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Effectiveness of Tuberculosis Preventive Therapy on Medication Adherence Among Household Contacts in Hitu Health Center

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Abstract

Background: Pulmonary Tuberculosis (TB) is currently still a public health problem both in Indonesia and internationally so that it is one of the goals of sustainable health development. Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis is one of the 10 leading causes of death worldwide. This study aims to analyze the effectiveness of Tuberculosis Prevention Therapy (TPT) on medication adherence for household contacts in the Hitu Health Center work area. **Method**: The research design used was pre-experimental with the approach (One Group Pretest-Posttest Design). The number of samples was 40 people taken by Total Sampling. The previous intervention of Tuberculosis Prevention Therapy (TPT) was first carried out by health education given through leaflets. **Results**: The results of the analysis indicated a statistically significant improvement in medication adherence after the intervention, as evidenced by a p-value of less than 0.05. Consequently, the alternative hypothesis was accepted. **Discussion**: The increase in knowledge and attitudes observed in this study may be attributed to the health education intervention. The findings indicate that the educational program contributed to improving participants' understanding and promoting positive attitudinal changes toward the recommended health practices. **Conclusion**: The findings demonstrate that Tuberculosis Preventive Therapy (TPT) significantly improved medication adherence among household contacts within the Hitu Health Center service area.

Keywords: medication compliance, pulmonary tuberculosis, tuberculosis prevention therapy

INTRODUCTION

Tuberculosis is an infectious disease that requires long-term treatment. Knowledge and attitude play an important role in the treatment of pulmonary TB patients. Patients who do not undergo regular treatment are at risk of recurrence and resistance [1]. The treatment of pulmonary tuberculosis is determined by the knowledge and attitude of TB patients [2]. Knowledge and attitude play an important role in the treatment process of pulmonary TB patients [3]. Patients who do not understand the treatment regimen generally complain of unpleasant side effects on the body [4]. Therefore, the knowledge and attitude of TB patients can determine the success or failure of the treatment they undergo [5].

According to the WHO in 2022, tuberculosis ranks second as one of the leading causes of death globally, after Covid-19. The WHO reports that the number of tuberculosis cases globally has reached 10.6 million, an increase of around 300,000 cases from 2021 [6]. The death toll from TB was 1.3 million people. The global decline in TB deaths from 2015 to 2022 was 19%, far from the WHO's End TB Strategy target of a 75% reduction [7]. Indonesia itself ranked second in the world with the highest number of TB patients after India in 2022.

The number of TB cases in Indonesia reached 10% of all cases. Thirty countries with the highest TB burden accounted for 87% of TB cases worldwide in 2022, and two-thirds of the global total occurred in eight countries, including Indonesia [8].

The Maluku Provincial Health Office stated that Maluku province ranked 18th out of 34 provinces with 4,334 cases of pulmonary tuberculosis (TB) in 2019, 5,476 cases in 2020, and around 6,871 cases in 2021. The Maluku Province is estimated to account for 20% of the national total of pulmonary TB cases in 2024 [9]. The city of Ambon itself ranks first for the highest number of tuberculosis cases in Maluku, with pulmonary tuberculosis (TB) accounting for 65% of cases. Based on data obtained in 2020, there were 716 cases of tuberculosis in the city of Ambon, 916 cases in 2021, in 2022 it reached 1,107 cases, and in 2023 it reached 1,175 cases of pulmonary tuberculosis (TB) in Ambon City. The number of tuberculosis cases in Ambon City has increased in the last 3 years. There were 494 cases in the Sirimau sub-district [10].

The high incidence of pulmonary tuberculosis is also caused by an environment with high levels of pollution from large vehicles and a lack of greenery such as trees to reduce pollution [11]. As a result of this pollution, patients who have been exposed to pulmonary tuberculosis have reduced immunity, which worsens their health and slows down their recovery. Resilience affects a person's performance in all areas, physical and mental health, and the quality of their relationships with others [12].

Household contacts of tuberculosis (TB) patients are at the highest risk of infection with Mycobacterium tuberculosis and developing latent TB infection (LTBI), which can progress to active TB. Latent TB is an inactive form of TB that does not cause symptoms. The management of ILTB is an important point in TB control strategies. This is the basis for the TB Prevention Therapy (TPT) program for TB contacts.6 TPT is a series of treatments given to people with latent tuberculosis infection [13].

The provision of TPT is expected to prevent individuals from being at risk of contracting pulmonary TB, break the chain of TB transmission, and achieve the elimination of pulmonary TB by 2030. The family is the main support system for people with pulmonary TB. The family provides the social context in which the disease occurs and how it is managed [14]. Pulmonary tuberculosis can be cured with regular treatment for 6 months, as can TPT, which also requires a long period of treatment, around 6 months or in some cases 3 months. Families must be involved in the patient's treatment while the patient is undergoing treatment, and be closer to the patient than the nurses [15].

Patient compliance with pulmonary TB treatment is very important in order to take the medication properly. The importance of patient compliance in taking medication lies in the fact that patients must be able to fully implement several things in complying with the importance of medication compliance, such as patients must take all the recommended medication at the time specified by health workers [16]. If taken on time, patients will recover quickly, and if patients feel better, treatment must be completed until the medication is finished or completed [17]. It is very important to inform patients who are traveling or moving to a new place that they must continue to report their health status to healthcare workers or their PMO, so that the patient's health and treatment can always be monitored [18].

Medical records from the Hitu Community Health Center documented 52 pulmonary tuberculosis cases in both 2023 and 2024, and 18 cases between January and April 2025. Interviews conducted in May 2025 indicated varying levels of family involvement in patient care, including support for treatment and caregiving. However, evidence regarding the combined effect of Tuberculosis Preventive Therapy (TPT) and health education on medication adherence among household contacts remains limited.

METHOD

The research design used was a pre-experimental design with a one-group pretest-posttest approach. This method involved a single group of subjects to reveal the causal relationship. Before the intervention, the group of subjects was observed and then observed again after the intervention [19].

Study site and samples

The population in this study consisted of 40 people who were household contacts of pulmonary tuberculosis patients at the Hitu Community Health Center. The sample in this study consisted of 40 respondents who had household contact with tuberculosis patients undergoing treatment at the Hitu Community Health Center. The sampling technique used in this study was total sampling. Total sampling is a sampling technique in which the entire population is used as the research sample if the population size is less than 100 [20].

Intervention

During the initial meeting (Week 1), respondents completed a pre-test questionnaire assessing medication adherence among household contacts. Subsequently, the researchers delivered educational information using a brochure and initiated Tuberculosis Preventive Therapy (TPT). The therapy was administered over a four-week period, with one dose taken each week, resulting in a total of four doses. Upon completion of the intervention in Week 4, respondents completed the same questionnaire as a post-test measure to assess changes in medication adherence.

Data analysis

The research data were analyzed descriptively and presented in tabular form to summarize the frequency and percentage distributions of respondents' characteristics, including age, sex, educational level, and the use of Tuberculosis Preventive Therapy (TPT). Based on the results of the normality test, a p-value of 0.001 was obtained, indicating that the data were not normally distributed. Therefore, the Wilcoxon signed-rank test was used for statistical analysis.

RESULTS AND DISCUSSION

Most participants were aged 20–39 years (60.0%, n = 24), whereas only 2.5% (n = 1) were aged 60 years or older. The sample consisted of slightly more females (55.0%, n = 22) than males (45.0%, n = 18). In terms of educational background, high school education was the most frequently reported level (72.5%, n = 29), while respondents holding a bachelor's degree constituted the smallest proportion of the sample (5.0%, n = 2) (Table 1).

Table 1. Respondent characteristics (n= 40)

Variables	Frequency (n)	Percentage (%)
Age		
20-39 Years	24	60.0
40-59 Years	15	37.5
60 Years	1	2.5
Gender	N	%
Male	18	45.0
Female	22	55.0
Education	N	%
Elementary School	3	7.5
Junior High School	6	15.0
Senior High School	29	72.5
Bachelor's Degree	2	5.0

Compliance before (pre-test) and after (post-test) the provision of tuberculosis preventive therapy (TPT)

Table 2. Pre and Post intervention adherence to TPT (n= 40)

Compliance	Pre-test		Post-test	
	n	%	n	%
High	3	7.5	21	52.5
Medium	25	62.5	16	40.0
Low	12	30.0	3	7.5
Total	40	100.0	40	100.0

Table 2 demonstrates a notable improvement in adherence following Tuberculosis Preventive Therapy (TPT). The percentage of respondents categorized as having high adherence increased from 7.5% (n = 3) before the intervention to 52.5% (n = 21) after the intervention. Conversely, the proportion of respondents with low adherence declined from 30.0% (n = 12) to 7.5% (n = 3). These findings suggest a positive shift in adherence levels among participants after receiving TPT.

The Wilcoxon signed-rank test revealed a statistically significant difference in medication adherence before and after Tuberculosis Preventive Therapy (TPT), with a p-value of 0.001. As the p-value was below the significance threshold of 0.05, the findings indicate that TPT had a significant positive effect on medication adherence among household contacts in the Hitu Community Health Center service area. These results suggest that the implementation of TPT was effective in improving medication adherence among household contacts.

The findings of this study demonstrated a significant improvement in medication adherence following the implementation of Tuberculosis Preventive Therapy (TPT). The proportion of respondents with high adherence increased substantially from 7.5% (n = 3) at baseline to 52.5% (n = 21) after the intervention. Conversely, the proportion of respondents with low

adherence decreased markedly from 30.0% (n = 12) to 7.5% (n = 3). Prior to the intervention, most respondents were categorized as having moderate adherence (62.5%, n = 25), whereas following the intervention, the majority exhibited high adherence. These findings were supported by the Wilcoxon signed-rank test, which indicated a statistically significant difference between pre- and post-intervention adherence levels. The results suggest that TPT contributed positively to improving medication adherence among household contacts. This finding is consistent with previous studies, which reported that the combination of Tuberculosis Preventive Therapy (TPT) and educational interventions delivered through leaflets was effective in enhancing treatment adherence among household contacts [21,22].

The results of this study corroborate previous evidence regarding the role of adherence in the effectiveness of anti-tuberculosis treatment. A prior study evaluating Fixed-Dose Combination (FDC) and Single-Dose Combination (SDC) regimens in pediatric pulmonary tuberculosis patients reported that treatment adherence was achieved when medications were taken according to the prescribed schedule recorded on tuberculosis treatment cards. Furthermore, the study highlighted the importance of information provision and patient education as key determinants of adherence, suggesting that educational interventions may directly contribute to improved treatment compliance [23].

The findings indicate that medication adherence among household contacts was relatively low before the implementation of Tuberculosis Preventive Therapy (TPT). However, adherence improved significantly following the intervention. A plausible explanation for this improvement is the educational component delivered through leaflets, which increased respondents' knowledge and awareness regarding tuberculosis prevention and the importance of adhering to the prescribed treatment regimen. Enhanced access to health information may have facilitated positive attitudes and behaviors toward medication adherence, thereby contributing to the observed improvement.

The results of the present study demonstrated a statistically significant improvement in medication adherence following the implementation of Tuberculosis Preventive Therapy (TPT). The Wilcoxon signed-rank test yielded a p-value of < 0.001, indicating a significant difference between pre- and post-intervention adherence levels. These findings suggest that TPT was effective in enhancing medication adherence among household contacts in the Hitu Community Health Center service area.

The findings are consistent with other reported, who found that TPT significantly reduced the incidence of tuberculosis among patients with HIV ($p < 0.001$; OR = 0.019). In that study, only 2% of patients who received TPT developed tuberculosis, compared with 36% in the non-TPT group, corresponding to a 98.1% reduction in TB risk. These findings underscore the effectiveness of TPT as a key strategy for tuberculosis prevention and support its broader implementation as part of Indonesia's National Tuberculosis Control Program and the WHO End TB Strategy targets for 2030 [24].

Furthermore, the observed improvement in adherence may be associated with the educational component delivered alongside the intervention. Previous research highlighted the importance of parental knowledge and awareness regarding TPT

implementation in children. However, the study revealed that many parents had limited knowledge of the potential side effects of TPT, with only a minority reporting adequate awareness of adverse effects [25]. Similar findings were reported by health-care providers, who indicated that educational sessions primarily focused on the benefits of TPT and instructions for medication use, while information regarding potential side effects received less emphasis. These findings suggest that comprehensive educational interventions addressing both the benefits and potential adverse effects of TPT may further improve adherence and support informed treatment decisions among household contacts and caregivers.

The findings should be interpreted in light of a potential testing effect bias inherent in the one-group pretest–posttest design. Participants may have modified their behavior following the pre-test due to increased awareness of the study purpose and the outcomes being assessed. As a result, improvements observed at the post-test may not be entirely attributable to the intervention itself but could partially reflect behavioral changes induced by repeated exposure to the assessment process.

CONCLUSION

Medication adherence among household contacts was relatively low before the implementation of Tuberculosis Preventive Therapy (TPT). Following the intervention and accompanying health education, adherence improved significantly. These results indicate that TPT, supported by educational interventions, is an effective strategy for improving medication adherence among household contacts in the Hitu Community Health Center service area.

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