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Revolutionizing Healthcare Awareness: Empowering the Masses with m-Health Media through 'Health Corner' for Comprehensive Tuberculosis Screening and Effective Treatment Insights

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ABSTRACT

Aims Tuberculosis remains a significant public health challenge, impacting both productivity and mortality rates. The limited detection of TB cases can be attributed to inadequate funding, insufficiently trained staff, and ineffective educational resources for healthcare workers. This research aimed to develop an m-health tool, specifically a 'Health Corner,' to enhance understanding of tuberculosis screening and the successful treatment of tuberculosis.

Materials & Methods This study employed a mixed methods approach, encompassing both design and development research. The intervention model underwent field testing using a quasi-experimental design involving a two-group pre-test post-test setup, with a control group comprising 60 randomly selected individuals from Legok Village, Jambi City, in September 2023. Data analysis comprised descriptive and inferential methods, including the t-test.

Findings Health promotion material experts confirmed that the academic manuscript complied with the material requirements and aligned with the prototype under construction. Multimedia experts likewise endorsed the suitability of the M-HEALTH application for public use. Practitioner experts also confirmed that the M-HEALTH application was highly suitable for practical implementation. Field trial results revealed a significant increase in participants' knowledge levels after exposure to the M-HEALTH application. Average knowledge scores rose from 7.66 to 9.63 post-education, reflecting an average difference of 2.03 (p=0.001).

Conclusion Using health education resources related to tuberculosis can effectively increase public awareness and knowledge about this disease.

Keywords Tuberculosis; Mass Media; Education; Knowledge

CITATION LINKS

[1] Directorate General of Disease Control and ... [2] Global report ... [3] The World Health Organization standards for tuberculosis ... [4] The same way to tackle TB and COVID-19 [5] The main results ... [6] Jambi Province Health ... [7] Factors associated with the incidence of pulmonary tuberculosis at the Labuang Baji Regional ... [8] Contact screening and risk factors for TB among the household contact of children with active TB: A way to find ... [9] Potential for transmission of Pulmonary Tuberculosis to family ... [10] A review of mobile health interventions for public private mix in ... [11] A customized m-Health system for improving Tuberculosis treatment adherence and follow-up ... [12] Mobile health to improve tuberculosis care and control: a ... [13] Effects of an mHealth intervention for pulmonary tuberculosis self-management based on the integrated theory of health behavior change: ... [14] Steps in conducting a scholarly ... [15] Educational Treatment-Based ... [16] The Systematic Design ... [17] Health Research ... [18] Population-based screening for pulmonary tuberculosis utilizing community health ... [19] Sub-national prevalence survey of tuberculosis in rural ... [20] Education on preventing transmission of TB disease through ... [21] Theory, research, and practice in health behavior and ... [22] The influence of education about pulmonary TB disease to household contacts on early detection of pulmonary TB disease at the Community Health Center in the Ex-Kawedanan Indramayu ... [23] Social capital and community participation in finding ... [24] Health behavior: Theory, research, ... [25] The influence of health education using audiovisual media on teenagers' knowledge and attitudes regarding efforts ... [26] The influence of video and poster media health education on children's knowledge and attitudes in ... [27] The relationship of health literacy with use of digital technology for health information: Implications ... [28] Applying and advancing behavior change theories and techniques in the context of a digital health revolution: proposals ...

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Introduction

Tuberculosis (TB) is an infectious disease caused by the bacterium *Mycobacterium tuberculosis*, primarily targeting the lungs but capable of affecting other organs as well. Its transmission occurs through the air via droplets [1]. TB stands among the top ten causes of death globally, with *M. tuberculosis* being the causative agent, infecting an estimated quarter of the world's population [2, 3].

In 2014, Indonesia reported a TB prevalence rate of 297 per 100,000 population. By 2016, the country had identified 298,000 cases of pulmonary TB and 156,000 TA-positive cases based on case coverage. The 2018 WHO Global TB Report predicts that the incidence of TB in Indonesia will increase to 842,000 cases and 107,000 deaths. Consequently, Indonesia ranks second worldwide in terms of TB burden, trailing only behind India [2].

Between 2018 and 2019, an estimated 60% of cases were detected, but this statistic took a worrisome turn in 2020, revealing that only 30% of cases were identified [4]. The pandemic exacerbated this situation, with only 350,000 out of an estimated 845,000 TB cases, and a mere 860 out of 24,000 estimated cases of drug-resistant TB, being reported [4].

Research from the Ministry of Health of the Republic of Indonesia in 2018 indicated a nationwide prevalence of clinical pulmonary tuberculosis at 1.0%. Some provinces, such as Aceh, DKI Jakarta, the Special Region of Yogyakarta, West Sumatra, Riau Islands, West Nusa Tenggara, East Nusa Tenggara, South Sulawesi, Central Sulawesi, and eastern Indonesia, reported rates higher than the national average [5]. The overall treatment success rate for TB cases stood at 89%, exceeding the 85% target, signifying that more TB patients are successfully completing their treatment.

In 2019, the estimated TB cases in Indonesia numbered 842,000, consisting of 569,899 reported cases, with an estimated 32% going unreported. In Jambi Province during the same year, only 2,500 out of the targeted 15,000 pulmonary TB cases received treatment. However, reports from various districts and cities indicated that only around 600 cases were reported. These data underscore the ineffective nature of case detection [6].

An essential component of TB control programs involves early diagnosis and the swift initiation of appropriate treatment. Delayed diagnosis and treatment can result in the source of transmission persisting and an extended period of transmission within the community. A delay in the diagnosis of pulmonary tuberculosis increases the risk of widespread and long-term transmission of the infection since a patient with tuberculosis can potentially infect 10-15 people in his/her vicinity, especially in close contact [7-9]. The educational media developed not only provides information about TB but also enhances the community's capacity to independently recognize the risk of TB transmission and report it to authorities. Empowering individuals to autonomously identify potential TB transmission risks is expected to break the transmission chain, particularly among close contacts [10-13].

From the aforementioned context, it becomes evident that TB cases in Indonesia are on an upward trajectory. This trend contradicts the extensive efforts undertaken by the government. Consequently, further research is imperative to explore alternative strategies for early TB detection to curtail the rising number of TB cases in Indonesia.

Leveraging smartphone applications holds great promise in aiding the identification of TB suspects within the community. Smartphone applications can serve as a user-friendly platform for disseminating TB-related information to the public. Additionally, these applications can empower the public to independently assess their TB transmission risk and transmit relevant data directly to healthcare professionals. The utilization of such applications can facilitate communication between the public and healthcare workers while preserving individuals' privacy. Moreover, healthcare workers can swiftly devise follow-up plans for those deemed at risk of TB infection through this technology.

This research aimed to develop an m-health tool, specifically a 'Health Corner,' to enhance the understanding of TB screening and the successful treatment of TB.

Materials and Methods

Research Design

This research is categorized as design and development research, employing a mixed methods approach [14]. The product design and development process follows the ADDIE framework [15], comprising analysis, design, development, implementation, and evaluation as its primary stages. For the design phase of the intervention products, the intervention design model by Dick *et al.* [16] was utilized. The educational media designed for independent detection of TB transmission risk is Android-based, aiming to present information in a more accessible and engaging manner.

The outcomes of this development process are referred to as artifacts, providing practical solutions to existing problems. This research aimed to integrate computer-based expert systems, particularly in the realm of education and independent TB transmission risk detection. The intervention model underwent field testing using a quasi-experimental design, specifically a two-group pre-test and post-test design with a control group.

This study engaged a sample of 60 individuals from Legok Village, Jambi City, in September 2023. The participants were selected randomly and met the inclusion criteria of having contact with individuals

affected by pulmonary TB and possessing the capability to operate an Android smartphone.

Sample size

A total of 60 students were calculated using Slovin's formula at α=0.05, and the total population was considered to be 71 people. According to Masturoh and Anggita [17], the sample size is calculated using the Taro Yamane formula as follows:

$n=\frac{N}{1+Nd^2}$ n=Number of samples

N=Number of populations

d=Precision

Research tools

The instruments used consisted of a list of questions and observation sheets, which were made by the researcher and were validated and declared appropriate.

Statistical analysis

In component 1, which involved analysis, qualitative data were initially gathered during the initial observation activities, specifically at the needs analysis stage. The analysis phase was constructed from the ground up, often referred to as an inductive approach. Quantitative data analysis was performed univariately to assess the percentages or the extent of issues or indicators under investigation. Quantitative data were collected from individuals who had close contact with TB patients, specifically the data generated during the needs analysis stage. These data were then subjected to descriptive statistical analysis, allowing for a narrative interpretation of the urgency of addressing the identified problems for practical problem-solving purposes.

In the prototype development component, expert validation was qualitatively explained. Subsequently, in the one-on-one trial phase, qualitative analysis techniques, such as the spiral method, were employed to gain insights into product weaknesses and shortcomings.

During small group tests, qualitative data were analyzed to guide further improvements in product quality. Additionally, quantitative data obtained from questionnaires and observations underwent statistical analysis.

In the field test, data were presented descriptively, including frequencies. The t-test was employed to establish a causal relationship between the use of the product and the observed impact.

Findings

Analysis

Based on the 2021 World Health Organization (WHO) report, TB cases reached 10.6 million, marking an increase of 600,000 cases compared to 2020. Of these cases, 6.4 million (60.3%) had received treatment, while 4.2 million (39.7%) had not been found, diagnosed, or reported. The number of deaths due to TB in 2021 reached 1.6 million, representing an increase compared to 2020 when there were 1.3 million deaths. Among these deaths, 187,000 were attributed to TB and HIV co-infections.

Indonesia holds the second-highest position globally in terms of TB cases, following India, and is trailed by China, the Philippines, Pakistan, Nigeria, Bangladesh, and the Republic of Congo. Indonesia reported 969,000 TB cases in 2021, a 17% increase from the 824,000 cases in 2020. The incidence rate of TB in Indonesia stands at 354 cases per 100,000 population. Shockingly, the death rate for TB in Indonesia has reached 150,000 cases, translating to one person dying from TB every 4 minutes. This death rate due to TB has surged by 60% compared to 2020 when it was 93,000 deaths. The TB case fatality rate (CFR) in Indonesia is 55 per 100,000 population. Of the total cases in Indonesia in 2021, only 443,235 (45.7%) cases were identified, leaving 525,765 (54.3%) cases undetected or unreported. In Jambi Province, the estimated number of TB cases in 2021 reached 5,820, with only 3,685 (63.3%) cases found, while 2,135 (36.7%) cases remained undetected, undiagnosed, or unreported.

The presentation of TB data highlights the persistently low number of TB cases in Indonesia, particularly in Jambi. Analysis of this issue is based on empirical data sourced from the WHO's Global TB Report in 2022. The analysis suggests that the limited number of TB cases identified may be attributed to suboptimal TB suspect screening processes, health education services related to TB, as well as negative societal stigmas and misconceptions surrounding TB. It is hypothesized that the primary determinant of the low number of TB cases detected in the community is the limited public knowledge about TB and related matters.

Design and development

The design and development represent a conceptual framework for problem analysis that has been executed and outlined in the form of a prototype for a health promotion model. This prototype aims to enhance the independent detection of the risk of transmission among close contacts of TB patients. The devices are designed and constructed leveraging information technology, utilizing computer hardware and software resources, along with the availability of Internet networks.

In prototype design, meticulous attention is required for message design, encompassing the selection of words, language, visual elements, and audio components. The entire message design process is delineated in the storyboard, serving the primary function of ensuring the effective and efficient conveyance of each message component while establishing a well-structured interaction design.

Prototype development

The prototype development stage was actualized through the creation of a web-based application designed for early detection of TB risk factors within the community, aptly named "Recognize, Record, and Check Tuberculosis" (M-HEALTH). The website's

pages are accessible at https://litmas.poltekkesjambi.ac.id/M Health/ after completing the registration process. Prototype development entailed thorough assessment and validation conducted by experts and practitioners.

Validation of expert

The material validation instrument contains 13 questions related to the content of material on early detection of risk factors for TB in the community (Table 1). The findings from material validation by health promotion material expert validators affirmed that the academic manuscript adhered to the essential content and aligned with the prototype under construction. These expert validators suggested the inclusion of a comprehensive application user manual, providing an in-depth explanation of the application and media development process. In conclusion, the expert validators deemed the educational media for self-detection of TB transmission risk suitable for testing, contingent upon implementing the recommended revisions (Table 2).

The outcomes of material validation conducted by multimedia expert validators indicated that the M-HEALTH application was applicable to society. These experts recommended enhancements to the color settings, emphasizing the need to improve the contrast between text and background to ensure clear visibility of information. As a result, the educational medium for self-diagnosis of the risk of transmission of tuberculosis was found suitable for testing and was pending revision based on the suggestions made.

Practitioner validation

Practitioner validation is conducted to gather practical perspective inputs. The practical viewpoint of the product serves as a bridge between the conceptual perspectives of experts and end-users regarding the product's practicality. The media validation instrument comprised ten questions related to the development of educational media for independent detection of TB transmission risk, titled M-HEALTH (recognize, record, and check for TB) (Table 3).

Table 1. Comments/suggestions on product validity by material expert validators

No	Comment/Suggestion	Revision
1	The utilization of the health belief model and planned behavior theory in the product is apt and aligns with the theoretical construct of behavior development media.	None
2	The elements within the health belief model and planned behavior theory construct correspond to each stage of the intervention.	None
3	The stage involving a sense of vulnerability is linked to the pre-contemplation and contemplation phases of the intervention, fostering the intention to understand the risk of contracting tuberculosis.	None
4	The phase concerning the severity perception is connected to pre-contemplation and contemplation within the intervention, stimulating the intention to grasp the risk of tuberculosis transmission.	None
5	The perceived benefit phase is associated with the pre-contemplation and contemplation stages in the intervention, cultivating the intention to detect the risk of tuberculosis transmission.	None
6	The phase of believing in perceived barriers is tied to the preparation and action stages within the intervention, where close contacts are encouraged to detect the risk of tuberculosis transmission.	None
7	The signal to take action stage correlates with the preparation and action stages in the intervention, generating the desire for close contacts to identify the risk of tuberculosis transmission.	None
8	Within the intention to carry out the behavior stage in the intervention, there are indicators of the ability to prepare for and take action in detecting the risk of tuberculosis transmission.	None
9	Health education content is integrated into the intervention introduction stage, specifically in recognizing the issue of tuberculosis transmission risk among close contacts.	None
10	Health education content is encompassed in the intervention preparation stage, involving the pursuit of information regarding the risk of tuberculosis transmission among close contacts.	None
11	Health education content is embedded in the intervention action stage, entailing the delivery of education about the risk of tuberculosis transmission among close contacts.	None
12	Health education content is featured in the intervention maintenance stage, focusing on providing ongoing education about the risk of tuberculosis transmission among close contacts.	None

Table 2. Comments/suggestions on product validity by media expert validators

No	Comment/Suggestion	Revision
1	The content of the M-HEALTH educational media does not yet align with the core material for detecting the risk of TB transmission.	None
2	M-HEALTH educational media is suitable and easily deliverable.	None
3	Several sections do not conform to the material settings of M-HEALTH.	Review the section according to the M-HEALTH material setting
4	M-HEALTH educational media represents the latest design development.	None
5	The complexity of material presentation still requires refinement.	Review the order of M-HEALTH educational media materials
6	The color composition used in M-HEALTH educational media requires further adjustment.	Review the use of color in M-HEALTH educational media, so that it is more attractive
7	The utilization of images in M-HEALTH educational media is appropriate.	None
8	The selection of fonts in the M-HEALTH educational media displays is appropriate.	None
9	The font size used in the M-HEALTH educational media displays is suitable.	None
10	The compatibility of colors, images, fonts, and backgrounds in M-HEALTH educational media requires improvement.	Review the use of color in M-HEALTH educational media, so that it is more attractive

Table 3. Comments/Suggestions on product validity by the physician validators

No	Comments/Suggestions	Revision
1	The content of M-HEALTH educational media aligns with the substance of material concerning tuberculosis transmission risk detection.	None
2	The formulated learning objectives serve as valuable health education material.	None
3	M-HEALTH educational media proves effective as health education material.	None
4	The material presentation within M-HEALTH educational media engages individuals and enhances their comprehension.	None
5	The material presentation on tuberculosis transmission risk detection is readily comprehensible.	None
6	M-HEALTH educational media systematically presents the material.	None
7	The material within M-HEALTH educational media simplifies the understanding of necessary steps for close contact with tuberculosis patients.	None
8	The coverage of training/skills material within M-HEALTH educational media is comprehensive and accurately reflects the tuberculosis transmission risk.	None
9	The presented material adheres to the principles of innovation. Learning objectives appropriately address tuberculosis transmission risk.	None
10	Learning objectives appropriately address tuberculosis transmission risk.	None

The results of material validation by expert practitioner validators affirmed that the M-HEALTH was highly suitable for practical application. The experts recommended enhancements and further exploration, particularly concerning the potential impact of reduced productivity in suspected TB cases, which is believed to disrupt social and economic conditions. They also suggested focusing on efforts to minimize the risk of TB exposure among infants and toddlers and proposed incorporating screening related to shortness of breath.

In conclusion, expert validation determined that the educational medium for self-diagnosis of TB transmission risk was suitable for testing, subject to revision based on their valuable suggestions.

Subsequently, based on the suggestions and recommendations provided by expert/practitioner validators, improvements were implemented for the application, encompassing both the material content and the application's visual presentation.

Implementation and evaluation

Implementation and evaluation were carried out through the stages of one-on-one assessment, small group assessment, and field trials.

One-to-one assessment

One-on-one evaluation or assessment entails interaction between users and researchers to evaluate the practicality of the product. This assessment was conducted with three close contacts of TB patients in the Putri Ayu Community Health Center area. Its purpose was to assess the ease of use of the M-HEALTH application, identify any obstacles and weaknesses in the application, and gather initial insights into user reactions. The System Usability Scale (SUS) was employed for this assessment. The assessment results are presented in Figure 1. The average assessment using the SUS for the M-HEALTH application yielded a score of 79.17, which falls within grade B (excellent). This interaction between users and researchers successfully unearthed valuable information and user feedback regarding the M-HEALTH application. Users can effectively access and use the M-HEALTH application as a whole.

Small group assessment

The small group assessment was carried out on 15 residents of Sungai Putri Village. The function of small group assessment is as a transition assessment between individual assessment in one-on-one assessments and field trials. The purpose of the small group assessment is to ensure that the M-HEALTH application product can be easily accessed by users or is user-friendly and to assess the temporary impact resulting from the use of the product (Figure 2).

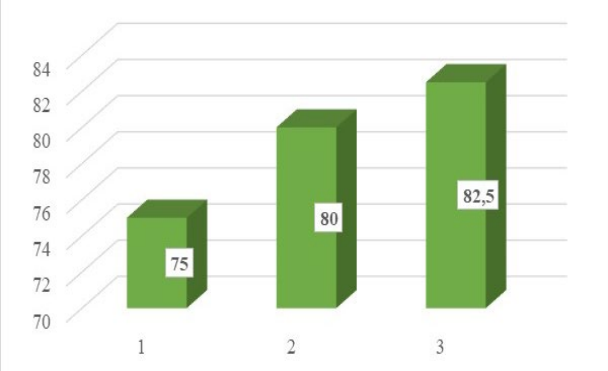

Figure 1. One-on-one assessment of satisfaction in using the application.

The average assessment using the SUS for the M-HEALTH application resulted in a score of 78.33, falling within grade B (excellent). Users are able to independently navigate the application without encountering significant obstacles. This enables individuals to enhance their knowledge and comprehension of TB, conduct self-screening for TB infection risk, and receive guidance and follow-up based on their self-screening results.

Field trials

Field trials were conducted with 35 respondents, who were introduced to the application with instructions based on the latest improvements. The testing primarily aimed to assess the impact and effectiveness of the application's usage within the community (Figure 2).

The average assessment of the M-HEALTH application using the SUS indicated a value of 80.21, corresponding to grade B (excellent). In addition to applying the M-HEALTH application, this stage involved measuring respondents' knowledge both before and after using the application.

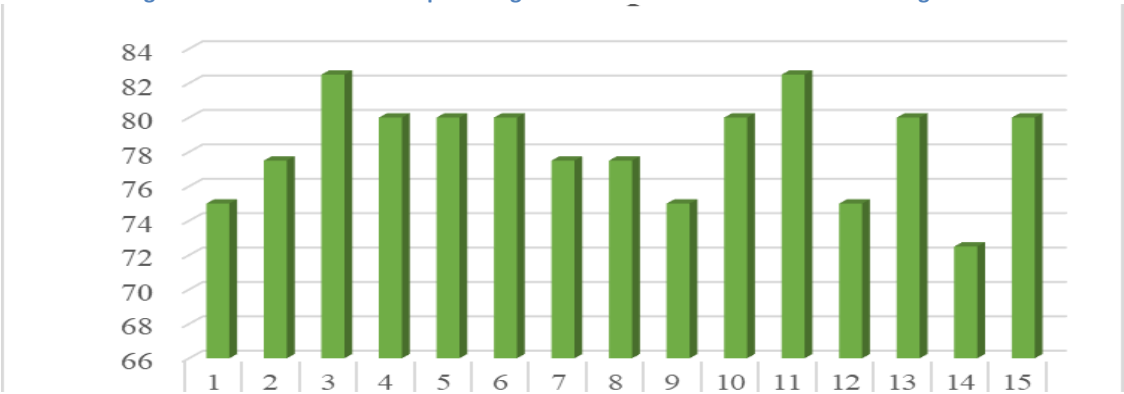

Figure 2. Small group assessment of application use satisfaction.

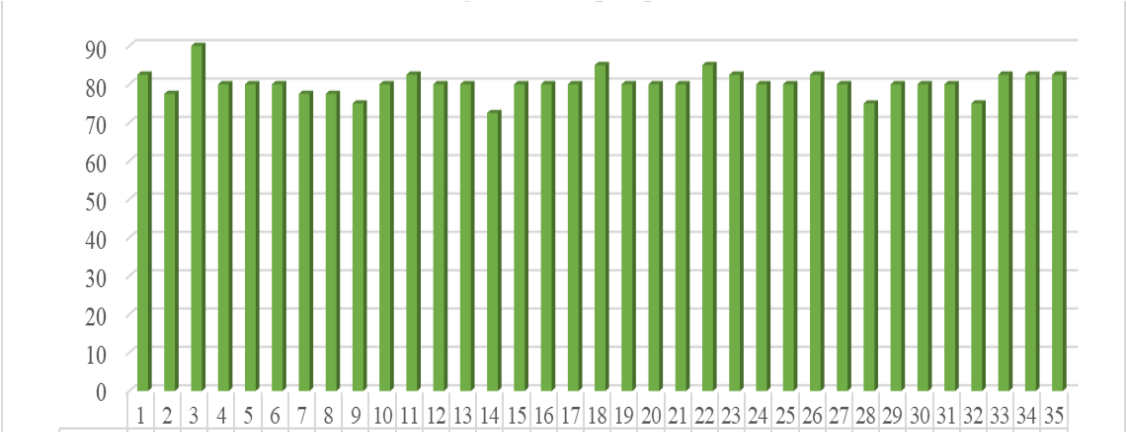

Figure 3. Field trial of application usage satisfaction

The results of the field trial demonstrated a significant increase in respondents' knowledge (9.63) compared to before (7.66) the implementation of the M-HEALTH application. This improvement reflected an average difference of 2.03 (p=0.001).

Discussion

The M-HEALTH application was developed as an educational and independent detection tool for TB transmission risk, following the research and development research approach using the ADDIE model. This process encompasses several stages, beginning with needs analysis, product design, validation for product development, and finally, implementation and evaluation within various test groups. This systematic approach resulted in an educational model and a practical tool for independent detection of TB transmission risk. The M-HEALTH application offers a structured and straightforward usage procedure, making it user-friendly.

The theoretical framework underpinning the development of the M-HEALTH application is the health belief model (HBM), which comprises perceived vulnerability, perceived severity, perceived benefits, cues to action, and self-efficacy. The concept of perceived susceptibility within this framework relates to individuals' beliefs regarding their likelihood of contracting a disease. In this context, the aim is to instill confidence in close contacts that they could be at risk of TB infection. Building this confidence in vulnerability to TB risk requires educational efforts to explain the TB transmission process and the health hazards associated with TB. This factor holds significant influence over individuals' decision-making processes and is a common component in many health behavior theories [18].

It is noteworthy that individuals often hesitate to acknowledge their personal vulnerability to danger, even when they recognize risks faced by others [19]. This observation aligns with the transtheoretical model, particularly at the pre-contemplation and contemplation stages. When there is a lack of confidence in perceived vulnerability, individuals may be in the pre-contemplation stage, signifying no intention to take action. However, after receiving education on the TB transmission process and its dangers, individuals are more inclined to take action, transitioning into the contemplation stage. This finding correlates with research conducted by Pangestika *et al.* [20], where the majority of respondents exhibited good knowledge of TB. Outreach activities effectively educated respondents about the dangers and transmission of TB, leading to increased awareness and potential action.

Application of the theoretical construct of perceived severity relates to people's feelings about the importance of having a disease or not treating it. This includes evaluations of the medical and clinical

consequences, such as death, disability, and pain, as well as potential social consequences, such as how the condition might affect work, family life, and social relationships. When vulnerability and severity are combined, it forms what is often termed a perceived threat. To instill a sense of understanding about the severity of contracting TB, education is vital. This education should encompass information about the health risks associated with TB, as well as data related to TB-related morbidity and mortality. This factor plays a pivotal role in influencing individuals' decisions and is a common element in most health behavior theories [21]. People often hesitate to acknowledge their personal vulnerability to danger, even when they recognize the risks faced by others.

This observation aligns with research conducted by Pangestika *et al.* [20], which focused on educating individuals about preventing the transmission of TB through close contact. The methods employed in this research included situation analysis, such as brainstorming, education, mentoring, and evaluation. The results showed that before the outreach activities, respondents had a knowledge level of only 42.8% regarding TB. After the outreach activities, knowledge about TB increased to 71.4%, knowledge about the mechanism of TB disease transmission increased by 71.4%, knowledge about TB treatment increased by 80%, and knowledge about preventing TB through PHBS increased to 100%. This indicates that the outreach activities were highly effective.

Additionally, research by Datiko *et al.* [20] in Ethiopia, involving 3,505 participants, found that 96% of the participants reported they would seek care at a public health facility if they experienced TB symptoms. Counseling and health education can significantly improve knowledge levels before and after counseling. This increase in knowledge often leads to a subsequent increase in perception levels, which can, in turn, influence behavior in the early detection of TB. This positive behavior change typically persists for at least three months after intervention through counseling [22].

Research conducted by Reviono *et al.* [23] underscores that the initial step in TB control is the identification of TB cases as early as possible. Many informants highlighted that community members were capable of recognizing TB symptoms, such as persistent coughing and weight loss, and determining the need for treatment. They typically sought medical examinations at local community health centers. To enhance the community's ability to identify these needs, the primary strategy for detecting new smear-positive TB cases involves TB education.

The theoretical construct of perceived barriers posits that negative aspects have the potential to be perceived as obstacles to taking action or engaging in recommended behaviors. This involves an implicit cost-benefit analysis, wherein individuals weigh the expected benefits of taking action against the perceived obstacles. In this context, it is essential to comprehend the consequences of not detecting the risk of TB transmission early, along with the substantial benefits, encompassing health, financial, and social aspects that can be attained. At this stage, close contacts already possess knowledge regarding the transmission process, the consequences and impacts of TB, and the advantages of early TB risk detection. Consequently, they are at the contemplation stage, signifying a desire to take action and make preparations. The combined levels of vulnerability and severity provide the impetus for action, while the perception of benefits, without significant resistance, presents a preferred course of action [21-24]. The development of educational media for independent detection of the risk of TB transmission in high-risk groups encourages individuals to openly acknowledge the risk of TB infection at the earliest possible stage. This, in turn, facilitates immediate prevention and treatment. The ultimate goal is to optimally control the rate of TB infection in affected cases.

The educational media for independent detection of the risk of TB transmission was designed in the form of a website, making it easily accessible anytime, anywhere. It is named the M-HEALTH application (recognizing, recording, and checking). This application was designed for effortless access, allowing users to maximize its utility, particularly as a tool for educating and independently identifying the risk of TB transmission in their surroundings. Additionally, the application records user historical data and links it to local health workers. This, in turn, enables regional health administrators to conduct screenings and early risk detection based on the M-HEALTH application's outcomes.

The enhancement of an individual's knowledge is influenced by health messages and information. The limited number of health workers available to provide communication, information, and education poses a significant challenge in disseminating health information and services. Here, health promotion media assumes a crucial role [25]. Utilizing media in health promotion aims to pique interest, simplify the conveyance and reception of health information, reach a wider audience, and encourage the public to share these messages with others. Media plays a pivotal role in shaping an individual's character, behavior, and lifestyle [26].

Numerous studies on technological advancements have emphasized the substantial impact of digital technology on public health services.

The implementation of health interventions through digital technology has proven highly effective in community service [27]. According to Moller *et al.* [28], digital technology-based health interventions offer significant advantages, including improved access to services, enhanced outreach to communities, the transition of health interventions to digital platforms, and new research opportunities to advance health service theories and concepts.

Educational media and independent TB risk detection have been designed and developed using the ADDIE approach. However, the effectiveness of using the M-HEALTH application as a medium for health promotion and education has not been implemented yet.

Conclusion

Engaging health education media that aligns with the content of TB material can enhance public knowledge about TB facts. The outcomes of independent screening for TB transmission risk serve as a database for subsequent TB prevention and control initiatives within the community. Data access is restricted to administrators and authorized individuals to ensure client confidentiality.

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