



## EFFECTIVENESS OF BOOKLET MEDIA TO IMPROVE KNOWLEDGE OF PULMONARY TUBERCULOSIS PATIENTS IN SOUTH CIMAHU COMMUNITY HEALTH CENTER

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### Abstract

Pulmonary Tuberculosis (TB) is a chronic infectious disease caused by *Mycobacterium tuberculosis*, primarily transmitted through coughing or sneezing. Despite various interventions, TB remains a global health challenge. In response, the Indonesian Ministry of Health launched the TOSS TB (Find TB, Treat Until Healed) program to enhance detection, diagnosis, treatment, monitoring, and prevention efforts. This study aims to determine the effectiveness of booklet media in improving the knowledge of pulmonary TB patients at the Cimahi Selatan Health Center. A pre-experimental design with a one-group pretest-posttest approach was employed. The study involved 20 respondents selected using purposive sampling, based on inclusion criteria. Data were collected using a 20-item questionnaire aligned with the booklet's content. Statistical analysis was conducted using Fisher's Test. The results showed a significant increase in knowledge, with a p-value of 0.009 ( $< 0.05$ ), indicating that booklet media significantly improved patient knowledge. The effectiveness ratio was calculated at 2.5, suggesting that participants who received health education via the booklet demonstrated 2.5 times higher knowledge gains compared to those who did not. In conclusion, booklet media is an effective educational tool to enhance the knowledge of pulmonary TB patients. It is recommended as a sustainable health promotion intervention to support TB control programs, especially in primary healthcare settings.

## What is already known

Pulmonary tuberculosis (TB) remains a major health problem in Indonesia, with a high incidence rate and major challenges in terms of patient compliance with treatment. Good patient knowledge about TB plays a significant role in the success of therapy and prevention of transmission. Previous studies have shown that health education can improve patient understanding and compliance, where printed media such as booklets have been used as effective educational tools because they are easily accessible, can be read repeatedly, and are adjusted to literacy levels. However, most previous studies have not specifically evaluated the effectiveness of booklets developed and implemented in primary health care facilities such as Puskesmas, especially in areas with unique socio-cultural contexts such as South Cimahi. This indicates the need for further research to fill this gap and assess the extent to which booklet media can significantly improve TB patient knowledge at the local level.

## What this paper adds

This study provides a new contribution by showing that booklet media designed contextually and adjusted to patient characteristics in the South Cimahi Health Center area is effective in increasing patient knowledge about Pulmonary Tuberculosis. This finding adds empirical evidence that print-based educational interventions are still relevant and reliable in primary health care, especially in areas with literacy challenges and limited access to digital information. In addition, this study fills a gap in previous literature that has not discussed much about the effectiveness of booklets in the local context, and provides a basis for developing more targeted and community-based health communication strategies.

## 1. Background

Pulmonary tuberculosis infection is still a global problem. This disease is caused by the microorganism *Mycobacterium Tuberculosis*, which is usually transmitted from person to person through coughing or sneezing. Coughing can produce around 3,000 mucus droplets, talking can spread 200 bacteria and sneezing can spread 4,500 to 1,000,000 bacteria contained in the droplets. Untreated pulmonary tuberculosis can have an impact on families and communities and cause death. Knowledge of preventing the transmission of pulmonary tuberculosis can be increased through health education using booklet media (Apriani, 2024). Serious treatment is needed for pulmonary tuberculosis which is the second largest health problem in the world after the HIV virus (Human Immunodeficiency Virus). Tuberculosis or better known as Pulmonary TB is an infectious disease caused by the *Mycobacterium Tuberculosis* germ which enters the body through breathing. Tuberculosis is an infectious disease that can attack various organs, especially the lungs (Ummah, 2019).

According to WHO (World Health Organization) in 2022, pulmonary tuberculosis was ranked 2nd as one of the main causes of death globally, after Covid-19. WHO reported that the number of cases of Pulmonary Tuberculosis globally reached 10.6 million cases, an increase of around 300,000 cases from 2021. The death toll from Pulmonary TB recorded 1.3 million people. The decline in the number of deaths globally from Pulmonary TB from 2015 to 2022 was 19%, this data is the achievement of WHO's final Pulmonary TB strategy which states a decline of 75%. Indonesia itself is ranked 2nd in the world with the highest number of Pulmonary TB sufferers after India in 2022. The number of Pulmonary TB cases in Indonesia reached 10% of cases. Thirty countries with the highest Pulmonary TB burden contributed 87% of Pulmonary TB cases in the world in 2022 and two-thirds of the global total occurred in eight countries including Indonesia (Kurniadi et al., 2024).

The Ministry of Health of the Republic of Indonesia (2020) reported that the tuberculosis case detection rate or CDR (Case Detection Rate Tuberculosis) in Indonesia has decreased in 2019. The number was 67.2% in 2018 and 64.5% in 2019, but only 42.8% compared to 2017. Although the number of pulmonary tuberculosis cases continues to increase, the case detection rate (CDR) in Indonesia is still far below the WHO recommended

standard, which is more than 90%. According to province, only West Java 96.2% and Gorontalo 94.6% achieved a CDR above 90% in 2019, while South Sumatra reached 58.5% (ranked 13) (Ministry of Health, 2020) (Nopita, Suryani and Siringoringo, 2023). Based on data from the Cimahi City Health Office, until July 2024, notifications of new TB cases reached/1140 cases, or 56.7% of the target of 3,775. The discovery of suspected TB is still low, only 46.5% of the target, namely 8,531 out of 18,346 suspects who have received standard services. (CIMAHI, no date) According to data from the Health Office, the South Cimahi Health Center ranks 2nd in the number of suspected Pulmonary TB cases who received standard services, as many as 555 cases.

Pulmonary tuberculosis caused by the microorganism *Mycobacterium tuberculosis* can be caused by several factors including environmental factors (population density and poverty, unhealthy air quality/high air pollution, damp conditions of the house and its surroundings, lack of ventilation and sunlight), behavioral factors (smoking, excessive alcohol consumption, poor healthy living behavior), low nutritional status, low economic status, comorbidities (HIV/AIDS, diabetes mellitus, lung diseases such as COPD (chronic obstructive pulmonary disease), asthma, and malnutrition), special conditions (pregnant women, the elderly and children). *Mycobacterium tuberculosis* bacteria can enter the bloodstream and cause serious complications in many organs of the human body other than the lungs. The most common complications of pulmonary tuberculosis include brain damage, impaired vision, bone and joint damage, liver damage, kidney damage, and heart damage (EMC Health care, 2020).

Pulmonary TB management is carried out by administering anti-tuberculosis drugs (OAT) regularly and completely according to a doctor's prescription. Patients also need to undergo periodic evaluations, namely BTA sputum examination at the end of the intensive phase and the end of treatment, and the doctor will monitor the patient closely to ensure that all doses of antibiotics are consumed. Other interventions in the management of Pulmonary TB include airway management, mucus suction, oxygen therapy, effective coughing and breathing exercises (Alomedika, 2023).

The tuberculosis prevention program run by the Indonesian Ministry of Health as part of health promotion efforts is health education, including the TOSS TB education campaign (Find Pulmonary TB, Treat Until Cured), community education, mobilization of early detection of Pulmonary TB, integration of prevention and treatment services for Pulmonary TB, cross-sector collaboration, increasing the role of the community in eliminating the stigma against Pulmonary TB patients, and the free Pulmonary TB 13 @workplaces program (Indonesian Ministry of Health, 2024). Health education requires educational media such as print media, electronic media and outdoor media to be more effective. Social media can also be used for health education (Airlangga, 2021). The printed media used in this study was a booklet because it has the advantage of being able to be stored, targets can be adjusted and self-study, more complete narratives with attractive pictures and the contents of the book are in accordance with core competencies and basic competencies (detikedu, 2023a).

Research conducted by Utaminingrum et al (2018) on the effectiveness of booklet media to improve the knowledge of pulmonary tuberculosis patients showed that booklet media is effective in improving the knowledge of pulmonary tuberculosis patients. (Wahyu Utaminingrum, Nauval Muzzaki and Much Ilham Novalisa Aji Wibowo, 2018) Research conducted by Hanye et al (2023) on the effectiveness of health education using booklet media in pulmonary tuberculosis patients showed that booklet media is effective in improving the knowledge of pulmonary tuberculosis patients. (Hanye, Pramono and Nulhakim, 2023) Research conducted by Alfian et al (2023) on the effectiveness of health promotion media through booklets showed that booklets improve the knowledge of tuberculosis patients (Rachmatjaya, 2023) Based on the results of a preliminary study that researchers have conducted by collecting initial data from the South Cimahi Health Center, the data obtained from the last five months obtained 33 people with pulmonary tuberculosis. During interviews with 10 respondents, 7 respondents

did not know much about pulmonary TB disease, and there were 3 respondents who knew about pulmonary TB.

According to Nola J. Pender's nursing theory, the "health promotion model" is a health behavior, which is the result of actions taken with the aim of achieving optimal health outcomes. Health promotion is an action motivated by the desire to improve well-being and realize human health potential. This is because the concept of nursing services has evolved from a curative model to prophylactic and preventive actions (Purwatyningsih and Nursanti, 2024). Nola J. Pender's theory of the health promotion model is closely related to this study because its focus is on changes in lifestyle, disease prevention behavior, motivation, attitudes, and the beginning of better behavioral changes. Based on this phenomenon, the researcher is interested in conducting a study entitled "The Effectiveness of Booklet Media to Increase Knowledge of Pulmonary Tuberculosis Patients".

## 2. Methods

The type of research used in this study is quantitative research using a pre-experimental research design with a one group pre-post test design. This type of research is to reveal a causal relationship with a research method involving one group of subjects measured before and after treatment. The population in this study were all Pulmonary TB patients at the South Cimahi Health Center who were registered at the DOTS (Directly Observed Treatment, Short-Course) polyclinic with a population of 33 people in the last five months at the South Cimahi Health Center. The sample size in this study was 20 people with a purposive sampling technique, because of the 33 people there were 11 people under the age of 10 and for that age were not used as samples because their reading and understanding abilities were not good enough besides 2 people who refused to be respondents. The research instrument used was a questionnaire from several researchers, namely those conducted by A. Yuda in 2018, Pamungkas in 2023, O. Halawa in 2019, N. W. A. Ekastuti in 2022, and C. I. Bisallah et al. which had been modified by the researchers in accordance with the research objectives and theoretical concepts that had been prepared.

Before the intervention, the researcher collected data on respondents' knowledge before being given education (pre-test), using instruments provided by the researcher. The intervention was given using the health education method, using booklet media about Pulmonary TB to improve patient knowledge at the Cimahi Selatan Health Center, accompanied directly by TB patients at the Cimahi Selatan Health Center DOTS polyclinic. Only 14 respondents were present at the data collection at the Cimahi Selatan Health Center, therefore the researcher conducted door to door visits to 6 respondents who were accompanied directly by RW 12 cadres. The post-test was conducted immediately after the intervention was completed. The statistical test used to see the relationship between the independent variable and the dependent variable was the chi square statistical test. Then, to see the effectiveness value in this study, the Fisher's test was used. This study has met the principles of research ethics, which is marked by the number of approval obtained from the Budi Luhur STIKes ethics committee with research ethics permit number: 110 / D / KEPK-STIKes / IV / 2025.

### 3. Results

Overview of Knowledge Level Before Health Education Using Booklet Media for Pulmonary TB Patients at the South Cimahi Health Center Polyclinic

Table 1: Frequency Distribution of Knowledge Level Before Being Given Health Education Using Booklet Media to Pulmonary TB Patients at the South Cimahi Health Center Polyclinic

Knowledge	Frequency (F)	Percent (%)
Good and sufficient	15	75,0
Less	5	25,0
Result	20	100

Source: Primary Data Research 2025

Overview of Knowledge Level After Health Education Using Booklet Media for Pulmonary TB Patients at the South Cimahi Health Center Polyclinic

Table 2: Frequency Distribution of Knowledge Level After Being Given Health Education Using Booklet Media to Pulmonary TB Patients at the South Cimahi Health Center Polyclinic

Knowledge	Frequency (F)	Percent (%)
Good and sufficient	17	85,0
Less	3	15,0
Result	20	100

Source: Primary Data Research 2025

Effectiveness of Knowledge Level After Providing Health Education Through Booklet Media to Pulmonary Tuberculosis Patients at South Cimahi Health Center

Table 3: Effectiveness of Booklet Media to Increase Knowledge of Pulmonary Tuberculosis Patients at the South Cimahi Health Center Polyclinic

Knowledge	Prior Knowledge		Knowledge After		P Value
	F	%	F	%	
Good and sufficient	15	75%	17	85%	0,009
Less	5	25%	3	15%	
Total	20	100%	20	100%	

Source: Primary Data Research 2025

### 4. Discussion

#### 4.1. Overview of the Level of Knowledge Before Health Education Using Booklet Media for Pulmonary TB Patients at the South Cimahi Health Center Polyclinic

The results of the study described in table 1 show that before health education using booklet media was given to 20 respondents of Pulmonary TB patients, most of the respondents, namely 15 people (75.0%) had a good and sufficient level of knowledge, while 5 people (25.0%) had a low level of knowledge. When health education was conducted, the purpose and objectives of the study were conveyed, namely to determine the level of knowledge of respondents before health education was conducted using booklet media. When the questionnaire was given before using booklet media, the results showed that 5 people

(25%) had low knowledge about Pulmonary TB, therefore efforts are needed to increase public knowledge, especially in Pulmonary TB patients.

Almost most of the respondents were well-informed and sufficient because they had suffered from Pulmonary TB for a long time, knew about Pulmonary TB based on their experiences, and the majority of their education was high school, this is in accordance with Budiman's theory in Rosanti's research that knowledge can be influenced based on personal experience and also education (Poltekkesjakarta library, 2020). Based on a study conducted by Utaminingrum et al (2018) entitled the effectiveness of booklet media to increase the knowledge of pulmonary tuberculosis patients, education and duration of TB patient treatment are known to affect the incidence of Pulmonary TB, seen from the decreasing incidence in line with increasing education and adequate education has been proven to increase patient knowledge and increase success in Pulmonary TB therapy (Wahyu Utaminingrum, Nauval Muzzaki and Much Ilham Novalisa Aji Wibowo, 2018).

#### **4.2. Description of the Level of Knowledge After Health Education Using Booklet Media for Pulmonary TB Patients at the South Cimahi Health Center Polyclinic**

Based on the results after health education was provided through booklet media, it was shown that a small portion of respondents, namely 3 people (15.0%) still had insufficient knowledge, almost all respondents, namely 17 people (85.0%) had good and sufficient knowledge.

This is possible from the 3 respondents who have less knowledge with the characteristics of junior high school education, two people working as laborers and one person not working, for the duration of treatment there are 6 months, 1 year, and 5 months. Each person's knowledge will vary, this is influenced by the level of education, because education is a systematic process designed to develop and expand a person's knowledge (Rika Widianita, 2023). Respondents who experienced an increase in knowledge (2 people) because the respondents were cooperative and actively asked questions during the implementation, besides that they were also given a posttest after a few minutes of reading the booklet so that their memory was still good.

The results of this study are supported by research by Utaminingrum et al. (2018) at the Linggang Bigung Health Center, West Kutai Regency entitled Effectiveness of Booklet Media to Improve Knowledge of Pulmonary Tuberculosis Patients, with 41 respondents with the results before education there was an average score of 15.71 and the results after education there was an average score of 17.41 this states that there is a difference between the average before and after the intervention, which is -1.70. The results of the statistical analysis show a p value = 0.001 ( $p < 0.05$ ) which means the results are statistically significant.

In this study, the level of knowledge of respondents after being given health education with booklet media is the stage of understanding (comprehension) it can be seen that during the implementation of the study respondents were able to understand the material in the booklet well and were active during the discussion session. Someone who has understood the learning or material that has been given can explain, conclude, and interpret objects or something that has been learned. Another factor that caused the respondents' level of knowledge to increase was that the researcher took an approach by explaining the contents of the booklet during counseling (Rika Widianita, 2023).

The advantages of booklet media in this study are the delivery of more detailed information, the use of clear and easy-to-understand language, practical and easy to carry and also as an independent learning medium. Based on the results of the study, it can be concluded that booklet media is an effective medium for increasing knowledge about Pulmonary TB disease.

### 4.3. Effectiveness of Knowledge Level After Providing Health Education Through Booklet Media to Pulmonary Tuberculosis Patients at South Cimahi Health Center

The characteristics of respondents in this study were mostly women, 12 people (60%) and men, 8 people (40%). Cases of pulmonary TB patients were mostly found in the productive age group, the average age in this study was 38 years, with the lowest age being 12 years and the highest age being 75 years, environmental conditions or places of residence when door to door showed damp residences, lack of exposure to sunlight and poor ventilation, in addition to dense housing, sanitation conditions or unclean environments so that they can be a place for pulmonary TB bacteria to grow. According to Notoatodjo (2018), the education of pulmonary TB patients is also known to affect the incidence of pulmonary TB, seen from the decreasing incidence of pulmonary TB in line with increasing education (Rika Widianita, 2023). Respondents in this study were also mostly unemployed, 11 people (55%) with relatively low incomes, therefore with relatively low incomes someone will prioritize primary needs rather than paying attention to or maintaining health. Respondents who work, there are 9 people (45%) who have a higher risk of contracting Pulmonary TB because they often have contact with many people. Low patient knowledge of Pulmonary TB will increase the risk of transmission of Pulmonary TB. Based on the results of the study, patients who have less knowledge do not know the media for transmitting Pulmonary TB and what symptoms arise from the disease. So they do not realize that they have been infected and easily become agents of TB transmission. Based on research conducted by Muzzaki (2018) that booklet media is known to be effective in increasing respondent knowledge in several studies, both in adolescent, adult and elderly respondents (Wahyu Utaminingrum, Nauval Muzzaki and Much Ilham Novalisa Aji Wibowo, 2018). Respondents' knowledge increases because they can read material from the booklet, this helps speed up respondents' memory about Pulmonary TB.

The substantial influence in this study is that the booklet media provides comprehensive information about Pulmonary TB, such as causes, symptoms, transmission, prevention, and treatment, this helps respondents understand their disease and follow the right treatment. While the statistical influence that p value (0.009) shows that the difference in knowledge before and after being given health education using booklet media is statistically significant, meaning that the increase in knowledge is unlikely to occur due to coincidence.

This is in accordance with the nursing model theory according to Nola J. Pender's theory of health promotion models is very relevant to this study because the focus is on changes in lifestyle, disease prevention behavior, motivation, attitudes, and the beginning of better behavioral changes. The role of nurses in pulmonary TB patients here is to provide health education, namely about pulmonary TB so that patients can carry out independent care such as preventing transmission of pulmonary TB, healthy living behavior, and this is in accordance with Nola J. Pender's nursing theory, namely the Expectancy Value theory and Social Cognitive Theory.

This is in accordance with references from previous journals, namely research conducted by Utaminingrum et al. (2018), research conducted by Hanye et al. (2023), and research by Alfin et al. (2023) entitled Effectiveness of Booklet Media to Increase Knowledge of Pulmonary Tuberculosis Patients that in this study there was an increase from 7 people with less knowledge to 5 people with less knowledge because in this study the majority had junior high school education and in accordance with the theory of Notoatmodjo that education can influence increased knowledge, so that booklet media is effective in increasing the knowledge of pulmonary tuberculosis patients (Wahyu Utaminingrum, Nauval Muzzaki and Much Ilham Novalisa Aji Wibowo, 2018).

Based on Fisher's Test, the value of  $\rho$  (0.009) <  $\alpha$  (0.05) is obtained, so  $H_0$  is rejected, thus the booklet media has effectiveness in increasing the knowledge of Pulmonary TB patients. Based on the results of providing health education through booklet media at the South Cimahi Health Center, the figure is 2.5, meaning that respondents who received health education had a level of knowledge of 2.5 times compared to respondents who did not receive health education using booklet media.

## 5. Limitations

This study has several limitations that need to be considered in interpreting the results. First, the quantitative research design with a pretest-posttest approach without a control group limits the ability to isolate the effect of the booklet exclusively, because there is no comparison of other interventions or controlled external factors. Second, the sample used only came from one health center in the South Cimahi area, so the results may not be generalizable to a wider population with different demographic and socio-cultural characteristics. Third, the evaluation of increased knowledge was only carried out in the short term after the intervention, so it cannot be concluded whether the effect of increased knowledge can be maintained in the long term or have an impact on changes in patient behavior. These limitations are recognized as part of scientific reflection and are the basis for improvements in further research, such as the use of experimental designs with control groups, wider coverage areas, and long-term evaluation of the impact of booklets on treatment adherence and patient clinical outcomes.

## 6. Conclusion

After analyzing the data on the effectiveness of booklet media to improve the knowledge of TB patients at the Cimahi Selatan Health Center Polyclinic, the conclusions of this study are as follows:

Before being given health education using booklet media to TB patients in 20 respondents, most of the respondents, namely 15 people (75.0%) had good and sufficient knowledge, and a small part of the respondents, namely 5 people (25.0%), had poor knowledge.

After being given health education using booklet media regarding TB in 20 respondents, a small part of the respondents, namely 3 people (15.0%) had poor knowledge, almost all respondents, namely 17 people (85.0%) had good and sufficient knowledge.

The effectiveness of booklet media regarding Pulmonary TB on the level of knowledge of Pulmonary TB patients at the South Cimahi Health Center Polyclinic, with  $\rho$  values (0.009) at a significance level of 0.05. From the results of the analysis, the effectiveness value showed a figure of 2.5, meaning that respondents who received health education had a level of knowledge that increased by 2.5 times compared to respondents who did not receive health education using booklet media.

The results of this study are one of the references to be used as additional literature, especially regarding the effectiveness of booklet media to increase the knowledge of pulmonary tuberculosis patients, and it is recommended that the results of this study be used as a reference for community service for lecturers and students in efforts to reduce and prevent Pulmonary TB. It is hoped that further researchers can conduct research with the title of the effectiveness of booklet media to increase the knowledge of pulmonary tuberculosis patients, to add references and add insight for readers.

## CRedit authorship contribution statement

Ira Aripah: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. Halimatusyadiah: Writing – review & editing, Writing – original draft, Visualization, Validation, Software,

Resources, Project administration, Methodology, Investigation, Data curation, Conceptualization. Dyeri Susanti: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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### Declaration of Competing Interest

The authors declare that they have no competing interests.

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