Indonesian Journal of Global Health Research
Volume 8 Number 4, August 2026
e-ISSN 2715-1972; p-ISSN 2714-9749
https://jurnal2.globalhealthsciencegroup.com/index.php/IJGHR

THE EFFECT OF TUBERCULOSIS SELF MANAGEMENT EDUCATION BASED ON SELF CARE THEORY ON SELF EFFICACY AND MEDICATION ADHERENCE IN PULMONARY TUBERCULOSIS PATIENTS

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ABSTRACT

Non-adherence to medication is still a major problem that has an impact on therapy failure, drug resistance, and increased morbidity and mortality. Multi Drug Resistant TB (MDR-TB) cases in Indonesia are ranked 3rd (7.4%) after India and Russia. Through an educational approach that empowers patients through Tuberculosis Self Management Education (TSME) based on Self Care Theory, it is hoped that it will be able to increase self-efficacy and medication adherence to tuberculosis patients. This study aims to analyze the influence of Tuberculosis Self Management Education based on Self Care Theory on self-efficacy and medication adherence in tuberculosis patients. Methods: The study used a quasi-experiment design with pretest–posttest with control group, population of 68 with a sample of 34 intervention group respondents and 34 control group respondents with accidental sampling technique. The independent variables are TSME based on Self Care Theory, while the dependent variables include self-efficacy and medication adherence. The research instruments used were TBSES-21 self-efficacy questionnaire and MMAS-8 drug adherence. Data analysis used Paired t-test and Independent t-test. The study showed a significant improvement in self-efficacy and medication adherence in the intervention group after intervention compared to the control group ($p = 0.000$). Conclusion: There is an effect of TSME based on Self Care Theory on self-efficacy and medication adherence in pulmonary tuberculosis patients. This intervention is recommended to be applied, especially TB patients and their families, nurses in nursing services to support the success of tuberculosis treatment.

Keywords: medication adherence; pulmonary tuberculosis; self-care theory; self-efficacy; tuberculosis self-management education

How to cite (in APA style)
Rochmah, A. F., Zahroh, C., & Nadatien, I. (2026). The Effect of Tuberculosis Self Management Education Based on Self Care Theory on Self Efficacy and Medication Adherence in Pulmonary Tuberculosis Patients. *Indonesian Journal of Global Health Research*, *8*(4), 1–8. https://doi.org/10.37287/ijghr.v8i4.1847.

INTRODUCTION

Adherence to taking medication is the key to success in carrying out tuberculosis treatment. Non-adherence to treatment results in a high rate of treatment failure, which can increase the risk of pain, drug resistance to standard treatment, and death (Husna & Irawan, 2024). Treatment failure can be caused by many factors such as medication, illness, and the sufferer himself. Drug factors consist of inadequate drug guidance, insufficient drug doses, less than appropriate treatment periods, and the occurrence of drug resistance. Disease factors are usually caused by lesions that are too extensive, the presence of other diseases that follow, and the presence of immunological disorders. The last factor is the patient's own problems, such as lack of knowledge about tuberculosis, lack of funds, laziness in treatment, poor self-management and feeling cured (Fitri et al., 2018; Lestari et al., 2022; Zhang et al., 2020).

Self-efficacy or an individual's confidence in his or her own abilities is one of the most crucial factors in controlling pulmonary TB. Self-efficacy reflects the extent to which a person is confident in managing certain behaviors to achieve healing. This belief is influenced by several factors, such as personal experience, observation of the success of others, verbal support in the form of information and emotional motivation, and the physical and psychological condition of the sufferer. Treatment of pulmonary TB that lasts for a long period of time and demands high adherence in drug consumption often causes saturation. If not balanced with adequate emotional and informational support, this can reduce the level of self-efficacy of sufferers. As a result, sufferers are at risk of becoming non-compliant in undergoing treatment, which can ultimately thwart the healing process.

The prevalence of pulmonary TB cases in Indonesia in 2023 was found to be 821,200 cases, a fairly high increase when compared to all cases found in 2022, which was 677,464 cases (Ministry of Health, 2024). East Java occupies the third position with 87,048 cases (93%) which has increased compared to cases in 2022, Surbaya City is one of the cities with high TB cases of 10,987 cases with the highest number of cases in Sawahan District of 749 cases (East Java Health Office, 2024). The Banyu Urip Health Center is one of the health centers in the city of Surabaya which is located in Sawahan District, the number of cases in 2023 is 151 cases. The large number of TB cases at the Banyu Urip Health Center is caused by the density and poor quality of settlements, the discovery of active cases by health workers, socio-economic and nutritional problems, and low public health awareness.

The success rate of treating TB patients in 2023 is 86.5%, this figure has not reached the target of 90% (Ministry of Health, 2024). In addition, Multi Drug Resistant TB (MDR-TB) cases in Indonesia are ranked 3rd (7.4%) after India and Russia (WHO, 2024). Prevalence of non-adherence to medication is mostly 50% of TB patients who do not comply with medication (Fitri et al., 2018).

Non-adherence in taking medication or non-completion of treatment can lead to pulmonary tuberculosis germ immunity to Anti-tuberculosis Pulmonary Drugs (OAT), which can result in Tuberculosis Mutidrug Resistant (TB MDR). This treatment costs a lot and takes a relatively long time for sufferers (Herdiman et al., 2020). In addition, non-adherence to taking medication can prolong the treatment time so that it can cause patients to feel bored or tired, which sometimes leads to non-adherence in taking medication due to lack of understanding of the importance of taking medication according to a prescribed schedule (Setyowati et al., 2019). However, until now the influence of tuberculosis self management education on medication adherence and self efficacy In patients with pulmonary tuberculosis has not been explained.

One way to improve health behavior towards self-efficcay and medication adherence is by providing education about TSME-based self care theory. Pulmonary tuberculosis management has five pillars, namely related to knowledge, drug consumption behavior, nutritional fulfillment, physical activity, and prevention of tuberculosis transmission. Based on some previous research (Nuwa & Kiik, 2021) (Faisal et al., 2021; Haskas et al., 2023; Nuwa & Kiik, 2021) It was found that there was an influence of education on medication adherence, self-efficacy and quality of life in tuberculosis patients.

METHOD

The research method used was a quasi-experiment with a pretest–posttest with control group approach. The population in this study is all pulmonary tuberculosis patients in the working area of the Banyu Urip Surabaya Health Center in 2025. A total of 68 respondents were selected as a sample with accidental sampling technique, which was divided into two groups, namely 34 intervention group respondents and 34 control group respondents. The intervention group was given TSME education based on Self Care Theory in a structured and sustainable manner, while the control group received standard services according to the procedures of the health center.

The independent variables in the study were TSME based on Self Care Theory, while the dependent variables were self-efficacy and adherence to taking medication. Self-efficacy measurement was carried out using the TB Self-Efficacy Scale (TBSES-21) with a validity value of 0.912 > 0.239 and a reliability of 0.856 > 0.60, while medication adherence was measured using the Morisky Medication Adherence Scale (MMAS-8) with a validity value of 0.834 > 0.239 and a reliability of 0.789 > 0.60. Data analysis was conducted using paired t-tests to see changes before and after the intervention, as well as an independent t-test to compare the results between the intervention group and the control group with a significance level of $p < 0.05$.

RESULT

Table 1.
Characteristics of respondents in the intervention group and control group of Tuberculosis Self Management Education based on Self Care Theory on Self Efficacy and Medication Compliance in Pulmonary Tuberculosis Patients

Features	Intervention	(n=19)	Control	(n=19)
They respond	f	%	f	%
Gender				
Male	21	61.8	20	58.8
Women	13	38.2	14	41.2
Education				
SD	0	0	1	2.9
SMP	2	5.9	6	17.6
SMA	32	94.1	25	73.5
PT	0	0	1	2.9
Jobs				
Work	20	58.8	17	50
Not Working	14	41,1	17	50
Duration of TB Treatment				
Intensive Phase	14	41,1	9	26,5
Advanced Phases	20	58.8	25	73,5

Based on table 5.1, it shows that the respondents in the intervention group based on gender were mostly male (61.8%) and the control group respondents were half (58.8%) male. The characteristics of respondents in the intervention group based on education were almost entirely (94.1%) the last education of high school and the respondent control group was mostly (73.5%) of the last education of high school. The characteristics of respondents in the intervention group based on employment, half (58.8%) worked as self-employed and half of the control group respondents (50%) worked and did not work. Respondent characteristics were based on the intervention group based on the duration of TB treatment, half (58.8%) of the advanced phase and the response of the control group Most (73.5%) of the advanced phase.

Table 2.
Self-efficacy before and after tuberculosis self-management education based on self-care theory in pulmonary tuberculosis patients

			N	Minimum	Maximum	Mean	SD
Self-efficacy	Intervention	Before	34	40	60	50.94	6.48
		After	34	42	65	54.38	6.74
	Control	Before	34	33	71	49.12	11.89
		After	34	31	70	49.10	11.87

Based on table 2 in the control group, the average self-efficacy score did not change from 49.12 in the pre-test to 49.10. Meanwhile, in the intervention group, the average self-efficacy also increased from 50.94 to 54.38, with a score range from 40–60 in the pre-test to 42–65 in the post-test

Table 3.
Medication adherence before and after tuberculosis self management education based on self care theory in pulmonary tuberculosis patients

			N	Minimum	Maximum	Mean	SD
Medication adherence	Intervention	Before	34	8	12	10.18	1.21
		After	34	9	15	12.66	1.66
	Control	Before	34	9	14	10.03	1.16
		After	34	8	13	10.01	1.10

Based on table 3 in the control group, the average adherence to medication did not increase from 10.03 before the intervention to 10.01. Meanwhile, in the intervention group, the average adherence increased from 10.18 to 12.65, with a range of scores from 8–12 on the pre-test to 9–15 on the post-test

Table 4.
Analyzing self-efficacy before and after tuberculosis self management education based on self-care theory in pulmonary tuberculosis patients

Variabel	Mean	St.Dev	SE	Df	P
Self Efficacy Pre Eksperimen - Self Efficacy Post Eksperimen	-3.44	1.307	.224	33	.000
Self Efficacy Pre Control - Self Efficacy Post Control	-2,35	1.175	.201	33	.083

Based on table 4, the results of the paired sample t-test showed that in the control group there was no difference in the average self-efficacy between pre-test and post-test (Mean = –2.35; p = 0.083), so it can be concluded that there was no increase in self-efficacy in the control group. In contrast, in the intervention group, there was an average difference of –3.44 with a significant value of 0.000 (p < 0.05), which indicates that the intervention was able to significantly improve self-efficacy.

Table 5.
Analyzing medication adherence before and after tuberculosis self management education based on self care theory in pulmonary tuberculosis patients

Variabel	Mean	St.Dev	SE	Df	P
Medication Compliance Pre Test Expression - Medication Compliance Post Test Experiment	-2.471	.748	.128	33	.000
Medication Compliance Pre Test Komntrol - Medication Compliance Post Test Komntrol	-,412	.701	.120	33	.163

Based on able 5, the results of the Paired Sample t-test showed that in the control group there was no difference in the average adherence to medication between pre-test and post-test (Mean = –.412; p = 0.163), so it can be concluded that there was no increase in medication adherence in the control group. On the other hand, in the intervention group, there was an average difference of --2,471 with a significance value of 0.000 (p < 0.05), which indicates that the intervention was able to significantly increase medication adherence.

Table 6.
Analyzing the effect of providing tuberculosis self management education based on self-care theory on self-efficacy and medication adherence at the Banyu Urip Health Center Surabaya

Variabel	Groups	Mean	St.Dev	SE	Df	P
Difference Self Efficacy	Intervention	7.20	4.47	1.406	36	.000
	Control	0.18	0.31	0.086		
Difference medication adherence	Intervention	15.40	6.130	1.027	32	.000
	Control	0.17	0.36	0.072		

Based on table 6 the results of the statistical test showed the mean value of self-efficacy difference in the intervention group of 7.20 with a standard deviation of 4.47 and in the control group showed a self-efficacy difference value of 0.18 and standard deviation of 0.31. Meanwhile, the average value of the difference in medication adherence in the intervention group was 15.40 with a standard deviation of 6.130 and in the control group showed a difference in medication adherence value of 0.17 and a standard deviation of 0.36.

The results of the Independent t-test for both variables there were differences in the score of self-efficacy and adherence to taking medication in the intervention group and the control group obtained a value of P = 0.000 and a value of α = 0.05 meaning P < α then Ho was rejected, meaning that tuberculosis self management education based on self care theory can improve self-efficacy and adherence to taking medication in tuberculosis patients at the Banyu Urip Health Center in Surabaya

DISCUSSION

Self-Efficacy of Pulmonary TB Patients Before and After Intervention

Based on the results of the study in table 5.2 in the control group, the average value of self-efficacy did not change from 49.12 in the pre-test to 49.10. Meanwhile, in the intervention group, the average self-efficacy also increased from 50.94 to 54.38, with a range of scores from 40–60 in the pre-test to 42–65 in the post-test. This shows that the control group did not experience a change in the average self-efficacy, while the intervention group experienced a significant increase after being given self-care theory-based tuberculosis self-management education. These findings indicate that educational interventions contribute positively to increasing patients' self-confidence in managing their illnesses independently. Self-efficacy plays an important role in shaping health behaviors, especially in medication adherence and lifestyle settings. Demographic factors such as age, education, and employment also affect self-efficacy. Respondents with a high level of education and stable employment status tended to have better cognitive abilities and confidence in receiving and applying health education. In addition, the higher a person's level of education, the lower the perception of susceptibility to disease and the higher the social awareness and self-efficacy in the prevention of tuberculosis (Yoshitake et al., 2019).

In patients with pulmonary tuberculosis, this education emphasizes on improving the patient's ability to understand the disease, how it is transmitted, preventive measures, and adherence to treatment. A good understanding will help the patient accept his condition positively, which will further increase motivation to heal (Setiyowati et al., 2020). Meanwhile, self-care is defined as the ability of individuals to manage their own health, including maintaining a healthy lifestyle, recognizing symptoms, and following medical recommendations. In the context of pulmonary TB, self-care includes regular medication fulfillment, prevention of transmission, and regulation of diet and rest. Self-efficacy plays an important role in supporting the implementation of self-care, because the higher the patient's level of self-confidence, the more likely he is to adhere to treatment and maintain consistent healthy behaviors. Self-management education based on self-care theory has proven to be effective because it not only increases knowledge, but also strengthens the patient's independence and responsibility in self-care. High self-efficacy encourages patients to be more consistent in carrying out therapy and maintain healthy behaviors during treatment.

Medication Compliance of Pulmonary TB Patients Before and After Intervention

Based on the results of the study in the control group table, the average adherence to medication did not increase from 10.03 before the intervention to 10.01. Meanwhile, in the intervention group, the average adherence increased from 10.18 to 12.65, with a range of scores from 8–12 in the pre-test to 9–15 in the post-test. The control group did not show an increase in medication adherence, while the intervention group experienced a significant improvement after receiving self-management education. This confirms that educational approaches based on self-care theory are effective in improving the compliance behavior of pulmonary TB patients.

Medication adherence is a major factor in the success of TB therapy which lasts 6–9 months. Non-compliance is often caused by medication side effects, burnout, perception of early recovery, and socioeconomic constraints. This condition is at risk of causing therapy failure and drug resistance (TB-MDR). According to Yulianti (2018), the length of the duration of treatment causes some patients to feel bored and tired, so there is a tendency to stop taking medication before the treatment period is over. This is in line with the opinion (Andriani & Prameswari, 2018) Which explains that many patients stop taking the medication because they feel better after symptoms subside in the first 1–2 months, as well as because of uncomfortable side effects of the medication. These factors are strengthened by the findings of Ali et al. (2015) which state that poverty levels, distance from living from health facilities, availability of medicines, and misperceptions about treatment and affect patient fulfillment. (Indiyah, 2018) states that patients who stop treatment halfway through have to repeat the treatment regimen from the beginning, which certainly reduces the effectiveness of the national TB control program. In addition to prolonging the healing period, non-compliance also has the potential to reduce patient motivation due to boredom, side effects, or lack of understanding of the importance of complete therapy (Setyowati et al., 2019)..

In this context, the tuberculosis self-management education approach based on self-care theory is a relevant strategy. This education focuses not only on medical communication, but also on empowering patients to understand their condition, recognize side effects, and develop intrinsic motivational information in maintaining medication adherence. Self-management aims to make the patient an active subject in his or her own care, not just a recipient of medical instructions. According to (Nuwa & Kiik, 2021), management of pulmonary TB includes five important pillars: knowledge, fulfillment of drug consumption, fulfillment of nutrition, physical activity, and prevention of transmission.

In the author's view, self-management-based education is an intervention that bridges the gap between conventional medical approaches and long-term behavior change. In many areas, health education is still one-way — patients simply receive information without internalizing value and responsibility. Through a self-care theory-based approach, patients are invited to understand that satisfaction is not just an obligation to health workers, but an investment in their own quality of life. Thus, self-management education has the potential to be a key component in the national TB elimination strategy 2030, especially in areas with low compliance rates. Self-management education encourages patients to become active practitioners in treatment by understanding the benefits of therapy, managing side effects, and maintaining motivation during long-term treatment. This approach is in line with Self-Care Theory which emphasizes the responsibility of individuals in maintaining their health.

The Effect of Self-Management Education on Self-Efficacy and Compliance
Based on Table 5.8, the average self-efficacy difference in the intervention group was 7.20 (SD 4.47), while in the control group it was only 0.18 (SD 0.31). The results of the Independent t-test showed a value of $p = 0.000$ ($p < 0.05$), so Ho was rejected. Thus, TSME based on self-care theory has been proven to increase the self-efficacy of tuberculosis patients at the Banyu Urip Health Center in Surabaya. In addition, the average difference in medication adherence in the intervention group was 15.40 (SD 6.13), while in the control group it was only 0.17 (SD 0.36). The Independent t-test also showed a value of $p = 0.000$ ($p < 0.05$), so Ho was rejected. This means that the intervention is also effective in improving medication adherence in tuberculosis patients.

The results of the study showed that interventions in the form of tuberculosis self-management education based on self-care theory had a significant effect on increasing self-efficacy and medication adherence in pulmonary tuberculosis patients. These findings were shown by the results of the Paired Sample t-test in the experimental group which showed a greater increase in the average self-efficacy and compliance than the control group. This indicates that the self-management education provided has succeeded in improving the patient's ability to regulate treatment behavior and strengthening self-confidence to complete therapy completely.

The results of this study are in line with the findings (Marbun et al., 2021) which shows that self-management interventions are able to improve self-efficacy in patients with type 2 diabetes mellitus. Patients who participated in the self-education program experienced increased confidence in managing their lifestyle, controlling symptoms, and undergoing treatment. Similar research by Widyanti et al. (2018) also proves that self-management education significantly improves individuals' ability to control themselves, comply with therapy, and manage emotions in chronic diseases.

In addition, (Yesayas et al., 2021) stated that self-management education is able to improve the adherence of TB patients in taking anti-tuberculosis drugs through increased knowledge and awareness of the importance of long-term therapy. These findings are reinforced by (Iskandar et al., 2023) which shows that the application of Health Belief Model-based self-management education is able to foster the perception of benefits and reduce the patient's barriers in undergoing treatment. Meanwhile, (Bao et al., 2022) affirmed that self-management is an important strategy for patients with chronic diseases, including tuberculosis, because it includes the ability to manage medical, emotional, and social needs. In pulmonary TB patients, self-management includes medication fulfillment, nutritional provision, stress control, and the ability to recognize signs of recurrence. This improvement in ability has been shown to improve self-efficacy, quality of life, and therapy success.

These interventions help patients understand the disease, manage side effects, regulate activities, and maintain motivation during treatment. Thus, the patient is no longer passive, but plays an active role and is responsible for the success of his therapy. The results of this study show that self-care theory-based education has a strategic role in improving the health behavior of pulmonary TB patients, especially in terms of medication adherence. The education provided systematically is able to strengthen the patient's understanding of the importance of sustainable treatment, while increasing the sense of responsibility for their health condition. According to the author, one of the biggest challenges in the treatment of tuberculosis in Indonesia is not only the limited facilities, but the low awareness and self-control of patients. Many patients stop taking medication when they feel cured after 1-2 months, even though the TB germ is still active in the body. Therefore, an educational approach that emphasizes self-awareness and self-regulation is much more effective than a passive approach that is only instructive.

Tuberculosis self-management education programs based on self-care theory can be an applicable intervention model at the primary service level such as health centers. If implemented in a sustainable manner with the assistance of health workers, this program has the potential to significantly increase patient fulfillment, reduce the TB-MDR rate, and accelerate the achievement of the target of eliminating tuberculosis by 2030.

CONCLUSION

Research at the Banyu Urip Health Center in Surabaya shows that tuberculosis (TB) self-management education based on self-care theory is effective in increasing self-confidence (self-efficacy) and medication discipline in patients. The intervention group showed significant changes and positive improvements in both aspects after being educated compared to before the intervention.

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