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THE EFFECT OF TELE-SUPPORT BASED ON THE HEALTH BELIEF MODEL ON IMPROVING SELF-MANAGEMENT AND SELF-HELP GROUP IN PULMONARY TUBERCULOSIS PATIENTS

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ABSTRACT
Long-term treatment for pulmonary tuberculosis often leads to non-adherence due to low self-management and limited involvement in self-help group. health belief model (HBM)-based Tele-support intervention has the potential to improve patients' health behaviors by strengthening perceptions and self-efficacy. Objective to analyze the effect of HBM-based tele-support on improving self-management and self-help group among pulmonary TB patients. This quasi-experimental study used a pretest-posttest control group design involving 70 respondents (35 each in the intervention and control group). The independent variable was HBM-based tele-support, while the dependent variables were self-management and self-help group. Data were collected using validated Self-Management and Self-Help Group questionnaires. The Self-Management questionnaire demonstrated good construct validity based on Confirmatory Factor Analysis (factor loadings >0.50) and excellent internal consistency (Cronbach's alpha = 0.91; subscale reliability = 0.80–0.85). The Self-Help Group questionnaire also showed good construct validity (factor loadings >0.60) with excellent internal consistency (Cronbach's alpha = 0.88–0.92) and analyzed using the Wilcoxon and Mann-Whitney tests. The intervention group showed significant improvements in self-management (P= 0.003) and self-help group (P= 0.025) post-intervention, whereas the control group showed no significant changes (P> 0.05). Inter-group analysis revealed a significant difference in self-management (P= 0.003), but no significant difference in self-help group (P= 0.063). HBM-based Tele-support is effective in improving self-management in pulmonary TB patients, but has not yet shown optimal results for self-help group. This intervention is recommended for implementation in outpatient services as a medium for education and remote monitoring.

Keywords: health belief model; pulmonaryy TB; self-help group; self-management; tele-support

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INTRODUCTION

Treatment for pulmonary tuberculosis (TB) requires a long time and high patient adherence; however, in practice, many patients have difficulty managing their treatment independently and lack peer support. This situation causes patients to undergo therapy on their own, thereby increasing the risk of treatment failure. Low self-management ability among pulmonary TB patients does not arise suddenly but is the result of a long, interrelated process involving individual, environmental, and healthcare system factors. Self-management is a critical aspect of long-term treatment for pulmonary TB. Many patients struggle to stick to their medication schedules, maintain a healthy lifestyle, and attend routine follow-up appointments. These challenges increase the risk of treatment discontinuation, drug resistance, and treatment failure (Rahman et al., 2022).

In addition, participation in self-help group (peer support group) remains low. Yet, peer support can strengthen motivation, boost self-confidence, and help patients persevere through long-term treatment(Putri et al., 2021). Self-help group play a crucial role as a platform for social support, sharing experiences, and providing motivation to help patients remain consistent with their

treatment (Putri et al., 2021). However, field observations indicate that TB patients' self-management skills remain low due to lengthy treatment schedules, a lack of understanding, and minimal family support. At the same time, self-help group—which are intended to be a source of peer support—have not yet functioned optimally, so patients often face treatment on their own without adequate social support. This situation makes it easy for many patients to lose motivation and puts them at risk of non-adherence to treatment; therefore, strengthening self-management and peer support is crucial to the success of pulmonary TB therapy.

Low levels of self-management and participation in self-help group among patients with pulmonary tuberculosis are a global issue. According to a report by the World Health Organization (WHO, 2023), treatment adherence among tuberculosis patients remains a challenge in many countries, with adherence rates reaching only 60–70%, indicating a persistently high risk of treatment discontinuation. In Southeast Asia, approximately 40% of TB patients do not complete their treatment due to weak social support and a lack of ongoing education (WHO, 2022). In Indonesia, although the Ministry of Health of the Republic of Indonesia reports a TB treatment success rate of 85%, this achievement is not aligned with patients' still-low self-management capabilities; consequently, treatment success depends more on the health system than on patient autonomy (Kementerian Kesehatan RI, 2023). A study by Rahmawati et al. (2022) in Mataram showed that the majority of pulmonary TB patients 75.2% fell only into the "adequate" self-management category, indicating that patients' ability to manage their treatment independently is not yet optimal. Furthermore, patient involvement in support group remains low. A study by Sari and Handayani (2023) reported that patient involvement in support group is still limited, even though active participation in self-help group has been shown to increase treatment adherence by up to 90%. In East Java Province, participation by pulmonary TB patients in support group remains below 50%, and in the city of Surabaya, only about 20% of pulmonary TB patients actively participate in self-help group activities (Mawarti et al., 2023). At Bakti Darma Husada Regional General Hospital, no measurements have been taken so far regarding self-management and the formation of self-help group, but by 2025, 15 pulmonary TB patients had already discontinued their treatment.

Declines in self-management and self-help group participation develop gradually due to various factors, including individual characteristics, environmental conditions, and support from the healthcare system. Low levels of self-management among pulmonary TB patients are generally caused by a lack of understanding of the disease, limited education from healthcare workers, and psychological barriers such as anxiety and stress following diagnosis (Kumar et al., 2024). Patients with low health literacy find it more difficult to manage their medication schedules, recognize side effects, and maintain long-term treatment routines (Aulia & Pramesti, 2023). These conditions result in reduced medication adherence, irregular follow-up visits, and an increased risk of treatment discontinuation and drug resistance (Dilas et al., 2023). Meanwhile, low participation in self-help group is influenced by a lack of outreach regarding peer support programs, minimal social support from the community, and the persistence of stigma that discourages patients from joining (Chowdhury, 2023). Lack of involvement in peer support group deprives patients of a space to share experiences, gain motivation, and build self-confidence in undergoing treatment (Nguyen et al., 2024). Consequently, patients are more vulnerable to a decline in motivation, less able to overcome obstacles during therapy, and at higher risk of treatment non-adherence (Putri et al., 2021). Furthermore, the decline in Communication, Information, and Education (CIE) activities and health outreach by healthcare professionals has exacerbated this situation. Many patients have not received adequate education regarding medication adherence, self-management, or the benefits of peer support group (Chowdhury, 2023).

One approach that has the potential to improve patients' self-management skills and their participation in some group is the effective implementation of health education and communication (KIE) strategies. However, conventional KIE methods conducted face-to-face often face constraints related to time, manpower, and distance (Nguyen et al., 2024). To address this, tele-support a form

of telenursing can serve as an alternative medium for implementing KIE. Tele-support is a form of remote health support that utilizes communication and information technology such as smartphones, video calls, text messages, and online applications to provide education, motivation, monitoring, and psychosocial support to patients without the need for direct physical presence (David-Olawade, 2024; Robert et al., 2025). In the context of patients with pulmonary TB, tele-support serves not only as a means of providing health information, but also as a tool to boost motivation, monitor medication adherence, and strengthen social support. Nurses act as facilitators and companions who actively remind patients, provide feedback, and help overcome psychological and practical barriers during treatment (Mawarti et al., 2023; Shalahuddin et al., 2024). Additionally, the application of the Health Belief Model in the implementation of tele-support provides a strong conceptual foundation. The HBM helps explain how an individual perceives disease risk, the benefits of treatment, perceived barriers, and their belief in their own ability to influence health behaviors (Rosenstock et al., 2022; Chen, 2023).

The HBM provides a strong theoretical foundation for improving patients' perceptions of risk, benefits, barriers, and self-efficacy. By combining tele-support and the HBM, patients can gain access to ongoing education, social support, and motivation from healthcare professionals without the constraints of time and distance. This approach is expected to improve self-management skills and active participation in self-help group, while also strengthening the implementation of digital health education and communication (KIE), which plays a major role in supporting the overall success of pulmonary TB treatment. Several previous studies have shown that the implementation of telenursing based on the Health Belief Model has a significant effect on improving health behavior change. For example, a study by Chen (2023) explains that integrating the Health Belief Model (HBM) into telenursing interventions helps patients understand disease risks and treatment benefits, and enhances self-efficacy in managing chronic diseases. Research by Shalahuddin et al. (2024) found that HBM-based telenursing is effective in improving treatment adherence among patients with pulmonary tuberculosis by increasing perceived benefits and reducing behavioral barriers. Meanwhile, Putri et al. (2021) and Sari and Dewi (2023) reported that telenursing interventions focused on enhancing social support and risk perception successfully strengthened self-management and participation in self-help group. These results indicate that tele-support a form of HBM-based telenursing is a promising approach for holistically improving the success of pulmonary TB therapy, encompassing educational, health behavior, and social support aspects.

METHOD

This study employed a quantitative approach with a quasi-experimental design using a pretest–posttest control group design to evaluate the effect of Health Belief Model-based tele-support on self-management and self-help group among patients with pulmonary tuberculosis. Respondents were assigned to an intervention group and a control group. Both group were assessed before and after the intervention. The intervention group received Health Belief Model-based tele-support delivered in five structured sessions with a frequency of two sessions per week, while the control group received standard care according to hospital procedures. Outcomes were measured using self-management and self-help group questionnaires administered before and after the intervention.

The study population consisted of all pulmonary tuberculosis patients attending the outpatient clinic of Bhakti Dharma Husada Hospital, Surabaya. Based on patient visit data in February 2026, the population was 121 patients. The sample size was calculated using the formula for comparing two independent means, resulting in 31 respondents per group. After adding 10% to anticipate potential dropouts, the final sample size was 70 respondents, comprising 35 participants in the intervention group and 35 participants in the control group. A consecutive sampling technique was used. Inclusion criteria were pulmonary tuberculosis patients aged 18–65 years, undergoing treatment for 3–6 months, able to read and write, having access to communication media (mobile phone, telephone, or WhatsApp), and willing to participate in the study. Exclusion criteria included

hospitalization during the study period, pregnancy, breastfeeding, emergency conditions, transfer to another healthcare facility, or withdrawal from the study.

The study was conducted at Bhakti Dharma Husada Hospital, Surabaya, from April 2 to April 30, 2026, after obtaining ethical approval from the Health Research Ethics Committee, Faculty of Nursing, Nahdlatul Ulama University of Surabaya (No. 0099/EC/KEPK/UNUSA/2026). Research instruments included a respondent characteristics form, a self-management questionnaire, and a self-help group questionnaires. The Self-Management questionnaire demonstrated good construct validity based on Confirmatory Factor Analysis (factor loadings >0.50) and excellent internal consistency (Cronbach's alpha = 0.91; subscale reliability = 0.80–0.85). The Self-Help Group questionnaire also showed good construct validity (factor loadings >0.60) with excellent internal consistency (Cronbach's alpha = 0.88–0.92). Data were analyzed using descriptive and inferential statistics. The Shapiro–Wilk test was used to assess data normality. Since the data were not normally distributed, the Wilcoxon Signed Rank Test was used to evaluate within-group differences, while the Mann–Whitney U Test was used to compare differences between the intervention and control group. Statistical significance was established at $p < 0.05$.

RESULT

The result was found that there was a significant difference between the intervention group and the control group in terms of self-management ($P < 0.005$), whereas for the self-help group, the P-value was greater than 0.005, indicating no significant difference between the intervention group and the control group. This indicates that the intervention was effective in improving self-management but did not demonstrate significant effectiveness for the self-help group.

Table 1.
Results Differences in Self-Management and Self-Help Group Participation Between Group

Variable	Group				P *value*	Notes
	Intervention		Control			
	Mean	SD	Mean	SD		
Self management pre	50,17	4,176	50,34	3,581	0.521	Not Significant
Self-help group pre	38,57	2,913	38,63	2,871	0.929	Not Significant
						Mann Whitney Test
Variable	Group				P *value*	Notes
	Intervention		Control			
	Mean	SD	Mean	SD		
Self management post	54,23	2,647	51,09	4,198	0.003	Significant
Self-help group post	39,80	2,411	38,63	2,871	0.063	Not Significant
						Mann Whitney Test

DISCUSSION

The results of this study demonstrated that Health Belief Model-based tele-support was effective in improving self-management among patients with pulmonary tuberculosis. The mean self-management score in the intervention group increased from 50.17 before the intervention to 54.23 after the intervention, whereas the control group showed only a slight increase from 50.34 to 51.09. Statistical analysis revealed a significant difference between group ($p = 0.003$), indicating that tele-support contributed to better self-management outcomes. These findings suggest that continuous education, monitoring, motivation, and reminders provided through tele-support can strengthen patients' ability to manage their disease independently. Similar findings have been reported by Iribarren et al. (2020), Nguyen et al. (2021), and Tola et al. (2021), who found that technology-based interventions improved self-management, treatment adherence, and health-related behaviors among patients with chronic diseases, including tuberculosis.

The effectiveness of tele-support may also be explained by the principles of the Health Belief Model. Through regular communication and behavioral reinforcement, patients become more aware of the benefits of treatment, receive continuous cues to action, and develop greater self-efficacy in managing their illness. Consequently, patients are more likely to adhere to medication schedules,

attend follow-up visits, and maintain positive health behaviors throughout the treatment process. In contrast, Health Belief Model-based tele-support did not significantly improve self-help group outcomes. Although the mean self-help group score in the intervention group increased from 38.57 to 39.80, the difference was not statistically significant compared with the control group ($p = 0.063$). This finding indicates that tele-support alone may not be sufficient to substantially strengthen social support and group participation among patients with pulmonary tuberculosis. Previous studies have shown that self-help group are influenced by emotional support, interpersonal relationships, peer interaction, and social engagement, which often require more intensive and direct interaction than can be provided through telecommunication-based interventions (Kyngas et al., 2020; Sari & Dewi, 2023; Putri et al., 2021). The lack of significant improvement in self-help group outcomes may also be associated with limited opportunities for participants to establish meaningful social connections during the intervention period. Studies by Rahman et al. (2022), Widodo et al. (2022), Alemu et al. (2023), and Utami et al. (2023) emphasized that sustainable social support is more likely to develop through continuous peer interaction, family involvement, and community engagement. Therefore, while tele-support effectively influences individual behavior, additional strategies may be required to strengthen social support networks among patients with pulmonary tuberculosis.

Overall, the findings indicate that Health Belief Model-based tele-support is more effective in improving self-management than self-help group participation. These results are consistent with previous studies showing that telehealth interventions based on behavioral theories can enhance patient engagement, treatment adherence, and disease management through continuous communication and health education (Wang et al., 2022; Alshammari et al., 2022; Martinez et al., 2024). This study has several limitations. First, the relatively short intervention period limited the evaluation of long-term effects. Second, the effectiveness of tele-support may have been influenced by differences in communication technology access and internet connectivity. Third, the quasi-experimental design limited control over potential confounding variables such as family support, health knowledge, motivation, and environmental factors. Finally, the use of self-reported questionnaires may have introduced response and social desirability bias. The findings suggest that Health Belief Model-based tele-support can serve as an effective nursing intervention to improve self-management among patients with pulmonary tuberculosis. Integrating tele-support into routine tuberculosis care may contribute to better treatment adherence, improved disease management, and enhanced patient empowerment during the treatment process.

CONCLUSION

Health Belief Model-based tele-support was effective in improving self-management among patients with pulmonary tuberculosis but did not significantly improve self-help group participation. The intervention enhanced patients' ability to manage their treatment, maintain medication adherence, and adopt positive health behaviors throughout tuberculosis therapy. However, improving self-help group participation may require additional approaches involving family support, peer interaction, and community engagement. Therefore, Health Belief Model-based tele-support may be considered an evidence-based nursing intervention for strengthening self-management among patients with pulmonary tuberculosis. Future studies are recommended to include larger sample sizes, longer intervention periods, and additional social support components to improve self-help group outcomes and strengthen the generalizability of findings.

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