

The effect of family empowerment on increasing knowledge and behavior to prevent pulmonary TB transmission in children in Semarang

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Abstract. Tuberculosis is a chronic infectious disease which is a major health problem globally, including in Indonesia. To increase knowledge and behavior to prevent transmission of pulmonary TB in children, this can be done through family empowerment. Empowering families through education can increase awareness and encourage preventive behavior changes, thus making the prevention practices of pulmonary TB in children more optimal and reducing the incidence and transmission of the disease. Intensive education can enhance knowledge about the causes, modes of transmission, symptoms, and preventive measures for pulmonary TB in children, which in turn can improve family support in treatment and prevention of transmission. Therefore, family empowerment becomes an effective strategy in improving the quality of life for children with pulmonary tuberculosis and supports a more optimal recovery. The aim of this research is to determine the effect of family empowerment on increasing knowledge and behavior in preventing transmission of pulmonary TB in children. This research used a quasy experimental quasy experiment with a non-randomized control group pre-posttest design. Data collection techniques include interviews using questionnaires, observation and measurement. Data were analyzed using the Wilcoxon Sign Rank Test, Mann-Whitney test, and Spearman Rho. The sample was 31 families who had children with pulmonary TB or pulmonary TB sufferers, divided into treatment and control groups. The results of this research show that before being given health education, the majority of knowledge of the 31 respondents was in the sufficient category, 16 people (51.7%) with the pre-test results of the attitudes and behavior of the majority in the positive characteristics category, 16 people (51.6%). After being given health education, there was an increase with good knowledge reaching 21 people (67.7%), attitudes and behavior increasing by 18 people (58.0%). The conclusion of this research is that there is an influence of health education on the level of knowledge, attitudes and behavior of families regarding preventing transmission of TB in children, namely with a significance value of $p=0.000$

Keywords: family empowerment, knowledge, health education, behavior, pediatric TB

1 Introduction

Pulmonary TB cases are the most common TB cases found globally. Currently, TB cases are among the top 10 causes of death in the world [1]. Tuberculosis (TB) is a highly contagious disease caused by infection with the bacterium *Mycobacterium tuberculosis* [2]. Based on data from the 2022 Global Tuberculosis Report, it is estimated that globally around 10.6 million people were infected with tuberculosis in 2021. Most tuberculosis sufferers are over 15 years old, with a percentage of 56.5% for men, 32.5% for women, and around 11% for children under 15. The number of deaths due to tuberculosis, both with and without HIV, was 1.6 million in 2021 [1].

According to Ministry of Health data, the highest number of TB cases in children is found on the island of Java. According to data from the Central Java Provincial Health Office, in 2022, there were 14,242 cases of TB in children, representing a 21% increase in the proportion of cases. The incidence of pulmonary TB in children is due to unsuccessful treatment. This failure of pulmonary TB therapy in children is caused by various factors, including treatment failure, inappropriate treatment, and discontinuation of treatment, necessitating appropriate and engaging education. Pulmonary tuberculosis

is highly contagious and can negatively impact family members living with a TB patient. Families living with a TB patient are more susceptible to TB infection. This rapid spread of pulmonary TB is due to the low level of knowledge among family members regarding how to prevent TB transmission in children.

Family empowerment can increase knowledge and behaviors to prevent TB transmission in children. Pulmonary tuberculosis is highly contagious and can negatively impact family members living with a TB patient. Families living with a TB patient are more susceptible to TB infection. The rapid spread of pulmonary TB is due to the low level of knowledge among family members regarding how to prevent TB transmission in children. Increasing knowledge and behaviors regarding TB prevention in children can be achieved through family empowerment.

2 Method

This research method uses a quasi-experimental design with a non-randomized control group pre-posttest. Data collection techniques include interviews, observations, and measurements. Data were collected using questionnaires and observation sheets. The research steps were carried out by conducting a pre-test, family empowerment intervention through health education, and conducting a post-test one week after the education. The data were then analyzed using the Wilcoxon Sign Rank Test, Mann-Whitney test, and Spearman Rho. Data processing used SPSS. The sample was 31 families with children suffering from pulmonary TB or pulmonary TB sufferers living in the Srandol Community Health Center area, divided into treatment and control groups.

3 Results And Discussion

3.1 Results

3.1.1 Identification of the Level of Knowledge, Attitudes and Behavior of Families Regarding the Prevention of Transmission of Pulmonary TB in Children Before Providing Health Education

Table 1. Level of knowledge, Attitudes and Behavior of Families the Prevention of Transmission of Pulmonary TB in Children Before Providing Health Education

Criteria	Pre-Knowledge	
	Frequency	Percentage (%)
Good	6	19.3
Sufficient	16	51.7
Insufficient	9	29.0

Criteria	Pre-Attitude and Behavior	
	Frequency	Percentage (%)
Positive	16	51.6
Negative	15	48.4
Total	31	100.0

Based on the research results in Table 1, the results obtained from 31 respondents before being given health counseling regarding family knowledge, attitudes and behavior regarding the prevention of TB transmission in children, some respondents had a sufficient level of knowledge, namely 16 people (51.7%), and some respondents had positive attitudes and behavior, namely 16 people (51.6%).

3.1.2 Identification of the Level of Knowledge, Attitudes and Behavior of Families Regarding the Prevention of Transmission of Pulmonary TB in Children After Providing Health Education

Table 2. Level of knowledge, Attitudes and Behavior of Families the Prevention of Transmission of Pulmonary TB in Children After Providing Health Education

Criteria	Post-Knowledge	
	Frequency	Percentage (%)
Good	21	67.7
Sufficient	10	32.3
Insufficient	0	0.0

Criteria	Post-Attitude and Behavior	
	Frequency	Percentage (%)
Positive	18	58.0
Negative	13	42.0
Total	31	100.0

Based on the research results in Table 2, the results obtained from 31 respondents after being given health education about family knowledge, attitudes and behavior regarding the prevention of TB transmission in children, some respondents had a good level of knowledge, namely 21 people (67.7%), and some respondents had positive attitudes and behavior, namely 18 people (58.0%).

3.1.3 Normality Test

Table 3. Distribution of Variable Normality Test Results *Pre-Posttest* Knowledge, Attitudes and Behavior of Families Regarding the Prevention of Transmission of Pulmonary TB in Children

Knowledge Variable	Shapiro-Wilk ^a	
	df	sig
Knowledge Results	Pre-Knowledge	31 .008
	Post-Knowledge	31 .000
Attitude and Behavior Results	Pre-Attitudes and Behavior	31 .000
	Post Attitudes and Behavior	31 .142

This normality test uses the Shapiro-Wilk test because it is intended for samples of less than 50. Based on the results of the normality test above, the Sig. value for the pre-knowledge group is 0.008, post-knowledge 0.000, pre-attitude and behavior 0.000, and post-attitude and behavior 0.142. Since the Sig. values for pre-knowledge, post-knowledge, and pre-attitude and behavior are <0.005, the Shapiro-Wilk test concludes that the data are not normally distributed. If the Sig. value for post-attitude and behavior is >0.005, the data are normally distributed. If the normality test finds that some of the data tested are more non-normal, then the pre-posttest data are not normally distributed. This is because the Shapiro-Wilk test found one group of normally distributed data and three groups of non-normally distributed data.

3.1.4 Wilcoxon Ranks Test

Table 4. Distribution of Wilcoxon Rank Test Results *Pre-Posttest* Knowledge, Attitudes and Behavior of Families Regarding the Prevention of Transmission of Pulmonary TB in Children

	<i>Pre-Posttest</i> Knowledge	<i>Pre-Posttest</i> Attitudes and Behavior
Z	-4.498 ^b	-3.695 ^b
Asymp. Sig. (2-tailed)	.000	.000

Based on the results of the Wilcoxon Signed Rank Test calculation, the Z value obtained was -4.498 and -3.695 with a p value (Asymp. Sig 2 tailed) of $0.000 < 0.05$, it can be concluded that the hypothesis is accepted. This means that there is a difference between the results of the level of knowledge, attitudes and behavior before being given health education and after being given health education regarding the prevention of TB transmission in children.

3.1.5 Mann-Whitney Test

Table 5. Distribution of Mann-Whitney Test Results Pre-Posttest Knowledge, Attitudes and Behavior of Families Regarding the Prevention of Transmission of Pulmonary TB in Children

RESULTS	
Mann-Whitney U	.000 496.000
Wilcoxon W Z	-6.810
Asymp. Sig. (2- <u>tailed</u>)	.000

It is known that the Asymp. Sig. (2-tailed) value is $0.000 < 0.05$. Therefore, it can be concluded that the hypothesis is accepted. This means that there is a difference in post-test results/increase in the level of knowledge, attitudes, and behavior after being given health education regarding the prevention of TB transmission in children. Therefore, there is an effect of health education on the level of knowledge, attitudes, and behavior of families regarding the prevention of TB transmission in children.

3.1.6 Spearman Rho Rank Test

Table 6. Distribution of Spearman Rho Rank Test Results *Pre-Posttest* Knowledge, Attitudes and Behavior of Families Regarding the Prevention of Transmission of Pulmonary TB in Children

		Post	Post Attitudes and Behavior
Knowledge	Spearman's rho	Corelation Coeffecient	1.000
		Sig. (2-tailed)	.767
		N	31
Attitudes and Behavior	Post	Corelation Coeffecient	-.055
		Sig. (2-tailed)	.767
		N	31

The output above yields a correlation coefficient of -0.055. This indicates a very weak correlation between the post-test knowledge and post-test attitudes and behavior variables. The correlation coefficient is negative, at -0.055. This indicates a negative correlation between the two variables. Therefore, good knowledge does not guarantee positive attitudes and behaviors in preventing TB transmission in children.

Based on the output above, the Sig. value is 0.767. Since a Sig. value of 0.767 is less than 0.05 or 0.01, there is no significant relationship between the knowledge and attitudes and behavior variables in preventing TB transmission in children. These results indicate that there is no

relationship between the two variables studied, namely knowledge and attitudes and behavior. This is because the Sig. value obtained is greater than 0.05.

3.2 Discussion

3.2.1 Knowledge, Attitudes, and Behavior of Families Regarding Efforts of TB Prevention and Transmission in Children Before Health Education

The results of the study showed that the knowledge of the 31 respondents was mostly in the adequate category (16 respondents (51.7%)), good knowledge (6 respondents (19.3%)), and poor knowledge (9 respondents (29.0%)). This indicates that respondents have sufficient knowledge regarding TB prevention and transmission efforts in children. Respondents with sufficient knowledge are those who live side by side with TB sufferers on a daily basis and have received health education from healthcare professionals during visits to community health centers or hospitals.

Supported by research [3] on the relationship between family knowledge levels and efforts to prevent pulmonary tuberculosis transmission at Teladan Medan Health Center, it shows that most families have good knowledge, namely 46 (92%) and 4 people (8%) have sufficient knowledge. This is also in line with research conducted [4] on the influence of health education on patient knowledge and attitudes in preventing tuberculosis transmission at Rotinsulu Bandung, showing that the level of family knowledge during the pre-test had sufficient knowledge, namely 19 people (54.3%), good knowledge as many as 6 people (17.1%), and poor knowledge as many as 10 people (28.6%).

The results of the pretest attitude measurement on 31 respondents showed that the majority of the results were in the positive nature category, namely 16 people (51.6%), and negative attitudes were 15 people (48.4%). This indicates that respondents already have a positive attitude towards efforts to prevent TB transmission in children. Most respondents have a positive attitude because they stated they strongly agree through the questionnaire that has been distributed. This study is in line with research conducted by [5] on the relationship between the level of family knowledge and attitudes towards preventing pulmonary tuberculosis transmission, showing that almost all respondents have a positive attitude towards the prevention and transmission of pulmonary tuberculosis, namely 24 people (80.0%). Attitude is a predisposition used to respond to an object either positively or negatively in situations, concepts, and people. One of the factors that influence the formation of a person's attitude is the knowledge they have. A person's knowledge and understanding of the prevention and transmission of tuberculosis plays an important role in efforts to prevent tuberculosis transmission.

3.2.2 Knowledge, Attitudes, and Behavior of Families Regarding Efforts of TB Prevention and Transmission in Children After Health Education

Following health education, there was an increase in knowledge, reaching 21 individuals (67.7%), while only 10 individuals (32.3%) had adequate knowledge. Furthermore, attitudes and behaviors improved following the health education, with 18 individuals (58.0%) having positive attitudes and behaviors and 13 individuals (42.0%) having negative attitudes and behaviors. This indicates that the health education regarding TB prevention in children was effective, and the material presented by the speakers was well-received by respondents. Essentially, health education aims to enhance individual abilities in maintaining and improving public health. This is in line with research conducted by [6] on the influence of health education on the behavior of families of TB sufferers in efforts to control adult TB in ABC Regency, West Sumatra, showing that there was an increase in knowledge, attitudes and actions of respondents before and after being given health education with pre-test and post-test p values = 0.001.

3.2.3 The Effect of Health Education on the Level of Knowledge, Attitudes, and Behavior of Families Regarding TB Prevention and Transmission in Children

The results of this study indicate that health education significantly impacts family knowledge, attitudes, and behavior regarding preventing childhood TB transmission, with a significance value of $p=0.000$. The increase in knowledge experienced by families with children with TB may be due to the provision

of health education, increased family awareness of their family members' health, and the age of the respondents.

Knowledge is the basis for individual actions, thus motivating them to take action [3]. A good level of knowledge within the family environment can have a positive impact on efforts to prevent tuberculosis transmission in children. This is due to the influence of family knowledge on their attitudes and behaviors regarding preventing tuberculosis transmission in children.

Education and experience are factors that can influence a person's knowledge, attitudes, and behavior. A person with a good education tends to acquire more information and knowledge than someone with a lesser education. These research findings align with research conducted by [7], The results showed a relationship between family knowledge and tuberculosis transmission prevention in the Penana'e Community Health Center (Puskesmas) working area in Bima City. The Spearman Rank correlation test obtained a p-value of 0.000. Furthermore, there was a relationship between family attitudes and tuberculosis transmission prevention in the Penana'e Community Health Center working area in Bima City. The Spearman Rank correlation test obtained a p-value of 0.001. This study explains that good knowledge and positive attitudes can be influenced by information sources/media, experience, and the environment. The greater a person's knowledge, the more positive attitudes they develop.

This study also aligns with research conducted by [4] on the effect of health education on patient knowledge and attitudes regarding tuberculosis transmission prevention in Rotinsulu Bandung, which showed a significant influence between knowledge and behavior and health education on tuberculosis transmission prevention at the Payo Selincah Community Health Center in Jambi City, as indicated by a p-value of 0.000.

4 Conclusion

This study shows that before being given health education regarding efforts to prevent and transmit TB in children, the knowledge of respondents was in the sufficient category of 16 people (51.7%), and after health education there was an increase in the level of knowledge to a good level reaching 21 people (67.7%). The results of the pre-test of attitudes in 31 respondents showed that most of them were in the positive category, namely 16 people (51.6%), and after health education there was an increase in attitudes and behavior after health education, namely 18 people (58.0%) had positive attitudes and behavior. Health education has an effect on the level of knowledge, attitudes and behavior of families regarding the prevention of transmission of TB in children, namely with a significance value of $p = 0.000$.

Conflict of Interest

The researcher declares that he has no conflict of interest that could influence the results or interpretation of this study.

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