

Research Article

The Impact of Community-Based Tuberculosis Education on Public Attitudes in Jambi City, Indonesia

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Abstract: Tuberculosis (TB) remains one of the most persistent infectious diseases worldwide, particularly in Indonesia, which ranks second globally in the number of TB cases. This study aimed to determine the effect of community-based TB education conducted by the Penabulu STPI community on the attitudes of Jambi City residents. The research used a quantitative approach with a pre-test and post-test design. Data were collected using questionnaires to measure participants' attitudes before and after the intervention. Data were analyzed using univariate and bivariate analyses, with the Wilcoxon signed rank test applied to determine significant differences in pre-test and post-test results. The findings revealed that most respondents were adults (85%), predominantly female (89%), and had completed senior high school (54%). Attitudes improved significantly, shifting from 19.2% negative responses before the intervention to 100% positive responses after. The Wilcoxon signed-rank test showed a statistically significant difference between respondents' attitude scores before and after the intervention ($Z = -8.395$, $p < 0.001$). These results demonstrate that community-based education effectively enhances public awareness and encourages positive attitudes toward TB prevention and treatment, highlighting the essential role of grassroots initiatives in controlling the spread of tuberculosis.

Keywords: Attitudes; Community-Based Education; Edukasi Berbasis Komunitas; Health Promotion; Tuberculosis.

1. Introduction

Tuberculosis (TB) is a contagious infectious disease caused by *Mycobacterium tuberculosis* (M. tuberculosis). According to the Global Tuberculosis Report published by the World Health Organization (WHO) in 2023, TB ranked as the second leading cause of death globally due to infectious agents in 2022. Indonesia ranked second among the countries with the highest number of TB cases, with an estimated 969,000 cases reported in 2022. The increase was attributed to the disruption of healthcare services during the COVID-19 pandemic, which caused delays in diagnosis and treatment.

The burden of tuberculosis remains a major public health concern in Jambi Province. Based on data from the Disease Prevention and Control Division (P2P) in 2022, the incidence rate reached 425 per 100,000 population, with 5,308 new TB cases detected that year. Jambi City, which has the largest population in the province, contributed 24.38% of all TB cases, making it the main hotspot for transmission. Spatial analysis of TB case distribution from 2015 to 2021 in Jambi City showed that two subdistricts, Alam Barajo and Paal Merah, consistently appeared in the red zone for TB incidence. According to the report in 2022, primary health centers such as Putri Ayu and Kenali Besar recorded the highest numbers of TB patients, with 84 and 63 cases respectively. Concentrated case numbers in these specific areas indicate the importance of targeted interventions, improved access to healthcare, and sustained public education on prevention and early diagnosis.

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To reduce TB cases, collaboration between government agencies, healthcare facilities, and non-governmental organizations (NGOs) plays a crucial role. Strengthening this partnership enables more effective public health outreach, especially in high-risk communities. One active NGO that contributes significantly to TB control in Jambi City is the Sub Recipient (SR) Community for TB Elimination, managed by Yayasan Penabulu and Stop TB Partnership Indonesia (STPI). This organization works closely with local communities through TB education, screening, and patient support activities. During the first quarter of 2022, the group successfully identified 137 new TB cases and supported 17 individuals to complete their treatment. Their success illustrates how grassroots initiatives can enhance national TB programs by reaching people who might not have access to formal healthcare systems. These programs also foster behavioral change and strengthen public understanding of TB prevention and control.

Given the ongoing high number of TB cases in Jambi and the significant role of community-based initiatives, it becomes essential to evaluate the effectiveness of health education programs. This study focuses on analyzing the effect of TB education conducted by the Penabulu STPI community on public attitudes in Jambi City. The findings are expected to provide valuable insight into how community engagement influences TB awareness and could serve as an evaluation tool for improving future educational interventions related to tuberculosis prevention and management.

2. Literature Review

Health Education and Behavior Change

Health education is a deliberate effort to influence individuals or communities so that they behave in ways that support health improvement. According to Notoatmodjo (2012), it is a process of communication between educators and the public aimed at achieving changes in attitudes and behavior. The process is interactive and allows mutual feedback, which makes the message more meaningful and effective. In tuberculosis (TB) control programs, education is not merely about information transfer but also about developing awareness and changing perceptions toward TB patients, who often experience stigma and discrimination.

Wulandari and Suryani (2020) explain that the choice of educational method whether through lectures, group discussions, or demonstrations affects how effectively people learn and adopt new information. Large-group sessions reach more people, but small-group or community-based sessions often lead to deeper understanding and engagement. The success of educational interventions depends on multiple factors, including literacy level, socioeconomic conditions, and community culture. These factors determine how well messages are received and translated into actual health practices in daily life.

Green and Kreuter (2005) identify three main determinants of health behavior change: predisposing factors (knowledge, attitudes, beliefs), enabling factors (resources, access, and media), and reinforcing factors (social and environmental support). Studies have shown that the use of interactive and visual media in health education increases message retention and enhances behavior change. Handayani et al. (2021) found that audiovisual materials improved health knowledge by up to 40% compared to conventional lectures, suggesting that innovative media can make educational programs more effective and memorable.

Community-Based Tuberculosis Education

Community-based health interventions play an essential role in controlling tuberculosis. Putra and Dewi (2019) demonstrated that targeted educational programs significantly improved participants' understanding of TB transmission, symptoms, and treatment. Prior to intervention, most respondents had limited knowledge, but after community education sessions, their attitudes improved markedly. Community involvement helps ensure that health messages are relevant and adapted to local conditions.

The community approach also aligns with the principle of empowerment encouraging people to take active roles in preventing and managing TB. The Penabulu STPI community is one of the organizations implementing this participatory model in Jambi City. They not only educate the public about TB prevention and treatment but also assist patients in adhering to therapy and overcoming stigma. Their involvement bridges the gap between formal health services and the public, ensuring that information and support reach even the most vulnerable groups.

The Penabulu STPI approach integrates local participation, empathy, and peer support, which are essential for sustainable behavioral change. By increasing positive attitudes, community-based TB education helps strengthen collective responsibility for health and supports the government's goal of TB elimination by 2030. This makes the role of Penabulu STPI not only complementary to health institutions but also transformative in shaping community awareness and long-term preventive behavior.

3. Proposed Method

This study is a quantitative research with a pre-experimental design applying the *One Group Pretest–Posttest* model. The research was conducted in the operational areas of the Rawa Sari, Kenali Besar, and Putri Ayu Community Health Center, Jambi City. These sites were selected due to having the highest tuberculosis (TB) incidence rates over the past five years. The study took place from June to August 2025.

The data collection tool used in this study was a questionnaire designed to assess respondents' attitudes toward tuberculosis (TB) before and after intervention. The questionnaire contained 24 statements, including 11 positive and 13 negative items, measured using a Likert scale. For positive statements, "strongly agree" received 4 points and "strongly disagree" 1 point; for negative statements, the scoring was reversed. This structure ensured balanced measurement of favorable and unfavorable attitudes.

All stages of this research were conducted following ethical standards and received approval from the appropriate ethics review committee. The confidentiality and anonymity of all participants were strictly protected, and data were used only for research purposes.

4. Results and Discussion

Result

Characteristic Respondents

Table 1 Characteristic Respondents.

Variables	Frequency (f)	Percentage (%)
Gender		
Male	10	10.1
Female	89	89.9
Age		
Adult (17-59)	85	85.9
Eldery (>60)	14	14.1
Education		
No formal education	0	0
Incomplete Primary School	0	0
Primary School	16	16.2
Junior High School	21	21.2
Senior High school	54	54.5
Diploma/Bachelor	8	8.1

Based on Table 1, most of the 99 respondents were female (89%), while males accounted for 10%, showing that women dominated the sample. The majority were adults aged 17–59 years (85%), followed by older adults aged over 60 years (14%). In terms of education, most respondents had completed senior high school (54%), with smaller proportions completing junior high school (11%), primary school (16%), and diploma/bachelor (8.1%). No respondents had no formal education or incomplete primary schooling. These findings indicate that most participants had attained at least a basic to upper-secondary level of education.

Univariate Analysis**Table 2.** Frequency Distribution of Respondents' Attitudes Toward Tuberculosis Before (Pretest) and After (Posttest) Intervention.

Respondent Attitudes	Respondent Group			
	Pretest		Posttest	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Negative	19	19.2	0	0.0
Positive	80	80.8	99	100.0

Table 3 shows that before the intervention, most respondents already had a positive attitude toward tuberculosis (80.8%), while 19.2% still had negative attitudes. After the intervention, all respondents (100%) demonstrated positive attitudes toward tuberculosis, and no respondents were classified as having negative attitudes. This indicates that the counseling program had a very strong influence on changing respondents' attitudes especially in terms of awareness, acceptance, and support for TB prevention and treatment behaviors.

The analysis of each attitude statement also showed a significant increase in positive attitudes across nearly all items after intervention. The most significant improvement was seen in statement regarding the awareness to visit a health center if experiencing a cough for more than two weeks, with "strongly agree" responses increasing from 35.4% to 92.9%. Another notable increase occurred in statement about the importance of regular health checkups for prevention, which rise from 21.2% to 84.8%. Statement about the effectiveness of anti-TB medication also improved from 27.3% to 85.9%, showing that respondents gained a stronger understanding of the importance of medical treatment.

In the negative domain, the most significant change was observed in the statement regarding attitudes toward TB treatment, where the proportion of respondents who "strongly disagreed" increased from 27.3% to 78.8%. A similar improvement was seen in the statement concerning awareness of seeking medical care when experiencing a persistent cough, which rise from 24.2% to 82.8%. Meanwhile, a notable shift occurred in the statement suggesting that TB prevention could be achieved by consuming herbal medicine. Before the educational intervention, 31.3% of respondents selected "strongly disagree" and 38.4% selected "disagree." After the intervention, the proportion of "strongly disagree" responses decreased to 1.0%, while "disagree" responses sharply increased to 92.9%, reflecting a more accurate understanding of appropriate TB prevention practices.

Bivariate Analysis**Normality Test**

A normality test was conducted to determine whether the data were normally distributed. The Kolmogorov–Smirnov test was used since the sample size was more than 50 respondents.

Table 3. Results of the Normality Test for Respondents' Attitudes About Tuberculosis.

Respondents' Attitudes	Kolmogorov–Smirnov
Before Intervention	0.000
After Intervention	0.031

As shown in Table 3 the Kolmogorov–Smirnov significance value for respondents' attitudes before intervention was 0.000 and after was 0.031. Since both values are below 0.05, it can be concluded that the attitude data are also not normally distributed, and thus a non-parametric test (Wilcoxon Signed Rank Test) was used to analyze differences before and after intervention.

Table 4. Statistical Test of Respondents' Attitudes Before and After Intervention.

		Mean Rank	Z	P-value
Posttest – Pretest	Negative ranks	22.00		
	Positive ranks	49.57		
	Total		-8.395	.000

Based on Table 4, 20% of respondents had negative ranks (posttest < pretest), indicating a slight decrease in attitude scores after the intervention. Meanwhile, 96.0% had positive ranks (posttest > pretest), suggesting that most respondents experienced an improvement in their attitude scores, and 2.0% had ties (no change). The Wilcoxon signed-rank test showed a statistically significant difference between respondents' attitude scores before and after the intervention ($Z = -8.395$, $p < 0.001$). Therefore, it can be concluded that the community-based TB education program had a significant effect on improving respondents' attitudes toward TB.

Discussion

Characteristic of Respondents

Respondents were categorized according to age, gender, and education level. In terms of gender, the majority of respondents were female (89.9%), while male respondents accounted for only 10.1%. This indicates that female participation in TB education activities was much higher than males. Women tend to have stronger motivation to maintain family health and household hygiene, making them more actively involved in health education initiatives. This aligns with findings by Wirawan et al. (2022), who stated that women are more often involved in local health development because they are closely connected to family routines and show greater concern for public health issues. Kongkamol et al. (2024) also found that women were more likely to volunteer in lung health education and screening programs than men. Thus, the predominance of female respondents in this study can be attributed to their social roles as family health caretakers, higher health awareness, and better accessibility to community-based educational programs.

Most respondents belonged to the adult age group (18–59 years). This age group generally demonstrates better accessibility and responsiveness to health education interventions. According to Kaffah et al. (2023), individuals aged 26–35 are more likely to possess higher TB-related knowledge than younger or older groups. Puspitasari et al. (2022) also reported that young adults show better knowledge and preventive behaviors regarding TB than other groups. Adults are typically more physically productive and capable of participating in community education programs while consistently applying TB preventive behaviors such as proper coughing etiquette, timely treatment, and avoiding exposure. Therefore, focusing TB education on adults can yield a broader and more sustainable impact on TB prevention efforts.

Regarding educational level, most respondents had completed high school (54.5%), followed by junior high school (21.2%), primary school (6.2%), and bachelor/diploma (8.1%). There were no respondents without schooling or who had not completed primary education. The high proportion of participants with at least secondary education indicates that most had sufficient literacy to understand health information. A multicenter Knowledge, Attitudes, and Perceptions (KAP) study in Indonesia also showed that sociodemographic factors, including education, are significantly associated with TB knowledge scores. Overall, the respondent characteristics in this study predominantly educated adult females represent a group that is highly responsive to health education and capable of disseminating information effectively within their communities, supporting the success of TB education programs.

Analysis of Differences in Attitudes Before and After Intervention

The frequency distribution analysis revealed a significant improvement in positive attitudes following the intervention. Before the intervention, 80.8% of respondents demonstrated a positive attitude, while 19.2% showed a negative attitude. After the intervention, the proportion of respondents with a positive attitude increased to 100.0%, and the negative category dropped to 0%. This change indicates a significant shift from negative attitudes toward greater acceptance of preventive behaviors as expected. Statistical analysis of the total attitude scores before and after the educational intervention using the Wilcoxon Signed Rank Test also

showed a significant result, with $Z = -8.395$ and $P = 0.000$ ($p < 0.001$). These findings indicate that the educational intervention was statistically significant and effective in enhancing public understanding and shaping attitudes toward tuberculosis prevention and control. Similarly, Bisallah et al. (2018) found that community-based educational interventions significantly improved the knowledge, attitude, and practice (KAP) scores among TB/HIV patients in Nigeria.

Item-level analysis of attitude statements showed that several items within the positive attitude domain exhibited significant improvement after the intervention. The greatest increase was observed in the statement regarding regular health check-ups as a preventive effort, which rose from 21.2% to 84.8%. This indicates that the intervention effectively improved the community's perception of the importance of routine health examinations. Likewise, agreement with the statement regarding the use of anti-tuberculosis drugs (OAT) as an appropriate treatment increased from 27.3% to 85.9%, and the belief in the importance of consulting a doctor rose from 35.4% to 92.9%. These findings highlight a substantial shift in trust toward the role of medical treatment. Moreover, statements related to the importance of natural lighting in homes and the role of environmental factors in TB transmission also demonstrated meaningful positive changes.

The substantial increase across several attitude items suggests that the intervention successfully altered beliefs and attitudes about seeking medical care and reinforced confidence in pharmacological therapy—two crucial behavioral determinants for TB prevention and control. These results align with findings from a study at Puskesmas Makasar, East Jakarta, which showed that continuous education through audiovisual media significantly improved patients' attitudes toward preventing treatment discontinuation and adherence to TB therapy. Consistent findings were also reported by UPTD Puskesmas Tapung II, where digital health education significantly enhanced preventive attitudes toward TB transmission, particularly in awareness of early detection and medical consultation behaviors.

Analysis of the negative attitude domain showed that respondents exhibited improved positive attitudes after the intervention, as reflected by a shift in responses toward "disagree" or "strongly disagree" on incorrect statements about TB. This indicates improved understanding and the ability to distinguish factual information from health-related myths. Among the 24 attitude items, most negative domain items showed a consistent shift toward positive responses, particularly those related to traditional medicine, social stigma, and inappropriate preventive behaviors.

The most notable change occurred in the statement regarding traditional medicine, which increased from 54.5% to 94.9%. This finding demonstrates that the educational intervention significantly changed community perceptions about TB treatment—from reliance on traditional methods to understanding that medical treatment under health worker supervision is the most effective approach. A substantial change was also observed in the statement about TB transmission; respondents who disagreed with the incorrect statement increased from 63.6% to 91.9%, reflecting improved understanding of TB's infectious nature and expected enhancement of preventive behaviors such as maintaining hygiene.

In addition, the statement related to TB patient discrimination showed an increase in disagreement from 58.6% to 87.9%, indicating reduced stigma after educational sessions emphasizing that TB is treatable and patients should not be avoided if they adhere to treatment and proper cough etiquette. The statement regarding treatment discontinuation also showed a significant change, from 60.6% to 93.9%, reflecting increased awareness about the importance of completing the full course of treatment to prevent drug resistance and relapse. Positive changes were also observed in statements concerning environmental factors not affecting TB (with disagreement increasing from 67.7% to 88.9%) and incorrect statements about cough etiquette (from 64.6% to 89.9%). These results illustrate the success of the educational intervention in instilling simple yet effective preventive habits, such as ensuring proper ventilation and practicing cough etiquette.

Overall, across all negative domain items, six attitude statements—regarding seeking medical care, TB treatment with OAT, traditional medicine, environmental hygiene, and stigma toward TB patients showed the most significant changes, with increases ranging from 21–40%. These findings are consistent with a community-based study in South Sulawesi, which reported that family education on TB prevention improved positive attitudes toward clean and healthy living behaviors and reduced misconceptions that TB is a curse or spiritual affliction. These results are also supported by studies by Lutfian et al. (2025) and Faradee et al. (2023), which demonstrated that educational interventions on TB treatment improve medication adherence and reduce stigma toward long-term therapy.

5. Conclusions

Based on the findings of the study regarding the effect of tuberculosis (TB) education on public attitudes, several important conclusions can be drawn. The characteristics of the respondents showed that the majority of participants who attended the TB education sessions were adults (85%), predominantly female (89%), and mostly had a high school education level (54%). These characteristics indicate that adults, especially women, tend to be more involved in community health education activities and play a key role in spreading health information within families and neighborhoods. In terms of attitudes, the study also identified a meaningful shift toward more positive perspectives regarding TB prevention and treatment. Before the education session, around 19.2% of respondents exhibited negative attitudes toward TB prevention efforts and treatment adherence. However, after the intervention, all respondents (100%) showed positive attitudes, and no participants remained in the negative category. This change illustrates the transformative effect of health education in shaping rational, empathetic, and supportive attitudes that encourage compliance with medication, early health checks, and reduced stigma toward TB patients. Health workers are encouraged to increase both the frequency and quality of TB education programs in community settings, such as health centers, posyandu, or youth organizations. Educational materials should be delivered using simple, easily understandable language and supported by engaging media such as posters, videos, or interactive simulations. These tools help capture attention and enhance message retention. Continuous monitoring of post-education behavior, especially regarding treatment adherence and preventive practices, is also necessary to maintain long-term behavioral change within the community. Community members are encouraged to take a more active role in participating in health education activities, particularly those related to TB prevention and control. Environmental hygiene, good home ventilation, and avoidance of risky behaviors should also be prioritized to reduce transmission risk. Future researchers are advised to expand the study population and adopt quasi-experimental or randomized controlled trial designs to strengthen causal conclusions. Furthermore, future studies could include behavioral (practice) variables to explore the relationship between knowledge, attitude, and actual preventive actions. The integration of digital and audiovisual educational media could also be tested as an innovative and interactive approach to enhance the effectiveness of TB education.

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