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The Relationship Between Self-Efficacy and Medication Adherence in Pulmonary Tuberculosis Patients

Erwin Bakhtiar[1*], Dwi Heppy Rochmawati[1], Wigyo Susanto[1], and Gagah Satria Hendrawan[2]

[1]Faculty of Nursing, Universitas Islam Sultan Agung, Central Java, Indonesia
[2]RSUD Banyumas, Central Java, Indonesia

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Co-Author
Erwin Bakhtiar
erwinbakhtiar6@gmail.com
Faculty of Nursing, Universitas Islam Sultan Agung, Central Java, Indonesia

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ABSTRACT

Introduction: Pulmonary tuberculosis (TB) patients need to have strong effort, desire, and belief in themselves to complete anti-tuberculosis drug (ATD) therapy. A preliminary study conducted on 30 patients observed that there were 12 patients (40%) with a history of incomplete ATD therapy due to non-adherence. This study aims to determine the relationship between self-efficacy and medication adherence in pulmonary TB patients.

Methods: This quantitative study used a correlational analysis method with a cross-sectional approach. The collected sample of 60 TB patients used a total sampling technique. Self-efficacy was measured using The General Self-Efficacy Scale (GSE) and adherence to taking ATD was measured using the Morisky Medication Adherence Scales-8 (MMAS-8). The analysis was performed using the Spearman Rank test.

Results: A total of 40 patients (66.7%) had moderate level of self-efficacy, and 27 patients (45%) had high level of medication adherence. There was a significant relationship between self-efficacy and adherence to taking ATD with a significance value of <0.001 and a level of closeness of 0.695.

Conclusion: The relationship between self-efficacy and adherence to taking ATD is a strong and unidirectional relationship. Families are expected to provide support to improve the self-efficacy of pulmonary TB patients, such as giving confidence to patients to be able to complete TB treatment.

Keywords: Adherence, Medication, Self-Efficacy, Tuberculosis

INTRODUCTION

Tuberculosis (TB) is a communicable illness triggered by infection from the Mycobacterium tuberculosis complex. Globally, TB is a major health crisis, ranking among the top ten causes of death globally and standing out as the number one cause of fatality from a single infectious source.

Globally, the incidence of TB in 2021 was estimated to be 10.6 million cases (ranging from 9.9–11.0 million), contributing to 1.6 million deaths (World Health Organization, 2020). In Indonesia, cases of pulmonary TB reached 1,017,290, and in Central Java, pulmonary TB cases reached 132,565 (Kementerian Kesehatan RI, 2018). According to Badan Pusat Statistik Kabupaten Brebes (2023), pulmonary TB cases reached 2,197 in 2023. A preliminary study conducted in December 2024 on a total of 30 patients observed found that there were 12 (40%) patients with a history of incomplete ATD therapy due to non-adherence. Interview results revealed that the reasons patients stopped taking ATD were that they felt they had recovered and were unaware of the consequences if their treatment was not completed. Some patients also expressed that they were bored, tired, and resigned to their condition.

Patients undergoing Anti-Tuberculosis Drug (ATD) are generally required to consume medication at the correct dose and regularly for 6 months or more (Isbaniah et al., 2021). However, in addition to the physical factors that must be addressed, psychological and mental factors are also important to consider. This is because the strict and lengthy treatment regimen poses challenges and obstacles for pulmonary TB patients, particularly concerning adherence to ATD (Sazali et al., 2023).

The Health Belief Model (HBM) suggests that a person's own understanding and thoughts about health strongly affect their actions, including whether they adopt healthy habits and follow medical advice. According to this model, people are more likely to act to protect their health when they believe they are at risk and recognize the seriousness of health issues (Khamai et al., 2024). This is especially important for understanding why people with pulmonary TB may struggle with their treatment. According to this theory, TB patients are more likely to stick to their treatment plan if they: feel at risk of TB, see TB as a serious illness, trust that the treatment will work, and don't anticipate major problems in getting better (Parwati et al., 2021). Therefore, pulmonary TB patients need to possess strong effort, desire, and belief in themselves to complete ATD therapy so that TB can be completely cured; this is referred to as self-belief or self-efficacy in pulmonary TB patients.

The most popular definition of self-efficacy was long ago stated by Albert Bandura in 1986, who stated that self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" and is closely related to feelings of self-confidence in one's ability to engage in any behavior (Ogden, 2023). Self-efficacy is self-control and self-belief that patients have the ability to succeed in a task or achieve a goal, in this case, successfully completing ATD treatment. When a patient believes in themselves, they are likely to face challenges in a different way compared to patients who do not believe in their abilities (McAneney, 2020). This underlies the importance of self-efficacy in patient health behavior related to ATD adherence.

Self-efficacy is related to ATD adherence in pulmonary TB patients, as evidenced by Marselina et al. (2024), who stated that there is a significant relationship between self-efficacy and ATD adherence in tuberculosis patients. Self-efficacy provides a sense of self-confidence in patients, so patients are confident and believe they can adhere to and complete ATD therapy. These results are consistent with research by (Hafiz, 2021), which revealed that self-efficacy is significantly related to ATD adherence in pulmonary TB patients. Patients with high self-efficacy will have the belief that they will recover, which creates awareness to take medication regularly and maintain this habit. Treatment adherence was found to be influenced by several factors, including: the seriousness of the illness, aspects of the

treatment itself like complexity and side effects, individual characteristics such as age, gender, personality, and emotional well-being, and external factors like financial situation, social support, and cultural beliefs. This is consistent with the Self-Efficacy Theory, which explains the concept of The Self System in Reciprocal Determinism by Albert Bandura, which explains that personal factors, behavior, and environment form a triangular chain that is interconnected, where the most important component of personal factors is self-efficacy (Brannon et al., 2022).

The goal of this study was to explore the correlation between self-efficacy and how well pulmonary tuberculosis patients adhered to their medication.

METHOD

The research study occurred between January 6th and 31st, 2025. It was a quantitative study that employed a cross-sectional approach and correlational analysis to investigate pulmonary tuberculosis patients. Researchers included all 60 pulmonary TB patients who were undergoing treatment as participants, using a total sampling method (Sugiyono, 2019). The inclusion criteria for this research were: (1) TB patients who were hospitalized; (2) patients who had undergone ATD treatment for more than 6 months; and (3) cooperative patients. Meanwhile, the exclusion criteria were: (1) patients with poor general condition; and (2) patients with comorbid diseases such as HIV/AIDS.

In this study, the researchers examined self-efficacy as the independent variable and adherence to Anti-Tuberculosis Drugs (ATD) as the dependent variable among pulmonary TB patients. Self-efficacy was measured using the valid and reliable General Self-Efficacy (GSE) questionnaire after adaptation through the back-to-back translation method. Construct validity using the Confirmatory Factor Analysis (CFA) method yielded t-value > 1.96 (df = 35) for all questionnaire items, and the factor loading ranged from 0.490 to 0.730 with respect to 585 samples. This questionnaire has 10 closed-ended questions with answers in the form of a Likert scale: 1 = “strongly disagree”, 2 = “disagree”, 3 = “agree”, and 4 = “strongly agree” (Novrianto et al., 2019).

In addition, adherence measurement was carried out using the Morisky Medication Adherence Scales-8 (MMAS-8), which has a correlation value > 0.374 and a Cronbach's alpha value of 0.954. This questionnaire has 8 questions, with 7 questions having "Yes" or "No" answers, where "Yes" has a score of 0 and "No" has a score of 1, except for question number 5 where the answer "Yes" is valued at 1. Meanwhile, for question number 8, there are several options: "never" has a score of 1, while "rarely", "sometimes", "usually", and "always" have a score of 0. The total MMAS-8 score can range from 0-8 and can be categorized into three levels of adherence: high adherence (score = 8), medium adherence (score = 6 or <8), and low adherence (score ≤6) (Alhaq & Indawati, 2024).

Data collection was carried out by distributing questionnaires to each patient who was willing to become a research respondent by directly completing an informed consent form. The researcher ensured that each respondent understood the purpose and potential impact of this research by explaining the research procedures to each respondent beforehand.

The Health Research Ethics Committee at the Faculty of Nursing, Universitas Islam Sultan Agung, approved this research, as indicated by review number 1400/A.1-KEPK/FIK-SA/XI/2024.

Univariate analysis was presented in the form of frequencies and percentages, while bivariate analysis was performed using the Spearman Rank Test, which was used to examine the relationship between self-efficacy and medication adherence in pulmonary TB patients.

RESULTS

Table 1. Respondent Characteristics (n = 60)

Characteristics	n	(%)
Age (year)		
26 – 45	31	51,7
46 – 65	29	48,3
Gender		
Male	33	55
Female	27	45
Level of Education		
Elementary	5	8,3
Middle	17	28,3
High	22	36,7
College	16	26,7
Job		
Unemployed	11	18,3
Laborer	12	20
Farmer	15	25
Private Sector Employee	13	21,7
Civil Servant	9	15
Total	**60**	**100**

A total of 60 respondents were obtained in this research. The research results shows the characteristics of respondents in the research on pulmonary TB patients. The age range of 26–45 years was the most frequent age category among pulmonary TB patients, with 31 samples or 51.7%, while the age range of 46–65 years was the least frequent age category, with 29 samples or 48.3%. Regarding gender, males were the most frequent with 33 samples or 55%, and females were the least frequent with 27 samples or 45%. Senior High School (SMA) was the most common education level among pulmonary TB patients, with 22 samples or 36.7%, and Elementary School (SD) was the least common, with 5 samples or 8.3%. In terms of occupation, private sector employees were the most frequent among pulmonary TB patients, with 13 samples or 21.7%, and civil servants/employees were the least frequent, with 9 samples or 15%. The detail is on Table 1.

Table 2. Descriotive Statistic Of Self Efficacy and Meditation Adherence

Variables	n	(%)
Self-Efficacy		
Low	7	11,7
Moderate	40	66,7
High	13	21,7
Medication Adherence		
Low	12	20
Moderate	21	35
High	27	45
Total	**60**	**100**

Table 2 shows that self-efficacy in pulmonary TB patients is predominantly categorized as moderate, accounting for 40 samples or 66.7%, while the low category is the least frequent, with 7 samples or 11.7%. Furbrebes, Table 2 also indicates that medication adherence among pulmonary TB patients is most commonly classified as high, totaling 27 samples or 45%, and least commonly as low, with 12 samples or 20%.

Based on Table 3, it can be seen that all 7 pulmonary TB patients (100%) with low self-efficacy were found to have low medication adherence. Among pulmonary TB patients with moderate self-efficacy, 5 patients (12.5%) had low medication adherence, 21 patients (52.5%) had moderate medication adherence, and 14 patients (35%) had high medication adherence. Meanwhile, all 13 pulmonary TB patients (100%) with high self-efficacy were found to have high medication adherence. The detail is on Table 3.

Table 3. Relationship Between Self-Efficacy and Medication Adherence (n = 60)

	Medication Adherence						Total		*r*	p_{value}
	Low		Moderate		High					
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*		
Low	7	100	0	0	0	0	7	100	0,695	<0,001
Moderate	5	12,5	21	52,5	14	35	40	100		
High	0	0	0	0	13	100	13	100		
Total	**12**	**20**	**21**	**35**	**27**	**45**	**60**	**100**		

The relationship between self-efficacy and medication adherence in pulmonary TB patients has a strong correlation coefficient of 0.695 with a significance value of <0.001. This indicates that the relationship between self-efficacy and medication adherence is positive, strong, and statistically significant. The study indicated a notable link between patients' belief in their ability to succeed (self-efficacy) and their consistency in taking medication (medication adherence). This relationship was observed among pulmonary TB patients specifically within the Isolation Inpatient Room. This relationship is strong and has a positive correlation, meaning that the higher the patient's self-efficacy, the higher their medication adherence for pulmonary TB.

DISCUSSION

Respondent Characteristics

The research findings indicate that the majority of pulmonary TB patients in this study were adults, aged between 26 and 45 years. According to Rahmawati et al. (2022), age is a significant risk factor for TB infection because the bacteria causing pulmonary TB are greatly influenced by an individual's immune system. National data shows that the highest number of pulmonary TB cases is in the 45–54 age group, but other age groups remain at equal risk of contracting pulmonary TB (World Health Organization, 2020).

Pulmonary TB is a curable bacterial disease, and the faster it is detected, the easier it is to manage (Organisation for Economic Co-operation and Development, 2024). In older adults, aged 50 years and above, immune system function declines with age compared to younger individuals. This decline is not only due to general biological aging but also related to thymus gland shrinkage, leading to changes in cellular and humoral immune responses. Consequently, older adults face an increased risk of various immune system disorders, making them more susceptible to infections. A weakened immune status in older adults elevates the risk of pulmonary TB infection (Fahdhienie et al., 2020). This aligns with research by Konde et al. (2020), which found a significant association between age and the incidence of pulmonary TB.

Regarding gender, this study shows that male pulmonary TB patients were proportionally higher in number compared to females. Men have a 4.24 times higher risk of developing pulmonary TB than women. One factor contributing to this difference is the higher prevalence of smoking among men. Smoking is known to weaken the immune system, thereby increasing susceptibility to pulmonary TB infection (Pralambang & Setiawan, 2021). This is consistent with research by Sunarmi & Kurniawaty (2022), which stated that there is a relationship between gender and the incidence of tuberculosis.

Education is also a risk factor for TB infection. This research indicates that most pulmonary TB patients have a high school education level. Individuals with higher education tend to be more effective at understanding and processing information

related to tuberculosis. This ability facilitates the implementation of disease prevention measures. Moreover, increased education levels positively correlate with improved overall health status (Muhammad, 2019). Education level can influence a patient's ability to access and understand information about tuberculosis. This adequate knowledge is believed to be a factor that can increase patient motivation. These results are in line with research by Sunarmi & Kurniawaty (2022), which stated that there is a significant relationship between education and the incidence of tuberculosis.

The occupation most frequently observed in pulmonary TB patients in this study is farmer. Research by Majdi (2022) shows that there is a relationship between occupation and the incidence of pulmonary TB. Occupation itself does not significantly influence the growth and development of TB-causing bacteria. However, unemployed individuals tend to have less access to available healthcare facilities. Meanwhile, Mar'iyah & Zulkarnain (2021) revealed that certain occupations increase the risk of exposure to TB bacteria due to potential direct contact with patients. The most at-risk profession is healthcare workers who directly interact with TB patients. This means that specific work environments can facilitate the transmission of this disease.

Occupation is related to a person's economic status, where better occupations often correlate with better economic status. This aligns with research by Salsabilah & Afriansya (2024), which revealed a significant relationship between economic status and the incidence of tuberculosis.

Self-Efficacy Among Pulmonary TB Patients

The research findings indicate that the self-efficacy of pulmonary TB patients in the Isolation Inpatient Room is mostly categorized as moderate. Moderate self-efficacy means having a reasonable, but not overwhelming, level of confidence in one's abilities. This person is generally capable and willing to engage with tasks but might experience more self-doubt, particularly under pressure or when facing novel challenges, than someone with high self-efficacy. They sit between the highly confident individual who tackles challenges readily and the individual with low confidence who tends to avoid challenges or gives up easily (Lee & Bong, 2023).

A study by Rachma et al. (2021) showed that knowledge, attitudes, health practices, family support, health education, and perceptions are factors related to prevention and transmission behaviors in pulmonary TB patients. In addition to self-efficacy, research by Giri et al. (2022) concluded that commitment to prevention and efforts to achieve recovery in pulmonary TB patients are also influenced by several factors such as perceived barriers, attitudes, and perceptions of interpersonal influence.

Self-efficacy plays an important role in self-control or self-awareness, in this case, awareness of one's own health condition. Basically, self-efficacy can be obtained, learned, and developed through four sources of information that can influence a person's self-efficacy. These sources of information include enactive or mastery experiences, vicarious learning, social persuasion, and physiological and affective state (Lee & Bong, 2023).

Self-efficacy will practically influence how far a patient's efforts go in dealing with their health problems, and how long these efforts will be maintained even if the patient faces various obstacles and even failures. This is reflected in the efforts of patients with pulmonary TB to achieve health by taking medication regularly and completely, because good self-efficacy in pulmonary TB patients generates motivation for treatment with the hope of achieving recovery (Sutarto et al., 2019).

Based on the explanation above, the researcher argues that self-efficacy in

pulmonary TB patients is a belief that is implicated in the efforts of pulmonary TB patients to achieve a healthy body condition. This can be influenced by personal experiences such as patient perceptions, the experiences of others such as knowledge gained by others, persuasion from others such as family support that provides understanding of the patient's condition, as well as the patient's physical and emotional state that requires them to complete tuberculosis treatment thoroughly.

Medication Adherence Among Pulmonary TB Patients

The research findings indicate that the majority of pulmonary TB patients in the Isolation Inpatient Room demonstrate high adherence to medication. High medication adherence means that a patient follows the prescribed medication regimen very closely (more than 80% of their prescribed medicines) (Brown & Sinsky, 2023).

Several factors can influence medication adherence in patients, as highlighted in a study by Gast & Mathes (2019). This study, which compiled 21 articles, concluded that higher levels of education and income are positively correlated with an individual's adherence to treatment. Conversely, high treatment costs exhibit a negative correlation with treatment adherence (Gast & Mathes, 2019). Consistent with these findings, Nezenega et al. (2020) also reported similar observations. They identified patient-related factors such as forgetfulness, inadequate knowledge, and self-efficacy, alongside social factors like medication reminders, economic factors, health system factors, treatment factors, lifestyle factors, and geographical access, as factors influencing medication adherence among pulmonary TB patients. According to Adhanty & Syarif (2023) study, unmodifiable factors include age, employment status, and medication side effects. Furthermore, Jung & Hwang (2018) revealed in their research that stigma, self-efficacy, family support, and alcohol consumption are also factors that can affect medication adherence in pulmonary TB patients.

Health insurance can also play a role in treatment adherence. However, it's worth noting that in Indonesia, government-sponsored health insurance is nearly universal among patients with chronic illnesses (Horvat et al., 2018).

In conclusion, while internal factors can indeed impact medication adherence in pulmonary TB patients, external factors, such as patient support systems, also significantly influence treatment adherence.

Relationship Between Self-Efficacy and Medication Adherence Among Pulmonary TB Patients

The analysis in this study indicates a strong and significant correlation between self-efficacy and medication adherence among pulmonary TB patients in the Isolation Inpatient Room. This result aligns with research by Azizi et al. (2018), which revealed that self-efficacy is the most dominant predictor of TB medication adherence among other factors such as perceived threat, treatment benefits, and barriers. Self-efficacy plays a crucial role in TB medication adherence. Dewi et al. (2022) research also demonstrated a significant relationship between self-efficacy and medication adherence in pulmonary TB patients. Consistent with these findings, Gebremariam et al. (2021) reported that self-efficacy is a predictor of adherence to TB treatment.

Self-efficacy reflects an individual's belief in successfully performing actions. Treatment success depends on the patient's experience in completing all phases of treatment (Dewi et al., 2022). Furthermore, when pulmonary TB patients possess high self-efficacy, they are more likely to actively seek health information and adopt healthy lifestyle behaviors, including adhering to medication regimens. A strong belief in one's

ability to recover motivates patients to follow treatment recommendations with discipline (Haerianti et al., 2022).

Moreover, high self-efficacy assists patients in managing neuroticism or negative behaviors that can hinder the healing process. With good self-control, patients are more receptive to positive information, possess high self-confidence, and are capable of adopting healthy lifestyles. This combination of factors significantly influences patients' attitudes towards medication adherence, increasing their likelihood of following treatment plans accurately (Huang et al., 2021). The role of healthcare workers is crucial in developing programs that can enhance motivation for TB medication adherence (Azizi et al., 2018), as self-efficacy plays a critical role in personal control, including in health matters.

Self-efficacy is an internal factor that empowers pulmonary TB patients with high self-confidence. This internal factor can be modified by providing social or family support, such as reassuring patients that they can maintain adherence to their medication.

CONCLUSION

Based on the research objectives and the analysis conducted, it can be concluded that there is a significant relationship between self-efficacy and medication adherence among pulmonary TB patients in the Isolation Inpatient Room. The relationship between self-efficacy and medication adherence is strong and directly correlated. Families are expected to provide support to enhance the self-efficacy of pulmonary TB patients, such as by instilling confidence in patients to complete their TB treatment and consistently reminding them about their medication schedules.

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