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Community Education And Assistance In Creating Healthy Physical Home Environments For People With Pulmonary Tuberculosis In Ngulak Sub-District, Musi Banyuasin

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Abstract

Background: *Pulmonary tuberculosis (TB) remains a public health problem in Indonesia. Poor housing conditions, such as inadequate ventilation, limited natural light, high humidity and crowding, increase the risk of TB transmission within households.* ***Objective:*** *To improve the knowledge of community members and families of people with TB about physical home environments that meet health standards as a means of preventing TB transmission.* ***Methods:*** *This community service activity was conducted in January 2025 in Ngulak Sub-district, Musi Banyuasin Regency, targeting community members and families of people with TB. It comprised a pre-test, education using slides and leaflets/posters, discussion, assistance on simple steps to achieve a healthy home, and a post-test.* ***Results:*** *Post-test results were better than pre-test results. Most participants understood the importance of ventilation, natural lighting, household cleanliness and clean and healthy living behaviour in preventing TB transmission, and actively asked questions about TB prevention at home.* ***Conclusion:*** *Education and assistance on healthy housing improved community knowledge. Monitoring of healthy-home practices and collaboration with the health centre and cadres are needed to translate knowledge into improved housing conditions.*

Keywords: pulmonary tuberculosis; healthy housing; ventilation; lighting; health education; community assistance

INTRODUCTION

Pulmonary tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis and transmitted through respiratory droplets released when an infected person coughs, sneezes, or speaks. The 2023 global TB report identifies Indonesia as having the second-highest TB burden in the world, after India, accounting for approximately 10% of all global TB cases (World Health Organization [WHO], 2023). The government has set a target to eliminate TB by 2030, as outlined

in Presidential Regulation Number 67 of 2021, which emphasizes the importance of community participation and the control of risk factors, including those related to the environment (Government of the Republic of Indonesia, 2021).

The physical environment of a home plays a significant role in the transmission of tuberculosis (TB), particularly among family members living in the same household as an infected individual. A systematic review indicates that high occupancy density and poor housing quality—including inadequate ventilation and high humidity—are risk factors for TB exposure and incidence (Lee et al., 2022). A meta-analysis of pediatric populations also found that high occupancy density (OR 2.29) and poor housing conditions are associated with the incidence of TB in children (Siddalingaiah et al., 2023). Inadequate ventilation hinders air circulation, allowing pathogen-laden droplets to remain in indoor spaces for longer periods, while a lack of sunlight increases humidity, which supports the survival of these pathogens. Environmental health standards for residential dwellings, including requirements for ventilation and lighting, are stipulated in the Minister of Health Regulation Number 2 of 2023 (Ministry of Health of the Republic of Indonesia, 2023).

Public knowledge is a prerequisite for independent home improvement efforts. Previous community service initiatives revealed that residents' understanding of tuberculosis (TB) transmission and the characteristics of a healthy home remains inadequate; therefore, education on controlling TB transmission must be accompanied by efforts to organize healthy living environments in collaboration with the residents (Setiyowati et al., 2022). Involving health volunteers is also essential for broadening the reach of TB-related education within the community (Sensusiati et al., 2023).

In Ngulak Village, Musi Banyuasin Regency, some residents' homes do not yet meet health standards—characterized by inadequate ventilation, minimal natural lighting, and suboptimal environmental hygiene—while public awareness regarding the role of a healthy home environment in preventing tuberculosis (TB) remains limited. Consequently, this community service initiative aims to enhance the knowledge of the general public and the families of individuals with pulmonary TB concerning the physical home environment that meets established health standards.

EXECUTION METHOD

The community service activity was conducted in January 2025 in Ngulak Village, Musi Banyuasin Regency, South Sumatra, with support from the village administration and local healthcare personnel. The target audience consisted of community members and families of individuals with pulmonary tuberculosis (TB). The educational materials used included PowerPoint presentations, leaflets, and posters. The stages of the activity were as follows:

1. Preparation: Coordination with the village administration and local healthcare personnel; development of educational materials, leaflets, posters, and PowerPoint presentations; and the creation of pre-test and post-test questionnaires.
2. Pre-test: Assessment of participants' baseline knowledge regarding pulmonary TB, risk factors for transmission, and the physical environment of a healthy home.
3. Health Education: Lectures and discussions covering the definition, causes, and transmission routes of pulmonary TB; risk factors for transmission within the home environment; criteria for a healthy home (including ventilation, natural lighting, humidity levels, occupancy density, and cleanliness); and disease prevention through clean and healthy living practices.
4. Guidance: Practical instruction on simple measures that can be implemented at home, such as opening windows and vents daily, utilizing natural sunlight, maintaining the cleanliness of the home and its surroundings, and practicing proper cough etiquette.
5. Post-test and Conclusion: A question-and-answer session, administration of the post-test (using the same questionnaire as the pre-test), and a summary of the key points.

The results from the pre-test and post-test were analyzed descriptively. Participant engagement throughout the activity was evaluated through observation.

RESULTS AND DISCUSSION

Implementation of activities

The activity was attended by community members and the families of individuals with pulmonary tuberculosis in Ngulak Village; the majority of the participants were homemakers. The outline of the activity is presented in Table 1. The educational session was conducted in an open, covered area within the residential neighborhood, utilizing leaflets and posters (Figures 1 and 2).

Table 1. Structure of Educational and Mentoring Activities for Healthy Homes

Stage	**Activity**	**Time**
Opening	Greetings, team introductions, statement of objectives; knowledge pre-test	3 minute
Presentation of material	Definition, causes, and modes of transmission of pulmonary TB; risk factors within the home environment; criteria for a healthy home (ventilation, natural lighting, humidity, occupancy density, cleanliness); and prevention through clean and healthy living behaviors (PHBS)	15 minute
Mentoring	Simple steps to follow: open windows/vents daily, make use of sunlight, keep the home clean, and practice proper cough etiquette.	–
Discussion and evaluation	Q&A; post-test on knowledge	10 minute
Closing	Summarizing the material and closing	7 minute

*Source: Community service activity report, 2025. *Time allocation is in accordance with the activity plan; the implementation of the pre-test, mentoring, and post-test extends the duration of the activity.*

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Figure 1. Presentation of information on healthy homes and the prevention of pulmonary TB transmission to residents



Figure 2. Group photo of participants and the community service team with educational posters Increased knowledge about healthy homes

The evaluation results show that post-test scores were better than pre-test scores. Following the educational session, most participants understood the importance of ventilation, natural lighting, household cleanliness, and healthy living habits as measures to prevent tuberculosis (TB). Throughout the activity, participants were enthusiastic and actively asked questions about how to prevent the transmission of TB within the home environment.

The topic of ventilation and lighting forms the core of these activities, as both are factors that families can improve at a low cost. Proper ventilation ensures air circulation, thereby reducing the concentration of infectious droplets indoors, while sunlight helps lower humidity levels. The significance of these factors is supported by evidence linking poor housing quality and overcrowding to an increased risk of tuberculosis (TB) (Lee et al., 2022; Siddalingaiah et al., 2023). For families living with someone who has TB, practical measures to reduce the risk of transmission include opening windows daily, avoiding sharing a bedroom with the affected individual during their infectious period (whenever possible), and practicing proper cough etiquette.

The role of accompaniment

Mentoring provides added value because participants do not merely receive information; they also gain direct guidance on how to implement "healthy home" standards tailored to their individual living conditions. This approach aligns with initiatives in Surabaya, which combine education on tuberculosis (TB) transmission control with the improvement of housing conditions in collaboration with local residents (Setiyowati et al., 2022). To ensure that these changes are sustainable, follow-up activities should involve community health volunteers (*kader*) to provide support at the neighborhood (*RT/RW*) level, as training for such volunteers has been shown to improve their knowledge regarding TB (Sensusiati et al., 2023). The follow-up plan includes periodic monitoring of participants' home conditions, coordination with local community health centers (*puskesmas*) and sub-district authorities, and the provision of regular health education during community activities.

Limitations

The activity report does not record the number of participants or quantitative pre-test and post-test scores; therefore, the extent of the increase in knowledge cannot be reported. Furthermore, the activity did not employ a comparison group, no statistical tests were conducted, and the physical conditions of the participants' homes—such as ventilation area, lighting intensity, and humidity—were not assessed either before or after the intervention.

CONCLUSION

Education and community outreach regarding the physical environment of a healthy home were successfully carried out in Ngulak Village, Musi Banyuasin Regency. These efforts improved the knowledge of community members—including families of individuals with pulmonary tuberculosis—about the importance of ventilation, natural lighting, household cleanliness, and the adoption of clean and healthy living habits to prevent the transmission of TB. Participants demonstrated enthusiasm and active engagement throughout the activities.

SUGGESTION

It is recommended that the sub-district office, community health centers (puskesmas), and health volunteers continue providing regular education on healthy housing and monitor its implementation, particularly within households affected by tuberculosis (TB). For future initiatives, it is advised to maintain comprehensive records—including the number of participants and their pre-test and post-test scores—apply statistical analysis, and assess the physical condition of the homes (e.g., ventilation area, lighting levels measured via a lux meter, and humidity levels measured via a hygrometer) both before and after the intervention.

THANK-YOU NOTE

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