

Factors Associated with Medication Adherence to Tuberculosis Preventive Therapy (TPT) Among Household Contacts in the Service Area of Paninggahan Primary Health Center, Solok Regency

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ABSTRACT

Background: Tuberculosis (TB) remains a major public health problem in Indonesia. Household contacts of TB patients are at high risk of acquiring TB infection and therefore require Tuberculosis Preventive Therapy (TPT). The success of the TPT program is highly dependent on medication adherence. Several factors, including knowledge, social support, treatment-related factors, and socioeconomic status, are presumed to influence adherence to TPT medication. **Objective:** To identify factors associated with adherence to TPT medication among household contacts of pulmonary TB patients in the working area of Paninggahan Primary Health Center, Solok Regency, in 2025.

Methods: This study employed a quantitative analytic design with a cross-sectional approach. The study population consisted of 113 household contacts receiving TPT in the working area of Paninggahan Primary Health Center. Total sampling was applied. Data were collected using structured questionnaires and analyzed through univariate analysis, bivariate analysis using the Chi-Square test, and multivariate analysis using multiple logistic regression.

Results: The findings revealed significant associations between knowledge ($p=0.001$; OR=6.083), social support ($p=0.008$; OR=5.121), treatment-related factors ($p=0.009$; OR=4.495), socioeconomic status ($p=0.002$; OR=3.750), and adherence to TPT medication. Multivariate analysis indicated that knowledge was the most dominant factor associated with TPT medication adherence, with an Exp(B) value of 5.553.

Conclusion: Knowledge, social support, treatment-related factors, and socioeconomic status were significantly associated with adherence to TPT medication among household contacts of pulmonary TB patients. Knowledge was identified as the most dominant factor. Strengthening health education, family support, and healthcare worker assistance is recommended to improve adherence and enhance the success of the TPT program

Keywords: Social Support, Adherence, Tuberculosis Preventive Therapy

INTRODUCTION

Tuberculosis (TB) is an infectious disease primarily caused by *Mycobacterium tuberculosis*. Most of these bacteria are capable of attacking the lungs, though they can also affect other organs of the body.

This infection spreads rapidly through airborne droplets. TB cases in Indonesia are among the highest globally, ranking second highest in the world after India. In 2023, 87% of the total global annual TB cases occurred across 30 countries. Five countries contributed to 56% of the world's total TB burden: India (26%), Indonesia (10%), China (6.8%), the Philippines (6.8%), and Pakistan (6.3%) (1).

Tuberculosis can be transmitted through air contaminated with *Mycobacterium tuberculosis* via droplets emitted when a TB patient coughs, sneezes, or talks—conditions in which these bacteria become scattered in the air. Because the bacteria can survive in the air for extended periods, the droplets can easily be inhaled by others. Once inhaled, the bacteria inside the droplet enter the lungs, gather, and multiply, particularly in individuals with a weakened immune system (2).

Efforts undertaken by local governments to combat TB include improving the nutritional status of TB patients and expanding TPT (Tuberculosis Preventive Therapy). TPT is a treatment provided to individuals infected with TB bacteria (*Mycobacterium tuberculosis*) who have not yet developed active TB disease (latent TB) to prevent it from progressing into active TB. The objective is to reduce the risk of developing active TB and lower the overall burden of the disease. Furthermore, strategies such as the implementation of the DOTS (Directly Observed Treatment, Short-course) framework and strengthening TB networks with private healthcare facilities—such as private doctor practices and pharmacies—have been put in place. One of the key factors for successful TB treatment is medication adherence. This adherence is maintained through TB DOTS via direct supervision to ensure that the prescribed medicine is actually taken by the patient, monitored by a Treatment Supporter (PMO) (3). There is a significant relationship between the role of the PMO (Treatment Supervisor) and the treatment success of pulmonary tuberculosis patients.

Based on this study, it was found that 93.75% of PMOs were supportive during the treatment process, and 93.5% of the TB treatment outcomes were declared cured (4). Preventive measures among household contacts are crucial to reducing the incidence of infectious diseases. Various approaches can be taken, including improving clean and healthy living behaviors, enhancing home environmental conditions, and conducting early detection through screening of family members living in the same house. Family-based interventions have been proven effective in reducing the risk of transmitting infectious diseases (5).

Adherence is a multidimensional phenomenon influenced by five main dimensions: socioeconomic factors, healthcare system factors, disease conditions, therapy, and patient-related factors (6). The Morisky Medication Adherence Scale (MMAS) serves as a questionnaire instrument to evaluate patient adherence levels in taking medication (7).

MATERIALS & METHODS

Design

This study is a quantitative study with a descriptive analytical regression design using a cross-sectional study approach, in which data for both independent and dependent variables were collected simultaneously and analyzed multivariately to determine the most significantly associated factor among the analyses. The type of analysis used in this study was multiple logistic regression.

Independent Variables:

- Knowledge
- Social Support
- treatment-related factors
- Socioeconomic Status

Dependent Variable:

- TPT (TB Preventive Treatment) Adherence

Population

The population in this study consisted of household contacts who had lived together

in the same family for a long period, making them at risk of TB occurrence in the working area of the Paninggahan Primary Health Center (Puskesmas), Solok Regency. The population in the working area of the Paninggahan Primary Health Center was recorded at 102 people from July to December 2024. Meanwhile, during the period of January to June 2025, there were 113 high-risk TB cases at the Paninggahan Primary Health Center, Solok Regency. Therefore, the population for this study was 113 people.

Sample

This study employed a total sampling (saturated sampling) technique, whereby all members of the target population who fulfilled the predetermined eligibility criteria were included as study participants. Using this approach, a total of 113 respondents were recruited. The inclusion criteria used to determine participants' eligibility for this study were as follows:

- Household contacts of TB patients
- Individuals at high risk for TB
- Individuals living in the same household as a pulmonary TB patient
- Household contacts residing in the working area of Paninggahan, Solok Regency

Statistical Analysis

Bivariate analysis was performed to examine the association between each independent variable and the dependent variable among the six variables included in the study. The relationship between variables was assessed using the Chi-square test to determine statistical significance. Statistical significance was evaluated at a predetermined significance level (α). A p -value less than α ($p < \alpha$) indicated a statistically significant association, and the null hypothesis was rejected. Conversely, a p -value greater than or equal to α ($p \geq \alpha$) indicated that the association was not statistically significant, and the null hypothesis was not rejected.

For the multivariate analysis, multiple logistic regression was employed to evaluate the combined influence of several independent variables on the dependent variable. This method is appropriate for assessing the simultaneous effects of both continuous and categorical (dichotomous) independent variables on a binary or dichotomous outcome variable, while controlling for the potential confounding effects of other predictors included in the model.

RESULT

Relationship Between Knowledge and Adherence

Knowledge	Adherence						P-value	OR
	Non-adherent		Patuh		Total			
	N	%	n	%	N	%	0.003	7.448
Low	26	76,5	8	23,5	34	100		
High	24	30,4	55	69.6	79	100		
Total	50	44.2	63	55.8	113	100		

The analysis showed that of the 79 respondents with a high level of knowledge, 55 (69.6%) demonstrated adherence to TPT medication. In contrast, among the 34 respondents with low knowledge, 26 (76.5%) were classified as non-adherent. The Chi-square test produced a p -value of 0.003, which is below the predetermined significance level, indicating a statistically significant association between knowledge

and medication adherence. Therefore, the null hypothesis (H_0) was rejected, confirming that knowledge is significantly associated with adherence to tuberculosis preventive treatment (TPT) medication among household contacts in the working area of Paninggahan Primary Health Center, Solok Regency. Furthermore, the Odds Ratio (OR) of 7.448 suggests that respondents with a high level of knowledge

were approximately 7.4 times more likely to adhere to TPT medication than those with low knowledge.

Relationship between Social Support and Compliance

Social Support	Compliance				Total		P-value	OR
	Non-compliant		Compliant					
	N	%	n	%	N	%	0.008	5.121
Low	26	70.3	11	29.7	37	100		
High	24	31.6	52	68.4	76	100		
Total	50	44.2	63	55.8	113	100		

From the analysis results above, it can be seen that among the 76 respondents with high social support, 52 (68.4%) were compliant. Meanwhile, among the 37 respondents with low social support, 26 respondents (70.3%) were non-compliant. The statistical test yielded a p-value of 0.008, meaning H_0 is rejected with the conclusion that "there is a relationship between social support and medication adherence among household contacts in the working area of the Paninggahan Primary Health Center, Solok Regency." This is also supported by an OR value = 5.121, which means "respondents with high social support are 5.121 times more likely to be compliant in taking TPT medication among household contacts at the Paninggahan Community Health Center, Solok.

Relationship between Medical Therapy and Compliance

Among the 61 respondents with positive medical therapy (perception/experience), 44 (72.1%) were compliant. Meanwhile, among the 52 respondents with negative medical therapy, 33 respondents (63.5%) were non-compliant. The statistical test yielded a p-value of 0.009, meaning H_0 is rejected with the conclusion that "there is a relationship between medical therapy and medication adherence among household contacts in the working area of the Paninggahan Primary Health Center, Solok Regency." This is also supported by an OR value = 4.495, which means "respondents with positive medical therapy are 4.495 times more likely to be compliant in taking TPT medication among household contacts

at the Paninggahan Primary Health Center, Solok

Relationship between Socioeconomic Status and Compliance

Among the 65 respondents with high socioeconomic status, 45 respondents (69.2%) were compliant. Meanwhile, among the 48 respondents with low socioeconomic status, 30 respondents (62.5%) were non-compliant. The statistical test yielded a p-value of 0.002, meaning H_0 is rejected with the conclusion that "there is a relationship between socioeconomic status and medication adherence among household contacts in the working area of the Paninggahan Community Health Center, Solok Regency." This is also supported by an OR value = 3.750, which means "respondents with high socioeconomic status are 3.750 times more likely to be compliant in taking TPT medication among household contacts at the Paninggahan Primary Health Center, Solok

Bivariate Selection

At this stage, multiple logistic regression analysis was conducted on all independent variables that passed the bivariate selection with a p -value < 0.25. The modeling process was performed step-by-step, in which variables without a significant effect were eliminated one by one from the model until the best model (parsimonious model) was obtained. The strength of the relationship or effect between variables was evaluated based on the Odds Ratio (OR) value; a larger OR value indicates a stronger effect of the independent variable on the dependent variable analyzed.

The analysis shows the results of the bivariate selection for the 4 variables by identifying variables with a p -value < 0.05 . Thus, the variables candidate for multivariate modeling regarding factors associated with compliance with TPT medication at the Paninggahan Primary Health Center, Solok Regency, are knowledge, social support, and medical therapy. Meanwhile, the excluded variable

is socioeconomic status, which is the one with the p -value > 0.05 or a smaller Exp(B) value.

Covariate Selection (Interaction Testing)

Frequency Distribution of Interaction Testing for the Most Dominant Variables in Compliance with TPT Medication at the Paninggahan Primary Health Center

No	Variable	P-value	Value	Exp(B)
1	Knowledge	0.001	<0.05	9.981
2	Social Support	0.002	<0.05	4.421
3	Medical Therapy	0.021	<0.05	2.441

From the multivariate analysis of the most dominant factors in compliance with TPT medication, the results obtained for household contacts at the Paninggahan Primary Health Center showed that knowledge had a p -value of $p=0.001(<0.05)$.and an Exp(B) value of 9.981.

DISCUSSION

Tuberculosis Preventive Therapy (TPT) is a critical public health intervention designed to prevent the progression of latent tuberculosis infection (LTBI) to active disease, particularly among high-risk individuals such as household contacts. However, the real-world success of TPT implementation relies heavily on patient adherence. This study identified several factors significantly associated with TPT medication adherence among household contacts in the working area of Paninggahan Primary Health Center, Solok Regency, including knowledge, social support, treatment-related factors (medical therapy), and socioeconomic status.

Relationship Between Knowledge and TPT Adherence

The findings of this study demonstrate a statistically significant association between knowledge and TPT adherence ($p= 0.003$; OR = 7.448). Household contacts with high knowledge levels were 7.4 times more

likely to adhere to TPT compared to those with lower knowledge. Furthermore, multivariate analysis revealed that knowledge is the most dominant factor predicting TPT adherence (Exp (B) = 9.881, $p = 0.001$).

Knowledge forms the foundational cognitive basis for health-seeking behavior (8). Individuals who understand the transmission mechanisms of TB, the distinction between latent infection and active disease, and the preventive purpose of TPT are more likely to acknowledge their risk and appreciate the therapeutic benefit of completing preventive treatment. Conversely, a lack of knowledge often leads to perception gaps, such as believing medication is unnecessary when symptoms are absent (9). This result aligns with findings by Gutierrez (2026) and Nayudu (2026), who highlighted that inadequate knowledge and lower health literacy directly impede TPT initiation and completion among household contacts. Intensive health education by healthcare workers can effectively bridge this gap and foster higher treatment compliance (10,11).

Relationship Between Social Support and TPT Adherence

Social support showed a significant relationship with TPT medication adherence ($p= 0.008$; OR= 5.121). Respondents receiving high social support were 5.121 times more likely to adhere to their TPT

regimen compared to those with low social support.

Social support—particularly emotional, informational, and instrumental assistance provided by family members and community health cadres—plays a pivotal role in sustaining long-term health behaviors. In the context of TPT, where patients are asymptomatic, family members often serve as Treatment Supporters (Pengawas Menelan Obat / PMO). They offer daily reminders, encouragement, and practical aid in managing routine visits or side effects (12,13). This finding reinforces systematic review evidence by Sagili et al. (2022) and Saputra (2025), which demonstrated that strong family and community-based social support significantly decrease treatment default rates and enhances TPT completion among household contacts in high TB burden settings (14,15).

Relationship Between Treatment-Related Factors (Medical Therapy) and TPT Adherence

A significant association was found between treatment-related factors/medical therapy perception and TPT adherence ($p = 0.009$; OR = 4.495). Respondents with positive experiences and perceptions regarding medical therapy had 4.495 times higher odds of being adherent.

Treatment duration, pill burden, and side effect profiles are well-documented determinants of medication adherence (16). Positive experiences with medical therapy often stem from clear instructions from healthcare providers, minimal unmanaged side effects, and manageable dosing schedules (17). When patients experience well-tolerated therapy and receive adequate guidance regarding potential mild side effects, their confidence in the treatment grows, resulting in higher adherence rates. This is consistent with a study by Brown et al. (2022), which stated that therapy-related factors, such as regimen complexity and drug side effects, are major determinants of patient adherence to long-term therapy (18).

CONCLUSION

Summary of Findings

This study confirms that knowledge, social support, treatment-related factors (medical therapy), and socioeconomic status are significantly associated with TPT medication adherence among household contacts in the working area of Paninggahan Primary Health Center, Solok Regency. Among these, knowledge was identified as the most dominant factor associated with TPT adherence.

Recommendations / Practical

Implications:

- 1. For Primary Health Centers (Puskesmas):** Healthcare providers should strengthen tailored health education strategies, prioritizing structured counseling for household contacts regarding the necessity of TPT despite the absence of clinical symptoms.
- 2. For Community and Family Involvement:** Family members should be actively trained and engaged as Treatment Supporters (PMO) to provide sustained emotional and routine daily support during TPT administration.
- 3. For Health Policy & Future Research:** Public health policies should address structural and indirect socioeconomic barriers to treatment, while future research could explore longitudinal interventions testing educational and digital reminder strategies to further boost TPT adherence.

Declaration by Authors

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