

Health Education Using Leaflets on Medication Compliance and Prevention of Transmission in Tuberculosis Patients at Simpang Lima Gumul Hospital, Kediri

Ayu Nani Septiana¹, Noer Solistijaningsih¹

¹Universitas Strada Indonesia

Email: ayusurel21@gmail.com

Abstract. *Tuberculosis (TB) remains a major global and national public health problem requiring comprehensive management. The success of TB treatment is not only determined by the availability of medication but is also strongly influenced by patients' knowledge and adherence to therapy. This study aimed to describe the level of knowledge and adherence of TB patients after receiving health education using leaflet media at Simpang Lima Gumul Hospital, Kediri. This study employed a descriptive quantitative approach supported by qualitative data. A total of 20 respondents, consisting of TB patients and their family members, were selected using purposive sampling. Data were collected through questionnaires, observations, and in-depth interviews. Data analysis was conducted using descriptive statistics in the form of percentages. The results showed that the level of knowledge and adherence of patients was categorized as good, with an average score of 76.5%. Approximately 70–80% of respondents demonstrated improved understanding after receiving the educational intervention. Supporting factors included family support, the role of healthcare workers, and access to healthcare services, while the main barriers were treatment fatigue, drug side effects, and limited understanding of treatment duration. In conclusion, health education using leaflet media contributes to improving knowledge and adherence among TB patients.*

Keywords: *Tuberculosis, Adherence, Knowledge, Leaflet, Health Education*

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INTRODUCTION

Although preventable and treatable, tuberculosis (TB) continues to be a global public-health problem (Floyd et al., 2018; Villar-Hernández et al., 2023; Dirlikov et al., 2015; Reid et al., 2023; Chakaya et al., 2021). Mycobacterium tuberculosis causes the disease and the infection is spread by airborne droplets produced when people with active pulmonary TB cough, sneeze, talk and expel infectious respiratory particles. About 10.7 million people got TB and an estimated 1.23 million people died of TB in 2024. They show that TB remains the top killer disease due to a single infectious agent, and that compared to other populations, effective diagnosis and treatment has yet to be effective in ensuring adequate disease control.

This burden is especially heavy for Indonesia. The country is responsible for around 10% of the total TB cases in the world in 2024, second only to India (Bhargava et al., 2023; Dhamnetiya et al., 2021). There are also recent national programme assessments that indicate Indonesia has a high TB burden and is relatively persistent. In 2023, WHO projected that the number of TB cases

in Indonesia reached about 1.09 million, which corresponds to 387 cases per 100,000 people, with over 130,000 of these TB cases resulting in death. Biological transmission is not the only possible cause of this situation. It also reflects ongoing programme level challenges such as delayed diagnosis, under-notification of cases, inequal access to appropriate services, treatment dropouts and inadequate continuity of patient support.

Treatment of TB is important, but in addition to diagnosing cases and ensuring that patients receive anti-tuberculous drugs, it depends on them finishing the treatment course (Akkerman et al., 2022; Heidary et al., 2022; Singh et al., 2023; Cáceres et al., 2022; Rockwood et al., 2016). A combination of medications is used for several months to treat TB. Katende-Kyenda (2025) and Tusho & Mokoboto-Zwane (2025) said that, Early stopping of treatment, non-adherence to treatment or treatment without proper clinical supervision can lead to persistent infection, TB relapse, ongoing community transmission and drug-resistant TB. However, compliance shouldn't be seen as simply the upkeep of personal restraint. It is a multifaceted health behavior influenced by treatment duration, adverse drug effects, treatment fatigue, socioeconomic pressures, healthcare service availability, communication with healthcare providers, perceived stigma, family involvement and understanding of the disease and treatment.

The concept of health literacy is especially relevant because patients need to be aware of the need to take medicine even though symptoms have diminished, know what side effects to look out for, go to follow-up appointments, and take steps to limit household and community spread (Magnani et al., 2018; Salm et al., 2018; Heijmans et al., 2015; Bailey et al., 2014). A systematic review of health literacy in TB control also revealed that decreased health literacy was linked to weaker participation in TB related prevention and treatment behaviors, such as treatment adherence. But, knowing doesn't always mean doing. Patients might know of the medical instructions but not be able or willing to follow them due to side effects, cost, competing responsibilities, psychological fatigue, stigma, or poor social supports. Educational interventions should thus be viewed as an element in a comprehensive patient-centred approach to adherence to treatment rather than a standalone approach to treatment interruption (Hyrkas & Wiggins, 2014; Moodley et al., 2020; Law et al., 2019; Vasiloglou et al., 2019; O'Neill et al., 2025; Bullock et al., 2025).

Leaflets are often employed in health education since they are low cost, portable, standardised and can help to reinforce health information that has been verbally given by health professionals. Patients and family members may read through the information at home, helping to retain the information and create discussion at home (Bernacki & Block, 2014; Gilligan et al., 2017). Leaflets can be especially helpful in providing key information about medication regimens, how long your treatment will last, how to cover your cough, wearing masks, ventilation and why you need to protect close contacts. But the educational value of these depends on the legibility, cultural appropriation, graphic design, language and accuracy of the information. Leaflets are usually one-way educational communication and may also be less effective if the target group has poor literacy skills, if there is a risk of misinterpretation and misunderstanding of technical language, or if individuals need to be drawn into the information. Therefore when distributing a leaflet, interpersonal explanation and question-and-answer should be included.

While there is strong evidence for the importance of health education as a component of TB care, context-specific evidence is needed to gain insights into how messages are understood after they are shared. Educating patients has been a topic of discussion previously, as has medication adherence, but both of those issues have rarely been addressed in relation to knowledge of how to prevent the transmission of the virus, the role of family support, and the actual barriers patients encounter while taking the medications. Patient characteristics, patterns of communication, accessibility of services and social support can also vary between individual healthcare facilities, so evidence from individual facilities is also valuable (Mannava et al., 2015; Kuluski et al., 2017; Nicolaidis et al., 2015; Rubin et al., 2015). Limited 'contextual information' is provided in Simpang Lima Gumul Hospital, Kediri, on knowledge and medication adherence

profiles of TB patients, after education based on TB leaflets, and the facilitators and inhibitors of TB treatment behaviour.

The purpose of this study was to describe the knowledge and adherence of TB patients in Simpang Lima Gumul hospital, Kediri after receiving health education in the form of leaflets. It also aimed to describe factors that encourage and hinder adherence to treatment and prevention of transmission with observations and in-depth interviews. The study used the descriptive design, which did not have a pre-intervention comparison or control group, so the purpose of the study was not to determine the causal effectiveness of leaflet education. Instead, it was to offer preliminary, context-specific evidence about what patients learned after being educated and conditions for patients to follow the education and adhere to it, and to inform the development of more responsive and patient-centred TB education strategies.

METHODS

Study Design and Setting

This study employed a descriptive quantitative design supplemented by a qualitative component. The quantitative component was used to describe participants' knowledge and medication adherence after receiving leaflet-supported health education, whereas the qualitative component was used to explore factors supporting or hindering medication adherence and transmission-prevention practices. The study was conducted at Simpang Lima Gumul Hospital, Kediri, from January to March 2026. The study was not designed to establish the causal effectiveness of leaflet-based education because it did not include a pre-intervention assessment, a control group, or random allocation. Accordingly, the findings were interpreted as descriptions of participants' conditions after the educational activity rather than as evidence of changes directly attributable to the intervention.

Population, Participants, and Sampling

The target population consisted of tuberculosis patients undergoing treatment at Simpang Lima Gumul Hospital during the study period. Participants were selected using purposive sampling based on predetermined eligibility criteria. The final sample consisted of 20 participants, including TB patients and family members who accompanied them during treatment. The manuscript should specify the number of TB patients and family members included, as well as the respective role of each group in the questionnaire, observation, and interview procedures. The inclusion criteria should include at least the participant's treatment status, age requirement, ability to communicate, willingness to participate, and availability during data collection. Exclusion criteria should identify conditions that could prevent participants from completing the study procedures or providing reliable information.

Health-Education Procedure

Health education was delivered using a leaflet accompanied by a direct explanation from a healthcare professional. Each educational session lasted approximately 15–20 minutes. The leaflet contained information concerning the nature and transmission of TB, the importance of regular medication use, the required duration of treatment, potential consequences of treatment interruption, and measures for preventing transmission within households and the wider community. The education was intended to reinforce the verbal information provided by healthcare professionals and to offer participants written material that could be reviewed after the session. To ensure procedural consistency, the manuscript should report whether education was delivered individually or in groups, identify the healthcare personnel responsible for its delivery, and describe whether the same educational protocol was applied to all participants. The source, development process, language, readability, and expert validation of the leaflet should also be specified.

Research Instruments

Data were collected using a structured questionnaire, an observation checklist, and a semi-structured in-depth interview guide. The questionnaire assessed two principal domains: knowledge concerning tuberculosis and adherence to the prescribed treatment regimen. Knowledge indicators should include understanding of TB transmission, treatment duration, medication-taking requirements, consequences of treatment interruption, and transmission-prevention practices. Adherence indicators should reflect relevant treatment behaviours, such as regular medication use, compliance with treatment schedules, attendance at follow-up services, and adherence to healthcare-provider recommendations.

The manuscript should report the number of questionnaire items, response format, possible score range, scoring procedure, and thresholds used to classify scores as good, sufficient, or insufficient. Because the results are presented as percentages and categorical levels, the derivation of the reported 76.5% score must be explained clearly. Evidence concerning content validity, construct validity where applicable, internal consistency, or pilot testing should also be provided.

The observation checklist was used to document relevant participant behaviours and responses during the educational process. The semi-structured interview guide was used to explore participants' experiences of TB treatment, perceived benefits of health education, family support, access to healthcare services, medication side effects, treatment fatigue, understanding of treatment duration, and other perceived barriers to adherence.

Data-Collection Procedure

Data collection was conducted after eligible participants received information about the study and provided informed consent. Leaflet-supported health education was then delivered by healthcare personnel for approximately 15–20 minutes. Following the educational session, participants completed the structured questionnaire according to the assessment schedule established by the researchers.

Observations were undertaken to obtain supplementary information regarding participant engagement and responses during the educational process. In-depth interviews were subsequently conducted with selected participants to obtain a more detailed understanding of the factors influencing treatment adherence and transmission-prevention behaviour. The manuscript should specify the interval between education and questionnaire administration, the criteria used to select interview participants, the duration and location of interviews, and whether interviews were audio-recorded and transcribed verbatim.

Quantitative Data Analysis

Quantitative data were analysed descriptively using frequencies, percentages, and mean scores. Participant characteristics and the distribution of knowledge and adherence categories were summarised using frequency and percentage distributions. Questionnaire scores were calculated according to the predetermined scoring procedure and converted into percentages before being classified into the relevant categories. No inferential statistical analysis was conducted because the purpose of the study was descriptive. Therefore, the quantitative results were used to characterise participants' post-education knowledge and adherence rather than to test the effectiveness of the educational intervention.

Qualitative Data Analysis

Qualitative data obtained from interviews and observations were analysed thematically. The analysis involved repeated reading of the interview records, identification of meaningful statements, initial coding, grouping of related codes, development of preliminary themes, review of theme consistency, and interpretation of the final themes. The analysis focused primarily on factors supporting or constraining medication adherence and transmission-prevention practices. Qualitative findings were used to contextualise the quantitative results by explaining why some

participants demonstrated stronger knowledge and adherence than others. The integration of the two data sources occurred during interpretation, with interview and observational findings used to provide a deeper explanation of the descriptive questionnaire results.

Research Rigour

Data credibility was strengthened through source and method triangulation. Information obtained from questionnaires was compared with relevant observations and interview accounts. The researchers should also report any additional strategies used to ensure qualitative rigour, such as member checking, peer review of coding, maintenance of an audit trail, or independent review of themes.

Ethical Considerations

The study was conducted in accordance with established ethical principles for research involving human participants. All participants received an explanation of the study objectives, procedures, potential benefits, confidentiality protections, and their right to refuse or withdraw without affecting their healthcare services. Written informed consent was obtained before data collection, and identifying information was removed or coded to protect participant confidentiality.

RESULT AND DISCUSSION

Post-Education Knowledge and Medication Adherence

A total of 20 respondents participated in the study. Following the delivery of health education using leaflets accompanied by verbal explanations from healthcare workers, the respondents obtained an average knowledge and adherence score of 76.5%. Based on the classification applied in this study, this average was included in the good category.

The post-education assessment indicated that most respondents understood essential information concerning tuberculosis, including its mode of transmission, the importance of taking anti-tuberculosis medication regularly, the need to complete the prescribed treatment duration, and the implementation of behaviours intended to reduce transmission. Approximately 70–80% of respondents were reported to demonstrate greater understanding after receiving the educational material. However, because the study did not report a pre-education measurement, this percentage should be interpreted as a descriptive post-session assessment or perceived improvement rather than as a statistically measured change from baseline. The distribution of respondents according to the knowledge and adherence categories is presented in Table 1.

Table 1. Distribution of Respondents by Knowledge and Adherence Category After Leaflet-Supported Health Education

Category	Number of Respondents	Percentage
Good	14	70%
Sufficient	4	20%
Insufficient	2	10%
Total	20	100%

Table 1 shows that 14 respondents, representing 70% of the sample, were classified in the good category. Four respondents, or 20%, were classified in the sufficient category, whereas two respondents, or 10%, remained in the insufficient category. These findings indicate that most respondents demonstrated favourable knowledge and adherence conditions after receiving leaflet-supported education. Nevertheless, the presence of respondents in the sufficient and insufficient categories suggests that the educational messages were not understood or translated into treatment-related behaviour uniformly across all participants.

Factors Supporting Medication Adherence

The qualitative findings identified three principal factors that supported medication adherence: family support, the involvement of healthcare workers, and access to healthcare services. Family members reportedly contributed by reminding patients to take their medication, accompanying them during treatment visits, and providing encouragement throughout the prolonged course of therapy. Such support appeared particularly important because TB treatment requires sustained behavioural commitment over several months.

Communication with healthcare workers also emerged as an important supporting factor. Respondents indicated that clear explanations from healthcare personnel helped them understand the purpose of treatment, the importance of medication regularity, and the consequences of treatment interruption. The leaflet appeared to function as supplementary material that reinforced the verbal information provided during the educational session.

Adequate access to healthcare services was another facilitating factor. Respondents who could attend health services and communicate with healthcare personnel more easily appeared to experience fewer practical barriers to continuing treatment. These findings suggest that adherence was supported not solely by the availability of written information but also by the wider interpersonal and service environment in which treatment was delivered.

Barriers to Medication Adherence

While the overall post-education outcomes were positive, there were still some challenges to overcome. Some of the more common concerns were fatigue with treatment, side effects of the medication, and the lack of knowledge about the length of treatment. Some patients became bored with the long duration of treatment for TB, and psychological fatigue resulted in a decreased interest in taking the TB medication on a regular basis. Uncertainty and discomfort also came about due to medication side effects. Patients with symptoms and/or a fear of side effects might be less willing to follow the treatment plan unless there was enough information and clinical assistance. Additionally, a few respondents persisted in not understanding the rationale behind treatment completion even after improved symptoms. These barriers show that the provision of information is not the only factor that affects medication adherence. While education can help to promote understanding, adherence also relies upon patients' physical experiences, psychological strength, family relations, interactions with health care providers, and access to ongoing treatment assistance.

The average score was 76.5% with 70% of the respondents in the good knowledge and adherence category following the health education using the leaflets. The results showed that the majority of the respondents could identify messages related to TB treatment and transmission prevention following the educational activity. The results are supported by Dameria et al. (2023), Puspitasari (2024), Okeyo & Dowse (2018), Rachlis et al. (2016), Gibney et al. (2014) who found that education using leaflets could help in disseminating health information about TB. The seeming utility of the leaflet may be due to the fact that it is structured and easily accessible to the reader. In contrast to verbal information alone, written information can be retained and re-read by patients and family members. This trait would be important in TB care because patients are asked to recall several instructions about drug dosage, length of treatment, follow-up visits, cough etiquette and how to prevent spreading the disease. The leaflet could thus have been used as a cognitive reinforcement device in addition to being a source of information.

The results, however, should not be interpreted as evidence of an increase in knowledge or adherence to medication due to the leaflet. Since this study did not have a baseline assessment, a comparison group, or inferential statistical analysis, the study was conducted to assess respondents after the educational session. Hence the observed score of 76.5% and the percentage for respondents in the good category reflect the post-education state of the respondents and do not provide a measure of change and improvement that is directly and exclusively due to the leaflet. It is also methodologically relevant to note that the knowledge and adherence of the

respondents could also have been impacted by factors such as past counselling, treatment history, education, family participation, and multiple encounters with health care providers. As the leaflet was mailed with a direct face-to-face education by health workers, it is not possible to distinguish the contributions of the written leaflet from the interpersonal education. The results should therefore be interpreted as representing the effect of health education which takes place based on the leaflet and not the effect of the leaflet alone.

The results also revealed that not everyone attained the good category. There were 30% combined in sufficient and insufficient. This variation means that if the same information is given to people, their understanding and behaviour will not be the same. The educational messages received and acted upon may vary based on differences in literacy, prior knowledge, treatment experience, motivation, perceived severity of illness, and perceived social support. Sometimes leaflets are less helpful when information has been made too technical, when the patient does not have a high level of reading ability or when leaflets do not directly answer the questions the patient is interested in. The qualitative results corroborate the qualitative interpretation that adherence is a multidimensional behaviour. Family support was identified as an important facilitator as members of the family were able to remind, encourage, and support with practical help. This can support patients in the long term treatment programs to sustain their behavioural patterns when they are low on motivation. But family engagement must not just be considered as an informal reminder system. Family members can also contribute to patients' knowledge of the disease, lessen sense of isolation, and foster ongoing involvement in health care.

The importance of healthcare workers was also highlighted. Clear and responsive communication seemed to help increase respondents' knowledge about treatment needs. The results of this finding indicated that the effectiveness of educational media relies greatly on the way the educational media is introduced and explained (Sahasrabudhe & Kanungo, 2014; Lawrence & Tar, 2018; Bernard et al., 2014). While a leaflet can give consistent and standardised information, health professionals are still required to help resolve misconceptions, address any worries about side effects and tailor information to the patient's particular situation. The barriers noted in this study are further examples of the constraints of information-centred approaches. Treatment fatigue is a psychological problem with sustaining therapy over time, and drug side effects are a physical and clinical one and cannot be addressed by a printed information sheet. Repeated education may be needed when there is limited understanding of the duration of treatment, but if non adherence is persistent, some counselling, follow-up, family involvement and clinical management of side effects may be necessary.

The results are also similar to Taylor et al. (2014), Pouls et al. (2021), Casale et al. (2019), Allegrante et al. (2019), who highlighted the importance of using printed education resources in supporting adherence in long-term treatment. The interpretation is extended by the present study, however, to demonstrate that educational materials are part of a larger support system. Education provided via leaflets can facilitate the reinforcement of knowledge, and positive adherence conditions include family involvement, communication between healthcare workers and the family, availability of services and responses to adherence challenges (Mackintosh et al. 2020; Goldfarb et al., 2022; Marcus, 2014; Lee et al. 2019).

The results indicate that leaflet-based public health education could continue as a viable addition to the standard TB care provided, especially when combined with face-to-face counselling. It should not be only used once in the educational process. These include repeated explanation, evaluation of the patient's understanding, family members' involvement, and the resolution of treatment barriers.

The study offers preliminary contextually-based evidence that good knowledge and adherence conditions were indicated for most respondents following health education using leaflets. The results also show that providing information is not enough to remove the social, psychological and treatment-related barriers of TB patients. The results were therefore in favor

of an educational approach that focuses on the patient, with leaflets providing support rather than replacing interpersonal communication and treatment.

CONCLUSION

This study found that health education using leaflets effectively increased the knowledge and compliance levels of tuberculosis patients at Simpang Lima Gumul Hospital in Kediri, with an average score of 76.5% in the good category and an increase in understanding reaching 70-80% of respondents. Key supporting factors included family support, the role of healthcare workers, and adequate access to services, while dominant obstacles were long-term therapy fatigue, drug side effects, and limited understanding of treatment duration. These findings align with previous studies that emphasized the role of simple visual media in the health behaviors of chronic patients.

SUGGESTION

However, this study was limited to a small sample size (20 respondents) and a single location, so generalization of the results requires caution. Suggestions for future research include expanding the sample size, using experimental designs, and developing innovative digital educational media. Practically, the research implications encourage the integration of leaflets as a standard tool in healthcare facilities to optimize TB treatment success, reduce transmission, and support the Ministry of Health's national program to promote patient adherence.

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