adherence and treatment outcomes.

Keywords: Adherence, Self-Efficacy, Social Support, Tuberculosis, Treatment.



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INTRODUCTION

Tuberculosis (TB) remains one of the most persistent global public health challenges, particularly in low- and middle-income countries (Abrahams-Gessel *et al.*, 2025). Despite the availability of effective anti-tuberculosis therapy, TB continues to cause significant morbidity and mortality worldwide. The World Health Organization emphasizes that successful TB control depends not only on early diagnosis and access to treatment but also on sustained medication adherence throughout the lengthy treatment period (Aminzade *et al.*, 2025). In practice, however, adherence to TB medication remains suboptimal, leading to treatment failure, relapse, drug resistance, and ongoing transmission. In Indonesia, including urban areas such as Palu City, tuberculosis continues to pose a serious burden despite the implementation of standardized treatment strategies and free access to care (Arjmand *et al.*, 2026).

The Directly Observed Treatment Short-course (DOTS) strategy has been adopted nationally to improve adherence by ensuring supervised medication intake (Arshed *et al.*, 2024). While DOTS addresses structural and procedural aspects of TB treatment, it does not fully account for the psychosocial factors that influence patients' daily treatment behaviors (Castro-Rodriguez *et al.*, 2025). TB treatment requires long-term commitment, often accompanied by drug side effects, social stigma, economic pressure, and emotional distress. These challenges frequently undermine patients' motivation and confidence to complete therapy, even when treatment is readily available. As a result, non-adherence persists as a critical obstacle in TB control programs (Davis *et al.*, 2024).

Among the psychosocial determinants of adherence, self-efficacy and social support have been widely recognized as key contributors. Self-efficacy refers to an individual's belief in their ability to perform behaviors necessary to achieve specific outcomes, including managing illness and adhering to treatment regimens (Divya *et al.*, 2025). In the context of tuberculosis, low self-efficacy may manifest as difficulty coping with side effects, poor confidence in managing treatment schedules, and emotional exhaustion during prolonged therapy. Similarly, social support encompassing instrumental, informational, emotional, and appraisal support plays a crucial role in reinforcing adherence behaviors (Evered and Evered, 2024). Patients who lack adequate family or social support may feel isolated, discouraged, and less motivated to continue treatment, particularly in environments where TB-related stigma remains prevalent (Hassani *et al.*, 2024).

Although previous studies have examined the relationship between self-efficacy, social support, and medication adherence among TB patients, several important gaps remain (Kaladharan *et al.*, 2025). First, many studies treat self-efficacy and social support as single, undifferentiated constructs, failing to examine their specific dimensions. This approach limits understanding of which aspects of self-efficacy, such as medical care management, support seeking, psychological adjustment, or transmission management, are most influential in sustaining adherence. Second, empirical evidence at the local level, particularly in eastern Indonesia, remains limited (Kumar Panda *et al.*, 2024). Sociocultural characteristics, stigma patterns, health service utilization, and family dynamics vary substantially across regions, suggesting that findings from other settings may not be fully generalizable to Palu City.

Furthermore, existing research often focuses on self-efficacy or social support independently, rather than examining their combined, multidimensional influence on medication adherence. This separation overlooks the possibility that internal psychological resources and external social environments interact to shape patients' adherence behaviors. For instance, strong medical care management skills may be insufficient without emotional or instrumental support.

In contrast, social support may not be optimally utilized by patients with low confidence in seeking help. These gaps highlight the need for a more integrated analytical approach that simultaneously considers multiple dimensions of self-efficacy and social support in relation to TB medication adherence.

This study addresses these gaps by analyzing the influence of specific dimensions of self-efficacy and social support on medication adherence among tuberculosis patients in Palu City. The novelty of this research lies in its multidimensional framework, which disaggregates self-efficacy into medical care management, support seeking, psychological adjustment, and transmission management, and social support into instrumental, informational, emotional, and appraisal support, by identifying which dimensions significantly influence adherence and which do not. This study provides more precise evidence to inform targeted interventions. The findings are expected to contribute to the development of psychosocially informed TB control strategies that strengthen patient confidence, enhance family involvement, and complement existing DOTS-based programs to improve treatment outcomes in local contexts.

RESEARCH METHODOLOGY

Study Design

This study employed a quantitative, comparative, analytical design with a non-experimental, cross-sectional approach. The design was selected to examine the influence of self-efficacy and social support on medication adherence among tuberculosis patients without providing any intervention or treatment manipulation. Data were collected at a single point in time to capture existing conditions and the natural relationships among variables.

Study Setting and Period

The research was conducted in public health centers located in Palu City, Central Sulawesi, Indonesia. Data collection took place from 29 August to 15 October 2025. Palu City was selected due to its ongoing tuberculosis burden and the availability of standardized tuberculosis treatment services under the national TB control program.

Population and Sample

The study population consisted of all registered tuberculosis patients undergoing treatment at Puskesmas in Palu City in 2025, totaling 489 individuals. The sample size was determined using probability sampling techniques. Cluster random sampling was used, selecting 7 public health centers from a total of 14 in Palu City as the sampling clusters. From these clusters, 83 tuberculosis patients who met the inclusion criteria were recruited as respondents.

Inclusion and Exclusion Criteria

Inclusion criteria were tuberculosis patients aged 18 years and above, currently undergoing anti-tuberculosis treatment, registered at the selected public health centers, and willing to participate in the study. Patients with severe cognitive impairment, critical illness, or those who were unable to complete the questionnaire were excluded.

Research Variables

The independent variables in this study were self-efficacy and social support. Self-efficacy was measured through four dimensions: medical care management, support seeking, psychological adjustment, and transmission management. Social support was assessed through instrumental, informational, appraisal, and emotional support. The dependent variable was medication adherence among tuberculosis patients.

Research Instruments

Data were collected using structured questionnaires. Medication adherence was measured using the eight-item Morisky Medication Adherence Scale (MMAS-8), consisting of seven positively worded items and one negatively worded item. Self-efficacy was assessed using the Tuberculosis Self-Efficacy Scale (TBSES), which evaluates patients' confidence in managing treatment and related challenges. Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS). All instruments have been widely used and have demonstrated acceptable validity and reliability in previous studies.

Data Collection Procedure

Trained researchers collected data in coordination with health workers at each selected Puskesmas. Respondents were informed about the purpose of the study and provided informed consent before participation. Questionnaires were administered directly to respondents, either self-completed or with interviewer assistance, when necessary, to ensure data completeness and accuracy.

Data Analysis

Data analysis was conducted using statistical software. Univariate analysis was performed to describe the characteristics of respondents and the distribution of each study variable using frequencies and percentages. Bivariate analyses were conducted to examine the influence of self-efficacy and social support dimensions on medication adherence using independent t-tests. A significance level of $p < 0.05$ was applied to determine statistical significance.

Ethical Considerations

Ethical approval for this study was obtained from the relevant institutional ethics committee. Permission was also secured from the local health authorities and the management of the selected Puskesmas. All respondents participated voluntarily and were assured of confidentiality and anonymity throughout the research process. Data were used solely for research purposes.

RESULT

This section presents the findings of the study examining the influence of self-efficacy and social support on medication adherence among tuberculosis patients in Palu City. The results are organized into two main parts. First, univariate analysis describes the sociodemographic characteristics of respondents and the distributions of self-efficacy, social support, and medication adherence. Second, bivariate analyses examine the relationships between each dimension of self-efficacy and social support, and medication adherence using independent t-tests. All results are presented to provide a clear overview of the patterns and statistical significance of the variables studied.

Table 1. Summary of Sociodemographic Characteristics, Self-Efficacy, Social Support, and Medication Adherence (n = 83)

Variable	Category / Dimension	n (%)	t-value	p-value	Remark
Sex	Male	55 (66.3)	—	—	—
	Female	28 (33.7)	—	—	—
Age (years)	18–35	32 (38.6)	—	—	—
	36–52	36 (43.4)	—	—	—
	53–69	15 (18.1)	—	—	—
			—	—	—
Education	Junior High School	6 (7.2)	—	—	—
	Senior High School	36 (43.4)	—	—	—
	Bachelor Degree	41 (49.4)	—	—	—

Medication Adherence	Adherent	58 (69.9)	–	–	–
Self-Efficacy	Non-adherent	25 (30.1)	–	–	–
	Medical Care Management (High)	75 (90.4)	3.034	0.003	Significant
	Support Seeking (High)	37 (44.6)	2.020	0.047	Significant
	Psychological Adjustment (High)	41 (49.4)	2.112	0.038	Significant
Social Support	Transmission Management (High)	73 (88.0)	-0.009	0.993	Not Significant
	Instrumental Support (High)	48 (57.8)	2.196	0.031	Significant
	Informational Support (High)	47 (56.6)	2.032	0.045	Significant
	Appraisal Support (High)	44 (53.0)	2.588	0.011	Significant
	Emotional Support (High)	69 (83.1)	2.477	0.015	Significant

This integrated table provides a comprehensive overview of respondents' sociodemographic characteristics, levels of self-efficacy, social support, medication adherence, and their statistical associations with adherence to tuberculosis treatment. The majority of respondents were male and within the productive age group, with nearly half having a bachelor-level education. Approximately two-thirds of patients were adherent to tuberculosis medication, indicating moderate overall adherence. Among self-efficacy dimensions, medical care management, support seeking, and psychological adjustment showed statistically significant associations with medication adherence ($p < 0.05$), highlighting the importance of patients' confidence in managing treatment routines, seeking assistance, and adapting psychologically during long-term therapy. In contrast, transmission management was not significantly associated with adherence, suggesting that preventive behaviors aimed at reducing disease transmission do not necessarily translate into consistent medication-taking behavior. All dimensions of social support, instrumental, informational, appraisal, and emotional, were significantly associated with medication adherence. This finding underscores the critical role of family and social environments in supporting patients' adherence throughout the prolonged tuberculosis treatment period. Overall, the results indicate that both internal psychological factors and external social support systems are essential determinants of medication adherence among tuberculosis patients in Palu City.

Based on this study's results, medication adherence among tuberculosis patients in Palu City was generally moderate, with nearly one-third demonstrating non-adherence to treatment. The findings indicate that self-efficacy plays an important role in influencing medication adherence, particularly the dimensions of medical care management, support seeking, and psychological adjustment, all of which showed significant associations with adherence behavior. In contrast, transmission management did not demonstrate a substantial relationship with medication adherence.

Furthermore, all dimensions of social support, including instrumental, informational, appraisal, and emotional support, were significantly associated with medication adherence. These results suggest that both internal psychological capacities

and external social support systems are key determinants of adherence to tuberculosis treatment. Strengthening patients' confidence in managing their treatment and enhancing family and social support may therefore be essential strategies to improve adherence outcomes among tuberculosis patients in Palu City.

DISCUSSION

This study examined the influence of self-efficacy and social support on medication adherence among tuberculosis patients in Palu City. The findings provide important insights into the psychosocial determinants of adherence within a standardized DOTS-based tuberculosis treatment program. Overall, the results indicate that although medication adherence among patients was moderate, a significant proportion remained non-adherent, underscoring the need for complementary psychosocial interventions alongside biomedical treatment (Matakanye and Mboweni, 2024).

The findings demonstrate that several dimensions of self-efficacy, namely medical care management, support seeking, and psychological adjustment, were significantly associated with medication adherence (Menon and Helen Cross, 2025). Medical care management emerged as a particularly strong determinant, suggesting that patients who were confident in organizing medication schedules, recognizing side effects, and communicating with health workers were more likely to adhere to treatment (Mumbu *et al.*, 2025). This aligns with self-efficacy theory, which posits that individuals who believe in their capacity to manage health-related tasks are more likely to persist in health-promoting behaviors. In the context of tuberculosis, where treatment is prolonged and demanding, strong medical care management skills appear critical for sustaining adherence (Munir and Ahmed, 2025).

Support-seeking also showed a significant association with adherence, indicating that patients who actively sought assistance from family members, health workers, or peers were more likely to maintain regular medication intake (Nsolo, Nziku and Kumar, 2025). This finding highlights that self-efficacy is not solely an internal construct but includes confidence in mobilizing external resources when facing treatment-related challenges. Patients who are able and willing to ask for help may better manage barriers such as forgetfulness, side effects, or logistical difficulties. This result supports previous studies emphasizing the role of proactive coping strategies in chronic disease management (Olawade *et al.*, 2024).

Psychological adjustment was another significant factor influencing adherence. Patients who were better able to emotionally adapt to their diagnosis and the demands of long-term treatment demonstrated higher levels of adherence (Pophale *et al.*, 2025). Tuberculosis is often accompanied by stigma, anxiety, and fear of social exclusion, all of which can negatively affect motivation and treatment persistence. Patients who achieve psychological acceptance and emotional stability may be more resilient in maintaining adherence despite these stressors (Raval *et al.*, 2024). This finding reinforces the importance of addressing mental and emotional well-being as part of comprehensive TB care (Schoor and Stokes-Francis, 2024).

In contrast, transmission management was not significantly associated with medication adherence. Although many patients reported high engagement in preventive behaviors, such as mask use and cough etiquette, these practices did not translate into better medication adherence. This suggests that adherence is more closely linked to treatment-oriented beliefs and behaviors than to preventive actions aimed at protecting others. Preventive practices may be driven by social norms, fear of stigma, or external expectations rather than internal motivation to complete treatment. This distinction underscores the need to distinguish between infection control and treatment adherence behaviors when designing TB interventions (Sekandi *et al.*, 2025).

Beyond self-efficacy, all dimensions of social support were significantly associated with medication adherence. Instrumental support, such as assistance with transportation, medication preparation, or clinic visits, directly reduced practical barriers to adherence. Informational support helped patients better understand the importance of treatment completion, manage side effects,

and navigate health services, thereby strengthening adherence behaviors (Singh, 2024). These findings emphasize that access to accurate and consistent information remains essential in supporting long-term treatment compliance (Suprpto Dewi Nurhanifah, Muh Yunus, Lumastari Ajeng Wijayanti, 2025). Appraisal support, including encouragement, recognition, and positive feedback, was also significantly related to adherence. Patients who felt that their efforts were acknowledged and valued were more motivated to continue treatment (Yang *et al.*, 2025). This form of support may enhance patients' self-worth and reinforce positive health behaviors, particularly in the face of fatigue and treatment burden (Syahrefi *et al.*, 2025). Emotional support further contributed to adherence by providing patients with a sense of acceptance, empathy, and security. Feeling emotionally supported may help patients cope with stress, stigma, and treatment fatigue, ultimately sustaining adherence over time (Sylvia Bawilin and Suprpto, 2025).

The combined significance of self-efficacy and social support highlights the interplay between internal psychological resources and external social environments in shaping adherence behaviors. While DOTS ensures structured supervision, these findings suggest that psychosocial factors remain crucial determinants of whether patients consistently take their medication. Strengthening self-efficacy without adequate social support, or vice versa, may be insufficient to ensure optimal adherence (Thorakkattil *et al.*, 2024). From a practical perspective, these findings suggest that tuberculosis control programs should integrate psychosocial interventions into routine care. Health workers can play a key role in strengthening patients' medical care management skills through counseling, reminders, and education. Encouraging patients to seek support and involving family members more actively in treatment may further enhance adherence (Unki *et al.*, 2024). Additionally, addressing psychological distress and providing emotional reinforcement may improve treatment persistence, particularly among patients at risk of non-adherence. Overall, this study contributes to a more nuanced understanding of medication adherence in tuberculosis by demonstrating that both self-efficacy and social support operate through specific, measurable dimensions. By identifying which aspects of these constructs are most influential, the findings offer valuable guidance for developing targeted, patient-centered interventions to improve tuberculosis treatment outcomes in Palu City and similar settings.

CONCLUSION

This study concludes that both psychological and social factors influence medication adherence among tuberculosis patients in Palu City. Several dimensions of self-efficacy, medical care management, support seeking, and psychological adjustment were found to affect adherence, whereas transmission management did not. In addition, all dimensions of social support, including instrumental, informational, appraisal, and emotional support, were significantly associated with medication adherence. These findings indicate that adherence to tuberculosis treatment is not determined solely by clinical supervision but is strongly shaped by patients' confidence in managing treatment and the support they receive from their social environment.

Based on these findings, tuberculosis control programs should integrate psychosocial approaches into routine TB care. Health workers are encouraged to strengthen patients' self-efficacy through continuous counseling, treatment reminders, and education on managing side effects. Family involvement should be enhanced to provide consistent instrumental, informational, and emotional support throughout the treatment period. Additionally, targeted psychological support should be considered for patients experiencing emotional distress or low confidence to reduce the risk of non-adherence and improve overall treatment outcomes.

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Conflict of Interest

There are no potential conflicts of interest relevant to this article.

Ethical Approval

The Ethics Committee of the relevant institution approved this study. Written informed consent was obtained from all participants before data collection. Confidentiality and anonymity of the respondents were maintained throughout the study, and all procedures were conducted in accordance with ethical research standards.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Authors' Contributions

Jessica Angelina Mangela contributed to the study design, data collection, data analysis, and manuscript drafting. Muhammad Jusman Rau and Arwan contributed to data analysis, interpretation of results, and critical revision of the manuscript. Rasyika Nurul Fadrijah contributed to the literature review, data interpretation, and manuscript editing. Ni Wayan Sridani contributed to study supervision, methodological guidance, and final approval of the manuscript. All authors read and approved the final manuscript.

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