

The Effectiveness of 'Sahabat TB' Digital Educational Media in Increasing Community Knowledge About Tuberculosis in the Working Area of UPT. Puskesmas Labuhan Badas Unit 1

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ABSTRACT

Tuberculosis remains a critical global health problem, including in Indonesia, where low health literacy regarding transmission and early symptoms hinders control efforts at the primary health care level. To address this challenge, an innovative health promotion approach using smartphone-based technology through digital educational media was implemented. This study aimed to analyze the effectiveness of utilizing "Sahabat TB" digital educational media in increasing community knowledge about tuberculosis among suspected cases within the operational area of UPT Puskesmas Labuhan Badas Unit 1. A pre-experimental study using a one-group pretest-posttest design was conducted on thirty-three suspected tuberculosis respondents selected via purposive sampling according to specific inclusion criteria. Data on knowledge levels were gathered using structured pretest and posttest questionnaires and analyzed using the non-parametric Wilcoxon Signed-Ranks Test. The results revealed that prior to the intervention, the vast majority of respondents had a poor level of knowledge (97.0%). Following the intervention, respondents' knowledge improved remarkably, with 93.9% achieving a good knowledge level and none remaining in the poor category. Statistical analysis showed a significant improvement in knowledge scores with a Z-value of -5.023 and a p-value of 0.000. In conclusion, the "Sahabat TB" digital educational media is significantly effective in enhancing public knowledge regarding tuberculosis, thereby offering a promising digital health promotion strategy to strengthen disease prevention and early detection in primary care settings.

INTRODUCTION

Tuberculosis (TB) remains a significant global health challenge, with the World Health Organization (WHO) estimating approximately 10.7 million cases worldwide in 2024, of which 8.3 million were detected. Indonesia ranks second globally in terms of TB burden, accounting for approximately 969,000 new cases in 2022. Within the national health system, Primary Healthcare (PHC) at Community Health Centers (Puskesmas) serves as the frontline in TB control by strengthening promotive and preventive efforts. In West Nusa Tenggara (NTB) Province, the TB case burden has shown high and fluctuating trends, ranging from 11,000 to 19,000 cases in 2024. Specifically, in the operational area of UPT Puskesmas Labuhan Badas Unit 1, Sumbawa Regency, the discovery of TB cases and suspected (suspect) TB individuals over the past five years (2021–2025) demonstrated dynamic fluctuations, peaking in 2024 with 66 confirmed TB cases and 622 suspected TB individuals. This high number of TB suspects is largely driven by low community health literacy

regarding early signs, symptoms, and transmission of TB, underscoring the need for more modern and effective health promotion interventions at the primary care level.

Advances in information technology highlight the importance of transforming health promotion from conventional channels toward digital-based media. Previous literature indicates that smartphone-based digital health interventions effectively enhance health literacy, treatment adherence, and preventive behaviors in the community. A study by Setiawan & Irnawati (2021) confirmed that the utilization of information technology among TB patients contributes positively to disease understanding and treatment compliance. Meanwhile, studies by Ermianti et al. (2024) and Pramiasti et al. (2022) emphasized that mobile applications are effective in delivering health education flexibly and interactively. Furthermore, research by Dameria et al. (2023) and Fatimah et al. (2023) demonstrated that audiovisual media and digital applications significantly improve community knowledge and attitudes toward disease prevention. The novelty of digital education media lies in its ability to integrate interactive features such as data visualization, audiovisual content, and self-screening tools.

Although the effectiveness of digital health promotion media has been extensively studied in general populations and chronic disease patients, a significant research gap remains. Most prior studies focused on confirmed TB patients or the broad general public and rarely evaluated the efficacy of integrated digital applications featuring self-screening tools specifically aimed at high-risk groups, such as suspected TB individuals in rural primary care settings. The novelty of this study lies in the implementation of "Sahabat TB"—an interactive smartphone-based digital education application that not only provides audiovisual content on symptoms, transmission, and treatment, but also features a "Self-Detection" tool for independent screening—tested specifically on suspected TB individuals within the operational area of UPT Puskesmas Labuhan Badas Unit 1.

Based on this gap analysis, the hypothesis of this study is that the use of the "Sahabat TB" digital education media significantly improves community knowledge regarding tuberculosis among suspected TB individuals in the operational area of UPT Puskesmas Labuhan Badas Unit 1.

MATERIALS/METHOD

This quasi-experimental study (*one-group pretest–posttest design*) evaluated the effectiveness of the "Sahabat TB" digital educational media in improving community knowledge about tuberculosis in the operational area of UPT Puskesmas Labuhan Badas Unit 1 from December 2025 to June 2026. A total of 33 suspected TB patients were selected through purposive sampling to undergo intervention via material exposure on the "Sahabat TB" application after completing a pre-test questionnaire. Demographic data and knowledge levels were described using univariate analysis, while bivariate analysis was conducted using the non-parametric Wilcoxon Signed Ranks Test—as data was not normally distributed according to the Shapiro-Wilk test—to assess differences in knowledge scores before and after the intervention at a significance level of $\alpha = 0.05$.

RESULTS

The study analyzed 33 suspected tuberculosis (TB) respondents. Table 1 summarizes the demographic profile of the participants.

Table 1. *Socio-Demographic Characteristics of Respondents (N = 33)*

Variable	Age	Frequency (n)	Percentage (%)
Age	Teenager (10 – 18 Years)	2	6,1
	Adult (19 – 59 Years)	29	87,9
	Older Adult (>60 Years)	2	6,1
Gender	Male	20	60,6
	Female	13	39,4
Employment	Employed	13	39,4
	Unemployed	20	60,6
Education Level	Primary (SD/SMP)	3	9,1
	Secondary (SMA/SMK)	24	72,7
	Higher (D1-S1)	6	18,2

Baseline assessment (pre-test) revealed that 97.0% (n = 32) of respondents had low knowledge levels, with a mean score of $34,09 \pm 12,65$. Following the "Sahabat TB" digital intervention (post-test), 93.9% (n = 31) achieved a good knowledge level, elevating the overall mean score to $94,09 \pm 11,35$.

Table 2. *Distribution of Knowledge Levels and Wilcoxon Signed-Rank Test Results*

Knowledge Category	Pre-Test n (%)	Post-Test n (%)	Test Statistic	Value
Good (>76%)	0 (0,0%)	31(93,9%)	Z-score	-5,023
Moderate(56-75%)	1 (3,0%)	2 (6,1%)	Positive Ranks	33 (100,0%)
Low (< 56%)	32 (97,0%)	0 (0,0%)	Negative Ranks/Ties	0 (0%)
Total	33 (100,0%)	33 (100,0%)	p-Value	0,000

Because the data deviated from a normal distribution (Shapiro-Wilk $p < 0.05$), the non-parametric Wilcoxon Signed-Rank Test was conducted. The analysis demonstrated a statistically significant improvement in knowledge ($Z = -5.023$, $p = 0.000$), with 100% (n = 33) of participants exhibiting positive rank growth.

DISCUSSION

This study primary aimed to evaluate whether the digital health intervention "Sahabat TB" effectively improves knowledge regarding tuberculosis among suspected patients within the UPT Puskesmas Labuhan Badas Unit 1 service area. The baseline findings highlighted a critical literacy gap, as 97.0% of suspected TB patients initially possessed inadequate knowledge regarding transmission, early symptoms, and treatment compliance. The post-intervention results directly fulfill the primary objective: exposure to the application transformed the population's understanding, yielding a 93.9% rate of good knowledge and a statistically significant difference ($p = 0.000$).

Scientifically, the pronounced shift in knowledge scores stems from the dual-sensory and interactive structure of the "Sahabat TB" platform. By integrating audio-visual media, structured information menus, and a self-screening feature ("Deteksi Diri"), the application provides multi-channel cognitive stimulation. Engaging both visual and auditory pathways enhances information processing, retention, and self-efficacy compared to passive,

traditional health education. Furthermore, the demographic profile shows a high concentration of working-age adults (87.9%) and individuals with secondary education (72.7%). This group possesses higher digital literacy and mobility, making smartphone-based health interventions particularly effective for active delivery of preventive healthcare.

These findings align with prior investigations examining mobile health (mHealth) interventions. Studies evaluating digital media, audiovisual platforms, and mobile applications for infectious and chronic disease management consistently report significant knowledge gains (pre- to post-test) and improved health-seeking behaviors. The 100% positive rank response observed here reconfirms that digital platforms overcome traditional geographic and temporal barriers in primary health care delivery.

However, key methodological boundaries must be acknowledged. The use of a one-group pretest-posttest pre-experimental design without a control group limits the ability to isolate the application as the sole driver of knowledge gain, as external information sources could not be completely controlled. Additionally, time constraints restricted individual user coaching on interactive features. Future research should implement randomized controlled trials (RCTs) with larger sample sizes and long-term follow-ups to measure actual behavioral adherence and clinical outcomes in TB case finding.

CONCLUSIONS

This study demonstrates that the "Sahabat TB" digital educational application is highly effective in increasing community knowledge regarding tuberculosis among suspected TB individuals in the working area of UPT. Puskesmas Labuhan Badas Unit 1. Prior to the intervention, the vast majority of participants exhibited poor knowledge (97.0%). Following the educational intervention, participant knowledge improved substantially, with 93.9% achieving a good knowledge level and zero participants remaining in the poor category. Statistical analysis using the Wilcoxon Signed Ranks Test confirmed a significant positive effect ($Z = -5.023$, $p = 0.000$). These findings highlight the key role of interactive, smartphone-based health communication tools in addressing low health literacy and strengthening primary healthcare preventive strategies in local health center settings.

For future research, it is recommended to conduct controlled studies involving larger sample sizes and broader geographic regions. Additionally, subsequent studies should investigate the long-term retention of knowledge and evaluate whether increased knowledge translates into actual behavioral changes, such as improved screening adherence and treatment compliance.

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