

# Development of a Health Literacy Model Based on the One Student One Family Support Method for Pulmonary Tuberculosis Prevention in Rural Communities

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## ABSTRACT

Place the question addressed in a broad context. Write the research objectives concisely and clearly Families need to pay attention by involving nursing students to enhance the role of family members in assisting the family's knowledge about pulmonary tuberculosis and how to care for sick family members, as well as its prevention. The aim of this study is to identify the knowledge, attitudes, and behaviors of families in the prevention of pulmonary tuberculosis in the Boroko Community Health Center area of North Bolmong Regency in the intervention and control groups. Methods: the research method used in this study is a quasi-experiment pre-post-test with a control group design. This research will conduct health literacy model assistance involving nursing students as companions and providing support to families with members suffering from tuberculosis for 8 weeks with a total of 14 meetings. The sampling technique uses stratified random sampling according to the established criteria, and the sample selection uses Slovin's formula, resulting in 52 respondents consisting of 26 for the intervention group and 26 for the control group. The research results indicate that there is a significant difference between the knowledge, attitudes, and behaviors of the intervention group and the knowledge of the control group.

**Keywords:** Health Literac, One Student Family Support, Knowledge, Pulmonary Tuberculosis

Received:	Revised:	Accepted:	Available online:
01.12.2025	01.02.2026	01.04.2026	27.06.2026

## INTRODUCTION

Tuberculosis remains a global threat to life safety and the quality of life of today's society. Globally, it is estimated that 10.6 million (range 9.8 - 11.3 million) people are sick with TB; 1.4 million (range 1.3 - 1.5 million) deaths due to TB including HIV-negative and 187,000 deaths (range 158,000 - 218,000) including HIV-positive (Kementerian keehatan, 2022). TB disease in Indonesia ranks second after India, with a total of 969 thousand cases and 93 thousand deaths per year, equivalent to 11 deaths per hour. In 2022, North Sulawesi Province experienced an increase in new TB case discoveries by 51.9% and North Bolmong Regency contributed the highest TB cases reaching 67.1% of cases. (Central Statistics Agency, 2024).

In 2024, there were 103 TB cases in North Bolmong Regency, specifically at the Boroko Community Health Center, and this number increased to 109 cases in 2024. This increase in TB cases was due to family behavior that did not comply with health principles, including not wearing masks when in contact with family members with TB, patients not covering their mouths with tissues when coughing, and a lack of follow-up after treatment, which increases the risk of transmission (Johani, 2024). TB disease must receive appropriate treatment immediately to be cured. There are two stages of lung treatment: intensive treatment for two months and continued treatment for four to six months (Wijaya & Handayani, 2023). The low coverage of TB patients who start treatment and the achievement of TB treatment success rates have the potential to increase TB transmission, cause more complex treatment resistance, and increase mortality (Falah et al., 2019). Previous research shows that 4.8% of TB patients default on treatment (Nabilah et al., 2022).

In order to prevent the potential spread of TB cases, the government, through the National Tuberculosis Control Strategy in Indonesia, implemented the Find and Treat Until Cured TB (TOSS TB) action, which involves mobilizing networks to strengthen the capacity of community organizations to improve optimal TB patient support (Ministry of Health 2023). To support this government program, it is necessary to empower families so that they can play an active role in the care and assistance of TB patients with medication. One way to increase the role of families in TB prevention is through increasing health literacy through the One Student One Family Support method by nursing students (Abselian et al,

2023). This is also in line with the North Bolmong Regency government program to realize a healthy and TB-free North Bolmong. Health literacy through the One Student One Family Support method by selecting nursing students as family companions is because nursing students have a strong understanding of the concepts of nursing and family health, as well as have the ability to apply theory in practice. In addition, nursing students are also able to identify family health problems, carry out interventions, and evaluate the impact of these interventions.

Numerous studies have been conducted on health literacy models using the One Student One Family Support method, albeit with different topics, such as addressing violence against women and children, supporting pregnant women, preventing stunting in toddlers, and supporting hypertension patients (Olfah et al., 2023). However, some of these studies have focused solely on increasing respondents' knowledge of health issues or diseases and have not addressed changes in attitudes that are then translated into behavior or preventative practices. The purpose of this study was to describe the knowledge, attitudes, and behavior of families in preventing pulmonary tuberculosis in the Boroko Community Health Center Area, North Bomong Regency in the intervention and control groups. The research problem formulation in this study was how to identify a health literacy model using the One Student One Family Support method in supporting the prevention of pulmonary tuberculosis in rural areas?

## **METHOD**

This study used a quasi-experimental pre-post-test design approach with a control group design. The experimental group in this study received One Student One Family Support assistance where one nursing student accompanied one family of TB patients for 8 weeks with a total of 14 meetings. The first meeting conducted an assessment of knowledge, attitudes and behavior by administering questionnaires for 1 week. The second to the 13th meetings implemented health education about TB in the form of understanding TB disease, causes, signs and symptoms, how to care for sick family members, regularity of taking medication and prevention for 60-90 minutes with a 2-day interval and the 14th meeting was an evaluation for the last 1 week. Meanwhile, the control group received treatment in the form of health education but without involving

nursing student assistance. This study will be conducted in the Boroko Community Health Center area of North Bolmong Regency for 4 months. The population in this study were all TB patients undergoing a 6-month treatment program, totaling 109 people. The sampling technique used stratified random sampling, which takes into account the strata of population elements according to predetermined criteria. The Slovin formula was used to select 52 respondents, consisting of 26 in the intervention group and 26 in the control group.

The data collection technique broadly consisted of the preparation, implementation, and final stages. Data were analyzed using SPSS version 25.0 statistical software, with a p-value  $\leq 0.05$  considered statistically significant. Descriptive analysis for all variables was performed using means and medians for continuous data, and frequencies and percentages for categorical data. Bivariate analysis used ANOVA and paired t-tests to compare the pre- and post-tests of the two groups, while the Independent Samples Test was used to compare the intervention and control groups.

## RESULTS AND DISCUSSION

**Table 1. Characteristics of respondents**

Variabel	Experimental Group		Control Group		Total	
	n	%	n	%	n	%
<b>Age</b>						
25-35 Years	12	46,2	7	26,9	16	40,0
36- 45 Years	9	34,6	13	50,0	25	43,3
46-60 Years	5	19,2	6	23,1	11	16,7
Total	26	100	26	100	52	100
<b>Gender</b>						
Male	15	57,7	17	65,4	33	53,3
Female	11	42,3	9	34,6	19	46,7
Total	26	100	26	100	52	100
<b>Work</b>						
Farmer	26	100	26	100	52	100
Total	26	100	26	100	52	100

Data Source: Processed By Author 2026

It was found that of the 26 respondents in the experimental group, the majority (46.2%) were aged 25-35 years and in the control group, 50.0% were aged 36-45 years. Based on gender, there were 57.7% of the experimental group who were male and 17 respondents (65.4%) in the control group who were male. Meanwhile, the type of work of all respondents was working as farmers (100%) both in the experimental and control groups.

**Table 2. Test of differences in knowledge before and after treatment for the two groups of respondents**

Variabel Knowledge	Pre test		Post test		Difference		<i>p value</i>
	Mean	SD	Mean	SD	Mean	SD	
Intervensi	7,40	1,616	11,25	1,252	3,85	-0,363	0,000
Kontrol	6,70	0,583	10,32	1,165	3,62	0,582	
U	24,32	-2,356	26,76	-2,321	2,44	-0,432	

Data Source: Processed By Author 2026

The Wilcoxon test showed that the knowledge aspect of the intervention group increased from a mean of 7.40 to a mean of 11.25, with  $p = 0.000$ . The knowledge aspect of the control group also increased from a mean of 6.70 to a mean of 10.32 with  $p = 0.000$ . The increase in the knowledge value of the intervention group was greater than the control group with a difference of mean 3.8 and mean 3.6. In the Mann-Whitney statistical test, the pre-test mean value was 24.32 with  $p = 0.000$  and the post-test mean was 26.89 with  $p = 0.000$ . So it can be concluded that there is a significant difference between the knowledge of the intervention group and the knowledge of the control group.

**Table 3. Test of differences in attitudes before and after treatment of the two groups of respondents**

Variabel Attitude	Pre test		Post test		Difference		<i>p value</i>
	Mean	SD	Mean	SD	Mean	SD	
Intervensi	5,68	0,574	7,87	1,260	2,19	-0,630	0,000
Kontrol	4,17	0,525	5,60	1,043	1,43	0,327	
U	22,42	-1,160	24,30	-2,238	1,88	-1,258	

Data Source: Processed By Author 2026

The Wilcoxon test of the attitude aspect of the intervention group increased from a mean of 5.58 to a mean of 6.87, with  $p = 0.000$ . The

attitude aspect in the control group also increased from a mean of 4.17 to a mean of 5.60 with  $p = 0.000$ . The increase in the attitude value of the intervention group was greater than the control group with a difference of mean 2.1 and mean 1.4. In the Mann-Whitney statistical test, the pre-test mean value was 22.42 with  $p = 0.000$  and the post-test mean was 24.30 with  $p = 0.000$ . so it can be concluded that there is a significant difference between the attitudes of the intervention group and the attitudes of the control group.

**Table 4. Test of differences in behavior before and after treatment of the two groups of respondents**

Variabel Behavior	Pre test		Post test		Difference		<i>p value</i>
	Mean	SD	Mean	SD	Mean	SD	
Intervensi	5,37	0,588	7,70	1,261	2,33	-0,671	
Kontrol	5,12	0,631	6,65	1,253	1,53	0,621	0,000
U	23,02	-1,445	26,55	-3,467	3,53	-2,614	

Data Source: Processed By Author 2026

The Wilcoxon test showed that the behavioral aspects of the intervention group increased from a mean of 5.37 to a mean of 7.70, with  $p = 0.000$ . The behavioral aspects of the control group also increased from a mean of 5.12 to a mean of 6.65 with  $p = 0.000$ . The increase in the behavioral value of the intervention group was greater than the control group with a difference of 2.3 and 1.5. In the Mann-Whitney statistical test, the pre-test mean value was 23.02 with  $p = 0.000$  and the post-test mean was 26.55 with  $p = 0.000$ . So it can be concluded that there is a significant difference between the behavior of the intervention group and the behavior of the control group.

## DISCUSSION

The effectiveness of one student one family on knowledge of tuberculosis prevention where the Mann-Whitney statistical test obtained a pre-test mean value of 23.02 with  $p = 0.000$  and a post-test mean of 26.55 with  $p = 0.000$ . so it can be concluded that there is a significant difference between the behavior of the intervention group and the knowledge of the control group. In this case, student mentoring in the family has a greater influence on patient knowledge in preventing drug-resistant tuberculosis. This study shows a difference in respondents' knowledge scores before and after being given health education, namely an average

of 23.16 and an average of 28.90 with  $p = 0.000$ . So there is an effect of providing health education on knowledge of tuberculosis in patients in the Suli Community Health Center area. Increased knowledge is one indication of the effectiveness of the implementation of the OSOF method.

The increase in knowledge in pulmonary tuberculosis patients in this study was due to the OSOF implementation process carried out in the form of lectures with the help of an LCD projector and the implementation of feedback or feedback that was carried out simultaneously and did not require a long time. Furthermore, the increase in TB patient knowledge was also due to the osof measures carried out by researchers, which were also assisted by Community Health Center staff, resulting in optimal results. In the intervention group in this study, students taught how to care for family members with TB, provided health education about TB and how to prevent it from recurring or spreading to healthy people. This enabled families to apply the knowledge they acquired in their daily lives, particularly in TB prevention in the Boroko Community Health Center area. Therefore, the assistance of nursing students as family support providers was very effective in improving patient knowledge in preventing drug-resistant tuberculosis. In this study, to prevent the risk of TB transmission among students, each student was equipped with personal protective equipment such as masks and gloves when in contact with TB patients, as were the patients' families (Abselian, 2023).

The effectiveness of one student, one family on tuberculosis prevention attitudes, where based on the Mann-Whitney statistical test, obtained a pre-test mean value of 22.42 with  $p = 0.000$  and a post-test mean of 24.30 with  $p = 0.000$ . Therefore, it can be concluded that there is a significant difference between the attitudes of the intervention group and the attitudes of the control group. In this case, student mentoring in the family has a greater influence on patient attitudes in preventing drug-resistant tuberculosis. This study is in line with previous research which concluded that there was an influence of counseling on improving patient attitudes in consuming Anti-Tuberculosis Drugs at the Pajagan Rangkasblitung Community Health Center (Widiantoro. 2021). Attitude is considered important by individuals where the better the attitude, the better the behavior so that attitude is not an activity, but a predisposing factor for the occurrence of behavior. In this study, attitudes in the

intervention group have an increased value because most respondents agree and support in taking measures to prevent pulmonary tuberculosis. This is evidenced by the decision of patients and families to always check themselves at the community health center, always use personal protective equipment and TB patients always maintain cough etiquette. So, the support of nursing students as family support providers is very effective in influencing patients' attitudes in preventing tuberculosis (Rindy 2022).

The effectiveness of one student one family on tuberculosis prevention behavior, where based on the Mann-Whitney statistical test, obtained a pre-test mean value of 23.02 with  $p = 0.000$  and a post-test mean of 26.55 with  $p = 0.000$ . so it can be concluded that there is a significant difference between the behavior of the intervention group and the behavior of the control group. In this case, student mentoring in the family has a greater influence on the patient's attitude in preventing tuberculosis. This study is in line with previous research which concluded that there was an influence of counseling on improving patient behavior in consuming Anti-Tuberculosis Drugs at the Pajagan Rangkasblitung Community Health Center (Widiantoro, 2021). All human activities or activities, whether observed directly or indirectly, which are the beginning of a stimulus are called behavior.

The family behavior of the intervention group that can be proven in this study is that patients always take TB medication correctly and on time, wear personal protective equipment (masks), maintain cough etiquette, visit health facilities for check-ups, and always eat nutritious food. The significant increase in scores in the intervention group was due to routine mentoring by nursing students for 8 weeks to patients. The control group also experienced an improvement after the post-test, but not significantly. The nursing students' mentoring activities as family support providers in this study included health education about TB, monitoring medication adherence, case detection, how to care for sick family members, and prevention. These mentoring activities were carried out to the fullest extent, resulting in optimal absorption of the information provided (Hidayat, 2020).

## CONCLUSION

The mentoring of nursing students as support providers in the family has an influence on the knowledge, attitudes and behavior of

patients in preventing tuberculosis. It is estimated that family members can play an active role in assisting the treatment of pulmonary tuberculosis patients. For further research, it is hoped that significant samples and qualitative research methods will be used.

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