

MODEL FOR CLEAN HEALTHY LIVING TO IMPROVE TB PATIENTS' QUALITY OF LIFE

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ABSTRACT

Tuberculosis is still a significant public health problem and a global health issue worldwide because it causes high morbidity and mortality rates. Behavioral patterns are one of the factors that cause the spread of the disease to continue to increase. This shows that our community's awareness of maintaining environmental cleanliness is relatively low. The purpose of this study was to determine the model for implementing clean and healthy living behaviors in improving the quality of life of tuberculosis patients in West Lampung Regency in 2025. This research methodology uses Research and Development (R&D), starting from problem analysis, design, model development and implementation. The informants used were 11 informants and a sample of 30 educational implementations. This research was conducted in West Lampung Regency. This research was conducted on February 20-March 10, 2025 using print media. The results showed that the educational media developed was effective in increasing the understanding of TB patients, with a significance value of $p = 0.000 (<0.05)$. Print media is compiled based on ten TB-specific PHBS indicators, including correct coughing behavior, mask use, safe phlegm disposal, hand washing habits, home ventilation, sunlight exposure, medication compliance, contact checks, socializing ethics, and family education. Although the media has proven effective, challenges such as budget constraints and sustainability of education still need attention. Suggestions are expected to strengthen cross-sector coordination to ensure more intensive and sustainable implementation of PHBS education to support the success of TB control.

Keywords: quality of Life; PHBS; tuberculosis patients

INTRODUCTION

Clean and healthy living behavior (PHBS) is a set of behaviors that are practiced on the basis of awareness as a result of learning that makes a person, family, group or community able to help themselves in the field of health and play an active role in realizing the health of the community (Ernyasih, 2020). Basically, patients know about PHBS, but this knowledge is only limited to understanding which has not been maximized in its application. Thus, it is necessary to increase awareness as a basis for the practice of PHBS. (Asfiya, 2021). Health promotion media is a means of displaying information through print, electronic and outdoor media, so as to increase knowledge to the target which is then expected to be a good behavior change in the health sector (Sutrisno & Sinanto, 2022).

According to the 2023 Indonesian Health Profile, 543,874 tuberculosis (TB) cases were identified, showing a decrease compared to 566,623 cases in 2018 (RI, 2023). In Lampung Province, the Case Detection Rate (CDR) for TB increased from 25% to 54% between 2017 and 2019 but still fell short of the national target of 70% (Lampung Provincial Health Office, 2023). In West Lampung Regency, 2023 data show that out of a target of 1,151 cases, 476 were detected and treated. Of these, 102 patients recovered, 129 completed treatment, 3 died, and 235 either moved or were not evaluated (Lampung, 2023). In 2022, TB cases in West Lampung continued to rise, with 426 confirmed cases (253 male and 173 female) out of 3,419 suspected samples tested. The

TB mortality rate was 0%, with a treatment success rate of 0.9%. A total of 26 TB cases were reported in children aged 0–14 years (Barat, 2022).

According to the World Health Organization (WHO), tuberculosis (TB) remains one of the world's deadliest infectious diseases. Every day, nearly 4,400 people die from TB, and around 30,000 fall ill with this preventable and curable disease. Global efforts have saved approximately 74 million lives since 2000. However, the COVID-19 pandemic, along with ongoing conflicts in Europe, Africa, and the Middle East, and socioeconomic inequalities, have reversed years of progress and placed a greater burden on vulnerable populations. WHO's latest Global TB Report revealed that, for the first time in over a decade, estimated TB cases and deaths have increased. In 2021, Indonesia reported 969,000 TB cases and 144,000 TB-related deaths. The existence of this disease certainly has a great impact on the community environment such as: the relationship built in the community in the form of interaction between communities that continues to decline, the level of disease sufferers is increasing, even due to the understanding that is still built by the community will hinder the resolution of the transmission of Tuberculosis disease (Ergenes, 2024).

Quality of life is also a value given in life that is modified by the presence of disease, functional status, and the level of individual circumstances within the scope of abilities, limitations, symptoms and psychosocial attitudes to function in various desired roles in society and be satisfied with these roles (Avelina & Natalia, 2020). Therefore, good care will help speed up healing. However, if care is not good, there is a risk of transmission to other family members (Ernyasih, 2020).

According to the World Health Organization, (2023) there are four key domains used to assess an individual's quality of life, each with specific aspects (Fauziyah et al., 2023). The physical health domain includes energy and fatigue, pain and discomfort, sleep and rest, mobility, daily activities, dependence on medication and medical aids, and work capacity. The psychological domain covers body image and appearance, negative and positive feelings, self-esteem, thinking, learning, memory and concentration, as well as spirituality, religion, and personal beliefs. The social relationships domain includes personal relationships, social support, and sexual activity. The environmental domain encompasses financial resources, freedom, physical safety and security, access to healthcare and social care, home environment, opportunities for acquiring new information and skills, participation in leisure activities, and physical environment factors like pollution, noise, traffic, and climate.

Additional supporting factors for successful TB treatment include avoiding smoking and alcohol consumption, maintaining a healthy lifestyle, ensuring proper nutrition, and strengthening immunity. Healthy behaviors that should be practiced include not spitting in public, consistently wearing a mask, limiting close contact with family members, and maintaining a balanced diet. Based on the survey results, many people still lack understanding of personal hygiene, contributing to the continued spread of tuberculosis. Therefore, more education from both national and local governments is needed. Interviews with 10 individuals revealed that 6 of them experienced fatigue, discomfort, poor sleep, limited mobility, dependence on medication, and reduced work capacity. Poor hygiene practices were also noted, such as not wearing masks and spitting carelessly. Although health education activities, particularly on tuberculosis, have been conducted, they have not been fully effective—many people remain affected and struggle to consistently practice clean living habits.

Interviews with five TB program officers showed that all agreed on the need for educational media to improve the quality of life for TB patients. Based on these findings, the researcher is interested in conducting a study titled "Model for Implementing Clean and Healthy Living Behavior to Improve the Quality of Life of Tuberculosis Patients in West Lampung Regency, 2025." This initiative also aims to support the local government's efforts in controlling TB transmission in the region.

METHODS

The study used the R&D (Research and Development) method with the ADDIE model, which includes the stages: analysis, design, development, implementation, and evaluation. The flow of the ADDIE process is; Analysis of TB incidence rates and literature studies, draft design. Use of the draft, evaluation of results. A total of 41 informants consisted of health workers, policy makers, heads of puskesmas, program holders, and patients. The study was conducted in West Lampung District on February 20 - March 10, 2025. The media used was the PHBS booklet to improve the quality of life of tuberculosis patients. Data were collected through FGDs, in-depth interviews, observations, and document studies. The instruments used in this research are interview guidelines, SUS (System Usability Scale) questionnaire, checklist sheet, and PHBS education draft. This study also conducted validity and reliability tests.

RESULTS AND DISCUSSION

Analysis Stage

This study employed a qualitative descriptive analysis approach and used purposive sampling, involving 30 pulmonary TB patients. Respondents showed strong enthusiasm toward the educational media. Each participant was informed about the study and signed an informed consent form before data collection and analysis. The research instrument was an educational media about Clean and Healthy Living Behavior (PHBS), developed by the researcher with input from content experts, language experts, and presentation experts. TB cases in Indonesia (2023): 543,874 cases, a decrease from 566,623 cases in 2018. In Lampung Province (2017–2019): Case Detection Rate (CDR) increased by 25%–54%, but still below the 70% target. In West Lampung Regency (2023): Out of 1,151 target cases, 476 were detected and treated (102 recovered, 129 completed treatment, 3 died, and 235 were transferred or unevaluated). In 2022: 426 TB cases (253 male, 173 female), 3,419 samples tested, 0% mortality, 0.9% success rate, and 26 cases in children aged 0–14 years. Some important aspects of the initial PHBS design: (1) Problem identification, (2) Goal creation, (3) Strategy determination, (4) Indicator determination, and (5) Target determination.

The following is an informant quote as the head of the district health office of Lampung Barat about Who are the public health centre staff responsible for monitoring the treatment of tuberculosis patients at the public health centre?

"Tuberculosis (TB) treatment monitoring at Puskesmas in Lampung Barat is conducted through an integrated approach by a team consisting of doctors, TB program officers, laboratory staff, nurses, health promoters, and health cadres. The process begins with initial diagnosis and patient registration in the TB register and SITB system. Patients receive education on treatment adherence and potential side effects. A Treatment Supervisor (PMO), who may be a family member, health cadre, or health worker, monitors daily medication intake. TB officers conduct regular follow-ups and sputum examinations in the 2nd, 5th, and 6th months. Non-adherent patients are

tracked to prevent treatment failure. The entire program follows national standards, with routine reporting to the District Health Office, and supports Indonesia's National TB Elimination Strategy 2020–2024 through the DOTS strategy, digital systems, and multi-sector collaboration”

The following is a statement from a doctor as an informant regarding What are the medical and non-medical equipment or supplies needed to manage tuberculosis patients?

“TB management requires medical tools like microscopes, sputum containers, PPE (N95 masks, gloves), weighing scales, and TB drugs. Non-medical items include TB registers, SITB system, reporting forms, and designated service rooms. During home visits, health workers carry necessary supplies for treatment, data recording, and patient education. However, education is mostly verbal, with limited printed or digital materials. Facilities support prevention through good ventilation, isolation rooms, PPE, handwashing stations, and educational posters. All tools aim to ensure proper care, minimize transmission, and support accurate reporting”

The following is a nurse's statement regarding how tuberculosis is managed?

“Tuberculosis (TB) management follows national guidelines from diagnosis to prevention. It begins with case detection through symptom screening and sputum tests (microscopy or TCM). Diagnosed patients are classified and educated about TB, its transmission, and treatment adherence. Anti-TB drugs (OAT) are administered under the DOTS strategy, supervised by health workers or PMOs. Patients are monitored through regular visits, and all data are recorded in TB registers and SITB. Contact tracing and cough etiquette education

The following is a statement from the head of the public health center regarding the tuberculosis program budget?

“TB management at Puskesmas is funded through operational support like BOK, covering home visits, PPE, education materials, and SITB reporting. However, funding varies, and challenges include limited budgets, delayed disbursement, and misalignment with field needs. These issues hinder effective TB care, especially during home visits. Adequate and timely funding is essential for program success”

What are the following statements from community health center program holders regarding barriers to the implementation of tuberculosis patient management?

“Budget limitations often hinder TB program implementation at Puskesmas. Available funds are frequently insufficient to support key activities like contact tracing, home visits, PPE, educational materials, and staff training. Delayed fund disbursement further disrupts field operations. In many cases, budget allocations do not match actual needs, forcing staff to adjust or self-fund activities. Home visits are often underprioritized, affecting their effectiveness. These challenges highlight the need for adequate and timely funding to ensure the success and sustainability of TB management programs.”

The following is a statement from a tuberculosis patient regarding whether the officer provides education?

“TB education is mostly delivered verbally during home visits or clinic visits, covering transmission, prevention, and treatment adherence. Printed or digital educational materials are rarely distributed due to limited resources. Health workers explain Clean and Healthy Living Behavior (PHBS) in simple language, emphasizing hygiene, mask use, cough etiquette, and

ventilation. They also supervise treatment 2–4 times a month, especially during the intensive phase, and conduct home visits when needed”

In this stage, the researcher designed the educational media based on the results of the situational analysis. The design involved planning additional materials and instruments to be included, tailored to the users' needs. The outcome was an updated educational media in the form of a tuberculosis patient handbook, featuring the latest content. This updated version included supplementary material on Clean and Healthy Living Behavior (PHBS) to improve the quality of life of TB patients. The handbook covers key topics such as TB transmission, treatment, prevention, and care. The material presented in the educational media in the form of a PHBS book on the management of tuberculosis as follows TB transmission, TB treatment, TB prevention and TB treatment. Determine the form of educational media to be used (educational pocket book). Adding 10 indicators of PHBS; Covering the mouth when coughing or sneezing, Using a mask when interacting, Not disposing of phlegm carelessly, Wash hands with soap after coughing/sneezing or contact with sputum, Good home ventilation, Adequate exposure to sunlight in the house, Adherence to taking TB medication regularly and completely, Routine examination of household contacts, Applying socializing ethics, and Family education about TB

Here are some additional indicators that can complement your list of TB indicators for more comprehensive monitoring and management of TB patients: Monitoring for side effects of TB drugs, Psychosocial support for TB patients, Accurate reporting and recording of TB cases, Implementation of regular home visits, Use of personal protective equipment (PPE) by health workers, Monitoring of the patient's clinical condition, Availability and affordability of TB drugs, Community involvement in TB prevention, Implementation of TB screening in high-risk groups, Management of medical waste from TB patients.

Development Stage

Based on the situation analysis and evaluation of existing educational materials, it was found that specific information on Clean and Healthy Living Behavior (PHBS) for tuberculosis patients is still lacking. Many patients do not fully understand the importance of PHBS in preventing TB transmission to family members. Health workers also noted the absence of practical and easy-to-apply PHBS guidance in current materials. This highlights the need for updated educational content that focuses on PHBS to support both prevention efforts and treatment success.

The additional educational material was developed to raise TB patients' awareness of the importance of Clean and Healthy Living Behavior (PHBS) in preventing transmission and supporting recovery. It aims to encourage consistent healthy habits during treatment, enhance patient knowledge of PHBS practices relevant to TB, promote positive behavior changes in daily life, and help prevent the spread of TB within households and the community.

The additional material emphasizes Clean and Healthy Living Behavior (PHBS) in TB care, focusing on five key areas: transmission, treatment, prevention, care, and healthy habits. It highlights the importance of wearing masks, proper cough etiquette, regular medication adherence, good ventilation, safe sputum disposal, handwashing, balanced nutrition, adequate rest, and maintaining hygiene. The goal is to improve patient awareness, support recovery, and prevent TB transmission at home and in the community. Based on the suggestions and improvements shown in the table, several revisions were made to enhance the educational material. These included

refining the quality of the images, correcting spelling and word usage according to the official Indonesian language guidelines, and adding song lyrics to make the material more engaging. Additionally, the book size was adjusted to a smaller format (10 x 8 cm), with a glossier cover that includes institutional logos and author information. Finally, the content was revised to ensure better integration between core and supporting materials. The additional educational material was validated by four doctors from Puskesmas in West Lampung Regency. Validation was conducted in February 2025 by three experts: a content expert, a language expert, and a presentation expert. Each validation session was held at the expert's residence and involved completing an evaluation form matched against the educational booklet. The results confirmed that the material was appropriate for use and aligned with health communication principles, PHBS guidelines, and TB management standards. A suggestion was given to include practical tips that patients could easily apply at home. The additional PHBS content has been integrated into the revised version of the TB educational media, featuring a new layout. The material is placed after the TB treatment section to serve as daily practices for patients at home. A summary titled "5 Healthy Steps to Live with TB" is also included at the end as practical guidance.

Implementation Stage

Tabel 1.
Respondents' Knowledge Level after Health Education
in West Lampung Regency in 2025

No	Knowledge	n	Mean	Min	Max	Sdt. Deviation
1	Post Intervention	15	93,3	84,6	100	6,38
2	Post Control	15	48,2	30,8	61,5	8,42

The assessment results show that the average knowledge score in the intervention group after receiving education was 93.3% (categorized as good), with a minimum score of 84.6% and a maximum of 100%, both also classified as good. In contrast, the control group had an average score of 48.2% (poor knowledge), with a minimum of 30.8% (poor) and a maximum of 61.5% (fair).

Tabel 2
Effect of educational media on respondents' knowledge

Kelompok	N	Mean	Sig. (2-tailed)
Intervention	15	93,5	0,000
Control	15	48,2	

Based on the Paired Samples Test showed a p-value of 0.000 (< 0.05), indicating that H_a is accepted. This means the PHBS educational draft media significantly affected the knowledge of tuberculosis patients in West Lampung Regency in 2025.

This study employs a qualitative descriptive analysis technique to validate the educational media. Purposive sampling was used to select a sample of 30 pulmonary tuberculosis (TB) patients. The research instrument consisted of educational media regarding clean and healthy living behavior (PHBS), which had been developed and validated by subject matter, language, and presentation experts. Nationally (in Indonesia), the number of TB cases declined from 566,623 in 2018 to 543,874 in 2023 (Ministry of Health of the Republic of Indonesia, 2023). In Lampung Province, the tuberculosis case detection rate (CDR) rose from 25% in 2017 to 54% in 2019, yet it has not reached the 70% target (Lampung, 2023). West Lampung Regency reported 476 TB cases in 2023

against a target of 1,151. In 2022, there were 426 cases, with a mortality rate of 0% and a treatment success rate of 90% (West Lampung Regency Health Office, 2023).

TB management in West Lampung Regency is generally effective in education and treatment, but faces challenges in mask use education and budget availability. Strengthening PHBS education and ensuring adequate preventive facilities, especially masks, is needed. Aspects of the physical health domain include energy and fatigue, pain and discomfort, sleep and rest, mobility, daily activities, dependence on medication and medical assistance and work capacity. Good physical health and mental health, in addition to high levels of physical activity and the absence of non-communicable diseases, have been shown to significantly improve the quality of life of older people. (Ichsan & Alfridsyah, 2022). Aspects of the psychological health domain include body image and appearance, negative feelings, positive feelings, self-esteem, thinking, learning, memory and concentration and religion/spirituality and personal beliefs.

Tuberculosis is a pulmonary infectious disease caused by microbacterium tuberculosis that is transmitted through the air with saliva droplets from one individual to another, and forms colonization in bronchioles or alveoli. If a large number of tuberculosis viruses manage to penetrate the respiratory defense system and successfully colonize the lower airway, the body will mount an immune response and strong inflammation will occur. Due to this severe response, mainly mediated by T-cells, only about 5% of people exposed to the bacillus will develop active tuberculosis. Only individuals with active TB can transmit it to other individuals. (Sabina & Mariana, 2015)

In this stage, the researcher designed educational media based on the previously conducted situation analysis. The analysis served as the foundation for developing a specialized educational tool for tuberculosis patients. The design process included planning additional content and determining the appropriate media format, tailored to the needs and characteristics of TB patients. The outcome was a pocketbook containing updated and relevant information. This educational media is an improved version of the previous one, enriched with new content on Clean and Healthy Living Behavior (PHBS) to enhance the quality of life of TB patients. Education, also known as education, is any planned effort to influence others, whether individuals, groups, or communities, so that they do what is expected by the perpetrators of education. (Notoatmodjo, 2018). Education is a process of learning from not knowing about the value of health to knowing, Education is a very important need for human life, it should be an effort in developing education systematically and quality needs to be continuously pursued, so that the objectives of the educational process can be achieved optimally.

Print media is a term that is often used for the general term of media derived from printed matter. Text-based learning has been recognized since the 1960s. Over time, text-based media became more interactive. Various ways are used to attract attention to text-based media such as color parts, letters and boxes. Print media can be used as a tool to convey health messages, some examples include booklets, leaflets, flyers, flipcharts, posters, photos and illustrated stories. Booklet is a medium for conveying health messages in the form of books in the form of both text and images. Leaflet is a medium for delivering information in the form of a folded sheet of paper, while flyer is a sheet that does not have folds Flip chart is a media in the form of a book but has a flip sheet. Posters are printed media containing messages or health information that are generally affixed to walls, public places or public vehicles, while photographs are two-dimensional media.

(Notoatmodjo, 2018)

During the development stage of the educational media, specific additional material on Clean and Healthy Living Behavior (PHBS) for tuberculosis patients was successfully created. This material was based on identified informational needs, highlighting patients' limited understanding of PHBS in preventing TB transmission and supporting recovery. The content focused on transmission, treatment, prevention, care, and practical application of PHBS. Language and visuals were adjusted to improve appeal and comprehension, and expert validation confirmed the material as appropriate and in line with health guidelines. The PHBS content was integrated into a redesigned pocketbook format, making it a more effective educational tool. This media aims to raise awareness and encourage positive behavioral changes, ultimately supporting the success of TB management through consistent PHBS practices by patients. Development, in general, is the process of improving something that already exists for the better, or creating something new. It involves improving the quality, usefulness, and application of science and technology, and can include product, process, or design development (Notoatmodjo, 2018).

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*, primarily affecting the lungs. It spreads from person to person through droplets from the throat and lungs of individuals with active respiratory TB. The main source of transmission is patients with smear-positive pulmonary TB (BTA+). Transmission occurs because infected individuals cough, sneeze and talk so that the bacteria come out in the form of droplets in the air (Ratna et al., 2023). Quality of life is the main target to be achieved in the field of development so that the quality of life is in line with the level of welfare. The more prosperous the higher the quality of life, one of which is influenced by the degree of health. The higher the degree of one's health, the higher the quality of life (Carolina & Aziz, 2019). Clean and Healthy Living Behavior (PHBS) is a set of behaviors that are practiced on the basis of awareness as a result of learning, which makes a person, family, group or community able to help themselves (independently) in the health sector and play an active role in realizing public health. (Kartika et al., 2021). Thus, PHBS includes hundreds and maybe even thousands of behaviors that must be practiced in order to achieve the highest degree of public health. Hundreds or even thousands of behaviors, the Health Office takes ten points or behaviors to indicate the minimum degree of assessment of whether the household is PHBS or not. Households with PHBS, has been modified from the one made by the health office for tuberculosis patients.

The results show that after receiving education, the average knowledge score was 93.3% (good), with a minimum of 84.6% and a maximum of 100%. In contrast, the control group had an average score of 48.2% (poor), with a minimum of 30.8% and a maximum of 61.5% (fair). Statistical analysis using the Paired Samples Test showed a p-value of 0.000 (<0.05), indicating a significant effect of the PHBS educational media on TB patients' knowledge in West Lampung Regency in 2025. Health education for health cadres also proved effective in increasing knowledge, supporting the development of TB-aware communities to help reduce TB incidence. Information, disease prevention, and campaigns all depend on communication, awareness and public obligation to health education and health promotion both individually and as a whole. It is hoped that increased knowledge can increase public awareness to always follow clean and healthy living behaviors, so that diseases can be prevented. (Candrawati et al., 2023).

Personal hygiene is self-care that is done to maintain health. Maintaining optimal personal hygiene is impossible without the cultivation of clean living attitudes and role models from parents or the community. The definitions above can be concluded that personal hygiene is an activity or act of cleaning all members of the body which aims to maintain one's cleanliness and health. (Firmansyah & Zannati, 2022). Quality of life is an individual assessment of the health conditions that are being experienced. quality of life can be defined as a conceptual measure to assess the impact of a therapy carried out on patients with chronic diseases. The measurement includes well-being, survival, and a person's ability to independently carry out daily activities and activities. Quality of life according to the World Health Organization Quality Of Life or WHOQOL can be defined as an individual's perception of their position in life where in the context of culture and value systems they have a goal, expectations and standards in life. (Avelina & Natalia, 2020).

TB patients can prevent transmission by covering their mouths when coughing or sneezing, as millions of TB germs can be released into the air through droplets. Sputum should be disposed of in a closed container to prevent the spread of bacteria. Clean and healthy living behaviors (PHBS), such as drying bedding under the sun, opening doors and windows each morning to allow sunlight and fresh air in, and maintaining good air circulation indoors, are essential to reduce the number of germs and support TB prevention efforts. Another important thing to do is to avoid smoking or becoming second-hand smoke. (Kementrian Kesehatan Republik Indonesia, 2022). Health education has strong potential to address many challenges in TB prevention and care at individual, community, and health system levels. However, demonstrating its effectiveness in reducing the global TB burden remains essential. According to the Directorate General of Disease Prevention and Environmental Health (P2MPL), the incidence of pulmonary TB remains high, and public knowledge is still lacking. The Indonesian Ministry of Health (2019) also reported that public understanding of pulmonary TB in Indonesia remains low. According to Damanik et al. (2023), there is a significant correlation between knowledge and efforts to prevent the transmission of pulmonary tuberculosis. This can be interpreted as the hypothesis H_a is accepted and H_0 is rejected, so knowledge has a relationship with efforts to prevent transmission of pulmonary tuberculosis. The use of PHBS-based educational media has proven effective in increasing tuberculosis patients' knowledge. Therefore, this intervention is suitable to be integrated into TB education programs in West Lampung Regency and other high-burden TB areas.

CONCLUSIONS

Health education in West Lampung effectively improved TB patient knowledge through a PHBS-based pocketbook. The media, validated by experts, enhanced understanding of TB prevention and care. Despite its success, challenges in funding and preventive behavior remain. Strengthened coordination and continued support are needed for optimal TB control.

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