THE EFFECTIVENESS OF LEAFLET MEDIA AS A HEALTH EDUCATION EFFORT IN ELIMINATING TUBERCULOSIS IN SIMALUNGUN REGENCY

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ABSTRACT

Tuberculosis (TB) is an infectious disease that remains a public health problem in Indonesia. Health education plays a vital role in increasing patient understanding and awareness of TB prevention and control. This study aims to determine the effectiveness of leaflets as an educational tool for improving knowledge, attitudes, and actions of TB patients. The study used a quasi-experimental design with a pretest-posttest with a control group design. The study population was all TB patients in the Tapian Dolok and Batu Anam areas. The sample size was 100 people, consisting of 50 respondents from the intervention group in Tapian Dolok and 50 respondents from the control group in Batu Anam, selected by purposive sampling. The research instrument was a questionnaire on knowledge, attitudes, and actions that had been tested for validity and reliability. Data analysis was performed using a paired t-test with a significance level of 0.05. The results showed a significant increase in respondents' knowledge, attitudes, and actions after being given education through leaflets in the intervention group ($p<0.05$). In contrast, the control group showed no significant changes. Thus, leaflets have proven effective as a health education tool in improving the knowledge, attitudes, and practices of TB patients. The results of this study can serve as a basis for healthcare workers in developing effective communication strategies to empower TB patients.

Keywords : *actions; attitudes; health education; knowledge; leaflets; tuberculosis.*

INTRODUCTION

Tuberculosis (TB) remains a significant global health problem, particularly in developing countries like Indonesia. This disease is caused by Mycobacterium tuberculosis and can attack various organs of the body, particularly the lungs.(Organization, 2013)Indonesia is among the top three countries with the highest TB burden in the world after India and China, with an estimated 969,000 new cases in 2022 (Ministry of Health of the Republic of Indonesia, 2023).

TB control efforts in Indonesia have been implemented through the Directly Observed Treatment Shortcourse (DOTS) strategy, which emphasizes direct supervision of patient treatment. However, the success of this program depends heavily on patients' knowledge, attitudes, and responses to their disease.(Kumalasari & Prabawati, 2021). Low levels of public health literacy are a significant obstacle in reducing the incidence of TB at the community level.

Health education is a crucial intervention to raise public awareness about TB symptoms, transmission, and treatment. Educational media such as leaflets can help convey health messages in a simple, engaging, and memorable way.(Christiany, 2024; Nasrullah et al., 2024; Pratiwi & Lucya, 2022). Leaflets allow message recipients to read them repeatedly, thereby strengthening understanding and forming positive attitudes towards healthy behavio(Tondong et al., 2025).

Several previous studies have shown that the use of leaflets can increase knowledge and preventive measures against infectious diseases.(Yu et al., 2022)(Thong et al., 2021)(Hasanica et al., 2020)However, the effectiveness of leaflets in the context of TB patients in rural areas such as Simalungun Regency has not been studied in depth. Social, cultural, and educational factors also influence the success of educational interventions.

Furthermore, social stigma against TB sufferers remains high in society. Many sufferers feel ostracised, resulting in delayed diagnosis and poor adherence to treatment. Several previous researchers have also noted this.(Chen et al., 2021)(Fuady et al., 2023)(Teo et al., 2021)The social stigma surrounding TB remains high, impacting the community. Therefore, education through appropriate media, such as leaflets, is expected to change negative public perceptions and increase awareness of TB prevention.

Empowering patients through print-based education has significant potential to support the success of TB elimination programs. Leaflets not only convey medical information but also build motivation for healthy behaviours.(Siregar et al., 2021)(Pratiwi & Lucya, 2022). Thus, this study focuses on measuring the effectiveness of leaflet media in improving the knowledge, attitudes, and actions of TB sufferers.

The results of this study are expected to contribute to the development of simple yet effective media-based health promotion strategies. Furthermore, they can serve as a reference for health workers in developing contextual educational interventions tailored to the characteristics of the local community.

METHOD

Research Design

This study used a quasi-experimental design with a pretest-posttest with control group approach. This design allowed researchers to measure changes in respondents' knowledge, attitudes, and actions before and after an educational intervention using leaflets.

Population and Sample

The population in this study was all TB patients in the working area of the Tapian Dolok and Batu Anam Community Health Centres, Simalungun Regency. The sample size was 100 people, consisting of 50 respondents in the intervention group in Tapian Dolok and 50 respondents in the control group in Batu Anam. The sampling technique used was purposive sampling based on the inclusion criteria: active TB patients undergoing treatment and willing to be research respondents.

Data Collection Instruments (Data Instruments)

The research instrument was a structured questionnaire covering three aspects: knowledge, attitudes, and actions related to TB prevention and control. The instrument was tested for validity and reliability before use. The educational intervention used leaflets titled "Education on Tuberculosis Prevention and Control" and "Stop the Stigma: TB Is Not a Curse, TB Can Be Cured."

Data Analysis

Data were analyzed using SPSS version 25 software. Univariate analysis was conducted to describe the frequency distribution of respondent characteristics. Bivariate analysis used a paired t-test to test the differences in pretest and posttest scores in the intervention and control groups with a significance level of 5% ($p < 0.05$).

RESULTS AND DISCUSSION

1. Respondent Characteristics

The characteristics of the respondents in this study are presented in Table 1, including the distribution of age, gender, marital status, educational level, ethnicity, and religion across

the two study sites, namely Tapian Dolok and Anam Stone. This description aims to provide an overview of the demographic profile of the respondents, which serves as an important basis for understanding the social and cultural background that may influence the research outcomes. By presenting these characteristics, a more comprehensive and contextual interpretation of the findings can be achieved.

Table 1. Frequency Distribution of Respondent Characteristics

Variables	Tapian Dolok		Anam Stone	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Age Range				
19 - 28	14	28	11	22
29 - 38	14	28	11	22
39 - 48	12	24	14	28
49 - 58	7	14	5	10
59 - 68	3	6	2	4
Gender				
man	32	64	12	24
Woman	18	36	36	72
Marital status				
Marry	35	70	7	14
Not married yet	15	30	43	86
Education				
No school	2	4	7	14
Elementary School	5	10	14	28
Junior High School	8	16	23	46
High School/Vocational School	30	60	6	12
D3/Bachelor's Degree	5	10	0	0
Ethnic group				
Karo	1	2	0	0
Batak	18	36	15	30
Java	32	64	35	70
Religion				
Islam	35	70	42	84
Christian	13	26	8	16
Catholic	2	4	0	0
Total	50	100	50	100

As presented in Table 1, the age distribution of respondents in Tapian Dolok was dominated by the 19–28 years and 29–38 years groups (each 28%), followed by 39–48 years (24%), 49–58 years (14%), and 59–68 years (6%). In Anam Stone, most respondents were aged 39–48 years (28%), followed by 19–28 years and 29–38 years (each 22%), 49–58 years (10%), and 59–68 years (4%). Gender distribution showed a predominance of male respondents in

Tapian Dolok (64%) and female respondents in Anam Stone (72%). In terms of marital status, 70% of respondents in Tapian Dolok were married, whereas 86% of respondents in Anam Stone were unmarried.

Regarding educational background, most respondents in Tapian Dolok had completed high school or vocational education (60%), while in Anam Stone, the largest proportion had attained junior high school education (46%). The dominant ethnic group in both study areas was Javanese (64% in Tapian Dolok and 70% in Anam Stone), followed by Batak. With respect to religious affiliation, Islam predominated in both locations (70% in Tapian Dolok and 84% in Anam Stone), followed by Christianity, while only a small proportion of respondents in Tapian Dolok identified as Catholic.

To evaluate the effectiveness of the intervention, changes in respondents' knowledge, attitudes, and actions were assessed using a pretest–posttest design in both the intervention group (Tapian Dolok) and the control group (Anam Stone). This assessment aimed to identify differences in outcome variables before and after the implementation of the intervention, as well as to compare the magnitude of change between the two groups. The distribution of respondents' knowledge, attitudes, and actions is presented in Table 2.

Table 2. Frequency Distribution of Respondents' Knowledge, Attitudes and Actions

Variables	Intervention (Tapian Dolok)				Control (Anam Stone)			
	Pretest		Post Test		Pretest		Post Test	
	n	%	n	%	n	%	n	%
Knowledge								
Good	2	4	48	96	2	4	2	4
Enough	11	22	2	4	11	22	13	26
Not enough	37	74	0	0	37	74	35	70
Attitude								
Good	3	6	47	94	3	6	3	6
Enough	8	16	3	6	0	0	0	0
Not enough	40	80	0	0	47	94	47	94
Action								
Good	3	6	47	94	0	0	0	0
Enough	7	14	3	6	3	6	6	12
Not enough	40	80	0	0	47	94	44	88
Amount	50	100%	50	100%	50	100%	50	100%

The Table shows the results of the pretest and posttest analysis related to education on Tuberculosis (TB) Prevention and Control through two leaflet media: "Education on Tuberculosis Prevention and Control" and "STOP THE STIGMA OF TB. TB is NOT a Curse

or Hereditary Disease. TB Can Be Cured!". This study involved 100 TB sufferers, consisting of two groups, namely 50 people in the intervention group and 50 people in the control group. Education was carried out in two locations, namely Batu Anam and Tapian Dolok.

Before receiving education, the majority of participants in the intervention group demonstrated insufficient knowledge (74% were in the "Poor" category). This reflects their low understanding of TB. However, after receiving education through leaflets, there was a significant improvement. In the posttest, 96% of participants in the intervention group demonstrated "Good" knowledge. This demonstrates that the educational media used was highly effective in increasing their knowledge of TB prevention and management.

In contrast, in the control group that did not receive education, despite a slight increase in posttest scores, only 26% of participants demonstrated "Good" knowledge. The majority (74%) remained in the "Poor" category, indicating that without structured education, their knowledge did not improve significantly.

Regarding attitudes, in the pretest, the majority of participants in the intervention group (80%) showed a less favourable or "Poor" attitude toward TB. After receiving an education, there was a marked change. In the posttest, 94% of participants in the intervention group showed a "Good" attitude toward TB, indicating that they had become more aware and open to the importance of preventing and managing this disease.

On the other hand, the control group that received no education showed very different results. In the pretest, the majority of participants (94%) showed a negative attitude. Only 6% showed a positive attitude in the posttest, indicating that without education, their attitudes remained unchanged.

Before education, no participants in the intervention group demonstrated good behaviour (all were in the "Poor" category). However, after education, 94% of participants in the intervention group demonstrated good behaviour in TB prevention and management. This indicates that education successfully motivated them to act in accordance with the knowledge they gained.

In the control group, although there was a slight improvement, only 12% showed good action on the posttest, indicating that without the educational intervention, their action levels remained low.

Overall, all three aspects—knowledge, attitudes, and practices—were observed to significantly improve in the intervention group after receiving education, while the control group showed no significant changes. This indicates that leaflet-based education plays a crucial role in improving knowledge, attitudes, and practices related to TB prevention and control.

Table 3. Test of the Effectiveness of the Influence of Leaflet Media as Health Education on the Knowledge, Attitudes and Actions of TB Patients.

Variables	Intervention (Tapian Dolok) Treatment Mean±SD (n= 50)	Average Change	p-value	Control (Anam Stone) Treatment Mean±SD (n= 50)	Average Change	p-value
Knowledge						
Pretest	48.20 ± 13.915	36.7 ± 9.124	0.006	48.20 ± 13.915	1.8 ± 0.213	0.001
Posttest	84.90 ± 4.791			50.00 ± 13.702		
Attitude						
Pretest	46.38 ± 13.791	36.68 ± 8.650	0.001	42.50 ± 10.927	0.88 ± 0.001	0.001
Posttest	83.06 ± 5.141			43.38 ± 10.928		
Action						
Pretest	46.20 ± 15.894	36.40 ± 10.248	0.025	41.60 ± 11.314	1.6 ± 0.730	0.001
Posttest	82.60 ± 5.646			43.20 ± 10.583		

Note: The mean difference between groups (treatment pretest & control pretest) was analyzed using the paired t-test statistical test, at a significant level of 5%.

The Table provided shows the results of statistical analysis using SPSS version 25. analyzed using the paired t-test statistical test, at a significant level of 5%related to the comparison between the intervention group (Tapian Dolok) and the control group (Batu Anam) in terms of changes in knowledge, attitudes, and actions after being given education on Tuberculosis (TB) Prevention and Control.

In the intervention group in Tapian Dolok, the average pretest score for knowledge was 48.20 with a standard deviation (SD) of 13.915. After the educational intervention, the average posttest score increased to 84.90 with an SD of 4.791, indicating a significant increase. A p-value of 0.006 indicates that this change is highly statistically significant. In the control group in Batu Anam, although there was a slight increase from pretest (48.20 ± 13.915) to posttest (50.00 ± 13.702), this change was not very significant, with a p-value of 0.001 indicating a significant change, although much smaller than in the intervention group.

In the intervention group (Tapian Dolok), the average pretest score for attitudes was 46.38 with a SD of 13.791. After education, the average posttest score increased significantly to 83.06 with a SD of 5.141. This increase is also reflected in the p-value of 0.001, indicating a highly significant change. Meanwhile, in the control group (Batu Anam), the pretest score for attitudes was 42.50 with a SD of 10.927, and the posttest score increased to 43.38 with a SD of 10.928. Although there was a slight increase, the change was minor, with a p-value of 0.001 indicating a significant change, although this change was not as large as in the intervention group.

In the intervention group (Tapian Dolok), the pretest score for action was 46.20 with a SD of 15.894, and after the intervention, the posttest score increased to 82.60 with a SD of

5.646. This change was highly significant, with a p-value of 0.025 indicating that education successfully drove a significant change in action. In the control group (Batu Anam), the pretest score for action was 41.60 with a SD of 11.314, and the posttest score increased to 43.20 with a SD of 10.583. Although there was a slight increase, this change was minor compared to the intervention group, with a p-value of 0.001 indicating a statistically significant change.

The analysis shows that leaflet-based education significantly impacted changes in knowledge, attitudes, and behaviour in the intervention group in Tapian Dolok. Improvements in the intervention group were significantly greater than those in the control group in Batu Anam. The significant p-value in the intervention group indicates that the educational intervention significantly influenced the changes. While the control group showed improvement, the changes were not as significant as those in the intervention group. This reinforces the evidence that structured education plays a crucial role in increasing awareness and behavioural change in TB prevention and control.

DISCUSSION

The study results showed a significant increase in the knowledge, attitudes, and actions of TB patients after receiving education using leaflets. This aligns with the theory of behaviour change, which states that increased knowledge is the first step in developing positive attitudes and actions.(Notoatmodjo, 2012).

In the intervention group, knowledge scores increased from an average of 48.20 to 84.90 after the intervention. This finding is consistent with the results of previous research.(Pratiwi & Lucya, 2022)(Siregar et al., 2021)(Puspitasari, 2024). This indicates that leaflets are effective in increasing patient understanding of infectious disease prevention. This increased knowledge is likely due to the simple presentation of information accompanied by easy-to-understand images.

Positive attitudes toward TB also increased significantly after the intervention. Education through leaflets helped change respondents' perceptions that TB is not a curse, but rather a disease that can be cured with regular treatment. This finding aligns with research.(Aulia & Sudiyat, 2021)(Wilson et al., 2016), which states that visual media-based education can reduce stigma and increase empathy towards TB sufferers.

Increased TB prevention practices, such as covering the mouth when coughing and regularly visiting a health facility, were also found in the intervention group. This suggests that the leaflets were able to trigger real behaviour change.(Notoatmodjo, 2012), Behavioural

changes that are preceded by increased knowledge and attitudes will be more lasting than changes that occur spontaneously.

In contrast, the control group showed no significant improvement in these three aspects. This indicates that structured education has a significant impact on the formation of health behaviours. Leaflets, as a simple medium, can be an effective alternative in areas with limited access to technology.(Zakiah & Winoto, 2021).

Thus, the results of this study strengthen the evidence that leaflets are effective in increasing awareness and healthy behaviours among TB patients. However, to achieve broader impact, educational interventions need to be integrated with a sustainable community approach.

CONCLUSION

The findings of this study confirm that health education using leaflet media has a statistically significant impact on improving tuberculosis (TB) prevention and control behaviors. Based on SPSS analysis, the intervention group in Tapian Dolok showed a substantial increase in mean scores for knowledge (from 48.20 ± 13.91 to 84.90 ± 4.79, $p = 0.006$), attitudes (from 46.38 ± 13.79 to 83.06 ± 5.14, $p = 0.001$), and actions (from 46.20 ± 15.89 to 82.60 ± 5.65, $p = 0.025$). In contrast, the control group in Batu Anam demonstrated only minimal changes across all variables, indicating that no significant improvement occurred without the educational intervention.

These results clearly demonstrate that leaflet-based education effectively enhances patient understanding and promotes behavioral change among TB patients. The medium's simplicity, accessibility, and ability to deliver consistent information make it particularly effective in rural settings. Therefore, leaflets can serve as an essential component of community-based TB education strategies, supporting government efforts toward TB elimination and patient empowerment.

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REFERENCES

Aulia, A. N., & Sudiyat, R. (2021). Video Animasi Mempengaruhi Pengetahuan Dan Sikap Masyarakat Mengenai Pencegahan Stigma Kepada Pasien Tb Paru. *Jurnal Kesehatan Siliwangi*, *2*(1), 258–266.

Chen, X., Du, L., Wu, R., Xu, J., Ji, H., Zhang, Y., Zhu, X., & Zhou, L. (2021). Tuberculosis-related stigma and its determinants in Dalian, Northeast China: a cross-sectional study. *BMC Public Health*, *21*(1), 6.

Christiany, I. (2024). Efektivitas Media Pendidikan Kesehatan Booklet Dan Leaflet Terhadap Perilaku Kepatuhan Minum Obat Pada Lansia Hipertensi Di Puskesmas Simomulyo Surabaya. *JURNAL KEPERAWATAN*, *18*(2), 129–135.

Fuady, A., Arifin, B., Yunita, F., Rauf, S., Fitriangga, A., Sugiharto, A., Yani, F. F., Nasution, H. S., Putra, Iw. G. A. E., & Mansyur, M. (2023). Stigma towards people with tuberculosis: a cross-cultural adaptation and validation of a scale in Indonesia. *BMC Psychology*, *11*(1), 112.

Hasanica, N., Ramic-Catak, A., Mujezinovic, A., Begagic, S., Galijasevic, K., & Oruc, M. (2020). The effectiveness of leaflets and posters as a health education method. *Materia Socio-Medica*, *32*(2), 135.

Kumalasari, F. M., & Prabawati, I. (2021). Implementasi Kebijakan Penanggulangan Tuberkulosis Dengan Strategi Directly Observed Treatment Short-Course (Dots) Di Puskesmas Kecamatan Bangsal Kabupaten Mojokerto. *Publika*, 201–214.

Nasrullah, H., ST, S., Ns, M. K., Basri, H. M., ST, S., Hartati, S. P., Ns, M. K., Bahtiar, H., Skm, M. K., & Masdiana Ar, S. K. M. (2024). *Media Dan Metode Promosi Kesehatan Dalam Perubahan Perilaku Kesehatan*. Nas Media Pustaka.

Notoatmodjo, S. (2012). Promosi Kesehatan dan Perilaku Kesehatan. In *Journal of Chemical Information and Modeling*. https://doi.org/10.1017/CBO9781107415324.004

Organization, W. H. (2013). *Global tuberculosis report 2013*. World Health Organization.

Pratiwi, G. D., & Lucya, V. (2022). Efektifitas Penggunaan Media Leaflet Dalam Peningkatan Pengetahuan Dan Sikap Terhadap Pencegahan Tuberkulosis: Effectiveness Of Using Leaflet Media In Improving Knowledge And Attitude Toward Tuberculosis Prevention. *Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing)*, *8*(3), 8–13.

Puspitasari, M. (2024). Health Education using Leaflet Media about Multidrug-Resistant Tuberculosis (MDR-TB) Improves Knowledge of Patients with Pulmonary Tuberculosis. *Adult Health Nursing Journal*, *1*(1), 24–34.

Siregar, P. A., Ashar, Y. K., Hasibuan, R. R. A., Nasution, F., Hayati, F., & Susanti, N. (2021). Improvement of knowledge and attitudes on tuberculosis patients with poster calendar and leaflet. *Journal of Health Education*, *6*(1), 39–46.

Teo, A. K. J., Singh, S. R., Prem, K., Hsu, L. Y., & Yi, S. (2021). Duration and determinants of delayed tuberculosis diagnosis and treatment in high-burden countries: a mixed-methods systematic review and meta-analysis. *Respiratory Research*, *22*(1), 251.

Thong, K. S., Chang, C. T., Lee, M., Lee, J. C. Y., Tan, H. S., & Shafie, A. A. (2021). Impact of targeted educational intervention towards public knowledge and perception of antibiotic use and resistance in the state of Perak, Malaysia. *Antimicrobial Resistance & Infection Control*, *10*(1), 29.

Tondong, H. I., Massa, K., Tanan, R., Setyoningrum, U., Panglipurningsih, N. A. P., & Mardona, Y. (2025). *Buku Ajar Pendidikan dan Promosi Kesehatan*. PT. Green Pustaka

Indonesia.

Wilson, J. W., Ramos, J. G., Castillo, F., Castellanos, E. F., & Escalante, P. (2016). Tuberculosis patient and family education through videography in El Salvador. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, *4*, 14–20.

Yu, S.-Y., Luo, J.-J., Shan, K.-S., Xu, L., Ding, L., & Chen, X.-Q. (2022). The Effect of Reading Leaflets During the Observation Period After Vaccination on Knowledge of COVID-19 and Vaccines Among Chinese Small Town Residents: A Randomized Controlled Trial. *Frontiers in Public Health*, *10*, 819446.

Zakiah, L. G., & Winoto, Y. (2021). Booklet Dan Leaflet Sebagai Media Promosi Kawasan Wisata Alam Talaga Bodas Kabupaten Garut. *Kebumen: Intishar Publishing*.