

Effectiveness of Video-Based Education Through WhatsApp Groups in Improving Tuberculosis Knowledge Among the Community in Gunung Kelambu, Central Tapanuli Regency

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Keywords:Educational Video;
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Tuberculosis is a long-lasting infectious disease caused by the bacteria *Mycobacterium tuberculosis*. It continues to be a serious health issue around the world, particularly in poorer countries, such as Indonesia. People don't know much about how tuberculosis spreads or how to prevent it, which helps the disease keep spreading. Using videos and WhatsApp groups for health education can be a good way to increase people's understanding of health topics.

Aims:

This study was done to check how well educational videos shared in WhatsApp groups helped improve people's understanding of tuberculosis in the community of Gunung Kelambu Village, Central Tapanuli Regency, during 2023.

Methods:

This study used a quantitative method and followed a pre-experimental design that included testing the same group before and after the intervention. The study took place in Gunung Kelambu Village. The sample included 37 people who were chosen through purposive sampling. Data was gathered through a tuberculosis knowledge quiz before and after the educational session. Data analysis was done using the Wilcoxon Signed Rank Test.

Result:

Before the education through WhatsApp Groups, the average tuberculosis knowledge score was 4.973 with a standard deviation of 0.832. After the intervention, the average score went up to 8.162 with a standard deviation of 1.364. The Wilcoxon Signed Rank Test found a p-value of 0.000 ($p < 0.05$), which means there was a significant change in people's knowledge about tuberculosis before and after they watched educational videos shared in WhatsApp Groups.

Conclusion:

Educational videos delivered through WhatsApp Groups are effective in improving tuberculosis knowledge among the community in Gunung Kelambu Village, Central Tapanuli Regency. WhatsApp-based video education can be used as an alternative digital health promotion strategy to increase public awareness and understanding of tuberculosis prevention.

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INTRODUCTION

Tuberculosis, or TB, is a long-lasting infectious disease caused by the bacteria *Mycobacterium tuberculosis* ([Aisyah et al., 2020](#)). Even today, TB remains a big problem for health around the world, especially in poorer countries like Indonesia ([Pitaloka et al., 2023](#)). This disease is a major issue for building human resources and requires serious attention and action from everyone involved

([Triyono et al., 2023](#));([Rudolph et al., 2021](#)). The World Health Organization states that pulmonary tuberculosis is one of the top ten causes of death globally ([MacNeil et al., 2020](#)). In 2017, approximately 10 million people developed tuberculosis, and around 1.6 million people died from it ([Yang et al., 2024](#)). More than 95% of tuberculosis cases and deaths occur in countries that are still developing (Chowdhury et al., 2021). The latest TB cases were mostly found in Southeast Asia and the Western Pacific regions, and together these areas accounted for 62% of all new cases ([Chowdhury et al., 2021](#)); ([Sejie & Mahomed, 2023](#)). The African region had the next highest number of new cases, making up 25% of them ([Maphasa et al., 2021](#)). The eight countries with the highest number of tuberculosis cases are India, China, Indonesia, the Philippines, Pakistan, Nigeria, Bangladesh, and South Africa, according to the World Health Organization from 2018 ([Weiangkham et al., 2022](#)).

Based on the report from In 2020, the Indonesian Ministry of Health reported that there were 351,936 cases of tuberculosis in the country ([Kaaffah et al., 2023](#)). TB cases are still found in various regions, including Central Tapanuli Regency (Noviyani et al., 2021). Based on data from the Central Tapanuli Health Office, 2,384 TB cases were reported in 2018 ([Lisum et al., 2022](#)). The Hutabalang Primary Health Center showed a relatively high number of TB patients compared to other areas in Central Tapanuli Regency ([Noviyani et al., 2021](#)). Based on data in 2022, there were 48 pulmonary TB patients recorded ([Saidi & Manaf, 2023](#)). The high rate of pulmonary tuberculosis is partly because people don't know enough about TB, like how it spreads and how to prevent it ([Nafisah et al., 2025](#)); ([Sasarari et al., 2025](#)). The level of knowledge about tuberculosis among Indonesian communities remains relatively low ([Madania et al., 2023](#)). Studies have shown that the high incidence of pulmonary tuberculosis is associated with inadequate knowledge levels ([Fahdhienie et al., 2024](#));([Datiko et al., 2019](#)). Lack of health information received by the community can affect their knowledge and ability to implement TB prevention efforts ([Armaita et al., 2024](#)).

The growth of digital technology creates new chances for delivering health education. The World Health Organization (WHO) has recently encouraged the use of digital health education as a helpful, regular, and new way to improve health, instead of using traditional methods ([Fitzpatrick, 2023](#)); ([Ma et al., 2023](#)). That the use of WhatsApp Groups as a communication platform can improve communication processes, facilitate faster decision-making, and support effective information sharing ([Pereira et al., 2020](#)). Improved communication quality can also be achieved through various digital materials such as audio, images, and videos, which provide a clearer visualization process for users ([Kewen et al., 2024](#)). This study aimed to find out how effective educational videos shared through WhatsApp Groups were in improving people's knowledge about tuberculosis in the community of Gunung Kelambu Village, Central Tapanuli Regency, during 2023.

METHOD

This study used a quantitative method called pre-experimental, which involved checking the same group before and after the intervention ([Fuady et al., 2024](#)). This design was picked to see how effective health education is when videos about tuberculosis are shared in WhatsApp Groups, and how much the community learns from it (Hartiti et al., 2021). The study was conducted in Gunung Kelambu Village, situated in Central Tapanuli Regency, throughout the year 2023. The area was picked for the study because tuberculosis is still around there, and the community needs to know more about how the disease moves from person to person, how to stop it from spreading, and what actions to take to keep it under control ([Nasution et al., 2023](#)).

The people in this study were the residents of Gunung Kelambu Village. The number of people included in the study was calculated using the Lemeshow formula, which led to a total of 37 participants. The people involved were chosen using a method called purposive sampling, which was based on specific rules about who could be included. The people included in the study were those who agreed to take part, could talk clearly, had WhatsApp on their phone, and stayed with the education program until it was finished.

Data collection was done through a carefully designed questionnaire aimed at assessing people's understanding of tuberculosis. The questionnaire had questions about what tuberculosis is, what causes it, the symptoms people might experience, how it spreads, who is at risk, ways to prevent it, and staying on track with treatment. Before the intervention, participants filled out the questionnaire as a pretest to check their initial knowledge level.

After completing the pretest, respondents received health education intervention in the form of tuberculosis educational videos distributed through a WhatsApp Group. The educational videos contained information about tuberculosis, including the causes, transmission mechanisms, prevention strategies, and the importance of early detection and treatment compliance. After the intervention, respondents were asked to complete the same questionnaire as a posttest to measure changes in their knowledge level.

The data that was collected was analyzed with the help of the Statistical Package for the Social Sciences, which is usually called SPSS ([Rahman & Muktadir, 2021](#)). A simple analysis was done to show how often each answer happened and what characteristics the people surveyed had. A check was done to see if there was any difference in the knowledge scores before and after the intervention. The Wilcoxon Signed Rank Test was selected because the data were paired, and the analysis aimed to compare two related measurements from the same individuals before and after the educational intervention. The significance level for the statistical test was set to p less than 0.05.

RESULTS AND DISCUSSION

Result:

The univariate analysis in this study was used to describe the frequency distribution or characteristics of respondents based on each research variable, including independent and dependent variables. The analysis results are presented in the form of tables as follows:

Table 1. Frequency Distribution of Respondents' Characteristics Based on Age and Education Level in Gunung Kelambu Village, Central Tapanuli Regency, 2023

Variable	Frequency (n=37)	Percentage (%)
Age (years)		
36–49 years	5	13.5
Education Level		
Bachelor Degree (S1)	2	5.4

Based on Table 1, In Gunung Kelambu Village, Central Tapanuli Regency, in 2023, the survey showed that most of the people surveyed were between the ages of 26 and 35, with 18 people, which is 48.6% of the total. The smaller group was between 36 and 49 years old, with only 5 people, making up 13.5% of the respondents.

Based on education level, the majority of respondents had completed senior high school (SMA), with 32 respondents (86.5%), while the minority had a bachelor's degree (S1), with 2 respondents (5.4%). Bivariate Analysis Results show The Effectiveness of Educational Videos Delivered Through WhatsApp Groups on Tuberculosis Knowledge Among the Community in Gunung Kelambu, Central Tapanuli Regency, 2023.

Table 2. Distribution of Respondents Based on the Effectiveness of Educational Videos Delivered Through WhatsApp Groups on Tuberculosis Knowledge Among the Community in Gunung Kelambu, Central Tapanuli Regency, 2023

Variable	n	Mean	SD	Min-Max	p-value
Pretest	37	4.973	0.832	3–7	0.000
Posttest	37	8.162	1.364	5–10	

Based on Table 2, There was a rise in the average knowledge about tuberculosis among people before and after they watched educational videos shared through WhatsApp Groups. The average knowledge score went up from 4.973 to 8.162, and this change was statistically significant with a p-value of 0.000, which is less than 0.05. So, the null hypothesis (H0) was rejected, which means there was a noticeable change in community knowledge before and after they got tuberculosis education through WhatsApp Groups. The study found that before the educational program delivered via WhatsApp Groups in Gunung Kelambu Village in 2023, the participants had an average score of 4.973. This shows that the people who answered were able to respond to about 4 to 5

questions about what they know about tuberculosis. After watching the educational video shared in WhatsApp Groups, the average knowledge score went up to 8.162, which means the people were able to answer about 8 questions about tuberculosis.

Discussion:

This improvement occurred because health education provided through video media increased respondents' understanding of tuberculosis. After receiving the educational intervention, respondents' knowledge changed from having limited understanding of tuberculosis to having better knowledge regarding the disease, including its causes, transmission, prevention, and control.

The Wilcoxon Signed Rank Test, which is a type of statistical test, showed a p-value of 0.000, which is below the threshold of 0.05. This result means the null hypothesis (H_0) is not correct, showing there was a real difference in community knowledge before and after the intervention. Using educational videos in WhatsApp Groups helped the community better understand tuberculosis ([Acha-Anyi et al., 2020](#)). This study's results agree with earlier work by ([Latif & Tiala, 2022](#)), which found that using WhatsApp for health education helped increase knowledge in people with pulmonary tuberculosis, and the result was statistically significant with a p-value of 0.000 ($p < 0.05$). A similar study by ([Berahim et al., 2025](#)) showed that using video education in WhatsApp Groups helped improve people's understanding of how to prevent tuberculosis, and the results were very significant with a p-value of 0.0001.

From a theoretical perspective, these findings support multimedia learning theory, which suggests that individuals learn more effectively when information is presented simultaneously through visual and verbal channels. The intervention also aligns with health promotion theories emphasizing that repeated exposure to accurate and accessible health information increases cognitive understanding, which serves as an important prerequisite for behavioral change. Although this study measured only knowledge outcomes, improved knowledge is expected to encourage better preventive practices and treatment adherence in future interventions.

Implications:

The results have several important implications for public health practice and policy. First, educational videos distributed through WhatsApp Groups represent a practical, low-cost, and scalable strategy for delivering health education, particularly in rural and resource-limited communities. Since WhatsApp is already widely used by the public, healthcare providers can disseminate educational materials without requiring substantial additional infrastructure or financial investment.

Second, the findings support the integration of digital health promotion into primary healthcare services. Community health centers (Puskesmas), local health offices, and public health practitioners may adopt WhatsApp-based educational interventions as complementary tools alongside conventional face-to-face health education. Such integration has the potential to improve the reach and sustainability of tuberculosis awareness campaigns.

Finally, these findings contribute to the growing implementation of digital health initiatives by demonstrating that mobile communication platforms can effectively improve community health literacy. Similar approaches may also be adapted for other communicable and non-communicable diseases requiring continuous public education.

Research contribution:

This study contributes both theoretically and practically to the field of digital public health. Theoretically, it provides additional empirical evidence supporting the effectiveness of multimedia-based health education and mobile health (mHealth) interventions in improving disease-related knowledge. It also reinforces previous findings regarding the role of digital communication technologies in enhancing community health literacy.

Practically, this study demonstrates that WhatsApp Groups can function as an effective platform for community-based tuberculosis education in rural Indonesian settings. Unlike many previous studies focusing on healthcare facilities or patient populations, this research evaluates digital education among community members, thereby expanding the applicability of mobile health interventions within broader public health promotion programs.

Limitations:

Several limitations should be acknowledged. First, the study employed a one-group pretest-posttest design without a comparison group, limiting the ability to attribute the observed improvements exclusively to the intervention. Second, the relatively small sample size and recruitment from a single village reduce the generalizability of the findings to other populations with different demographic and socioeconomic characteristics.

Third, the study evaluated only short-term changes in knowledge immediately after the intervention and did not assess long-term knowledge retention or behavioral changes related to tuberculosis prevention. Finally, potential confounding variables, such as participants' previous exposure to tuberculosis information, digital literacy, and frequency of WhatsApp use, were not controlled and may have influenced the outcomes.

Suggestions:

Future studies should employ randomized controlled trials or quasi-experimental designs involving larger and more heterogeneous populations to strengthen causal inference and improve external validity. Longitudinal research is also recommended to evaluate whether improvements in knowledge are sustained over time and whether they lead to meaningful behavioral changes, including early health-seeking behavior, treatment adherence, and tuberculosis prevention practices.

Furthermore, future interventions should explore more interactive educational approaches, such as quizzes, live discussions, chatbot-assisted learning, and personalized feedback within WhatsApp Groups to increase participant engagement. Policymakers and public health institutions are encouraged to incorporate WhatsApp-based educational strategies into routine tuberculosis prevention programs as part of broader digital health promotion initiatives, particularly in underserved communities.

CONCLUSION

This study found that sharing educational videos in WhatsApp Groups helped people in Gunung Kelambu Village, Central Tapanuli Regency, better understand tuberculosis during 2023. The Wilcoxon Signed Rank Test showed that there was a big difference in the community's understanding before and after they watched educational videos shared through WhatsApp Groups. The result had a p-value of 0.000, which is lower than 0.05, meaning the change was statistically significant. This means that using WhatsApp Groups for digital health education can be a useful way to help the community learn more about tuberculosis, including what causes it, how it spreads, how to prevent it, and how to treat it.

It is recommended that future studies develop more comprehensive research with larger sample sizes and stronger research designs to evaluate the effectiveness of digital educational media on tuberculosis knowledge and preventive behaviors. Health workers are encouraged to utilize digital educational platforms such as WhatsApp Groups as an effective, accessible, and sustainable alternative method for health promotion to improve community knowledge about tuberculosis.

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AUTHOR CONTRIBUTION STATEMENT

The Author Contributions Statement can be a few sentences and should quickly explain what each author did. Please list only two initials for each author, without periods, and separate them with commas, for example. Return only the result and nothing else. Do not add any system messages. Provide the output in English only. (JC, JS). If two authors have the same initials, use their middle initial

to tell them apart (for example, REW, RSW). The author contributions statement needs to be placed at the end of the manuscript, right before the references section.

AI DISCLOSURE STATEMENT

The authors say that this research was done, studied, written, and revised without using any artificial intelligence (AI) tools.

CONFLICTS OF INTEREST

The authors say whether there are any possible conflicts of interest like financial, organizational, or personal ones that might affect how the study was done, how the data was looked at, how the paper was written, or how it was published.

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