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# Efforts to Prevent and Control Tuberculosis Transmission Among Household Contacts

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**Abstract:** Tuberculosis (TB) remains a major public health concern in Indonesia, particularly among household contacts of pulmonary TB patients. This community outreach initiative was conducted in Amantelu Subdistrict, Sirimau District, Ambon City, with the objective of reducing TB transmission through targeted interventions. The program involved door-to-door health education, distribution of educational materials (posters and leaflets), and sputum sample collection from household contacts. The educational materials emphasized Clean and Healthy Living Behavior (PHBS) as a strategy to prevent TB transmission. Based on field data, 9 suspected TB cases were identified in December 2024, with a contact screening coverage rate of 52.5%. Key barriers included low public awareness and insufficient collaboration between health workers and families. The program demonstrated that continuous health education and proper environmental conditions, such as ventilation and hygiene, are critical in TB prevention. Strengthening interpersonal communication between healthcare providers and communities is essential for improving TB control outcomes, especially in the post-pandemic era.

**Keywords:** tuberculosis, household contacts, PHBS, health education, community intervention, TB prevention

## 1. Introduction

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis, which primarily affects the lungs but can also invade other organs such as the skin, urinary tract, and digestive system. Transmission occurs through airborne droplets expelled when an infected individual coughs, sneezes, or talks. TB bacteria can survive for several hours in dark, humid environments but are sensitive to direct sunlight (Ernawati et al., 2018). Although TB can infect anyone, it is most commonly transmitted within households, especially among those with prolonged close contact with active pulmonary TB patients (Setiadi & Adi, 2019).

Globally, TB remains a major health burden. Indonesia ranks among the top three countries with the highest TB incidence after India and China (Making et al., 2023). In 2019, the World Health Organization (WHO) estimated that 10 million people developed TB. Despite a slight decrease in incidence, the reduction did not meet the End TB Strategy's target of a 20% decline in new cases between 2015 and 2020. Instead, only a 9% cumulative reduction was achieved (Making et al., 2023).

In Indonesia, based on data from the Ministry of Health, 351,936 TB cases were reported in 2020, which was a decrease from 568,987 cases in 2019. However, the treatment success rate also declined slightly from 83% to 82% (Making et al., 2023). The persistence of TB, despite these declines, keeps it prioritized in national health strategies, including in the Rencana Induk Riset Nasional (RIRN) with the goal of achieving TB elimination by 2030.

TB symptoms include a persistent productive cough lasting more than two weeks, sometimes accompanied by blood, chest pain, shortness of breath, fever, night sweats, weight loss, and general malaise (Sari, 2022). While not all individuals with TB are infectious, pulmonary TB patients are the main source of transmission in communities. Household contacts are at the highest risk due to frequent, close exposure (Setiadi & Adi, 2019).

Environmental and behavioral factors also influence TB transmission. Poor housing conditions, inadequate ventilation, and lack of awareness about preventive measures such as mask use significantly increase household risk (Mulasari, 2019; Ernawati et al., 2018). Moreover, limited interpersonal communication between healthcare workers and patients has been shown to affect treatment adherence and understanding of TB prevention, especially in resource-limited settings (Yuliastri, 2016).

During the COVID-19 pandemic and into the new normal era, TB prevention remains essential. The government has issued protocols to continue preventive health behaviors. Knowledge and attitude are critical components influencing TB prevention practices, especially within households (Making et al., 2023). When the public understands the risks and prevention

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methods of TB, individuals are more likely to engage in protective behavior and support early diagnosis and treatment. However, many people still lack sufficient knowledge and awareness, highlighting the need for effective health education and behavioral interventions.

## 2. Materials and Methods

This method was carried out based on a situational analysis of the community in Amantelu Subdistrict, Sirimau District, Ambon City. The activities included door-to-door health education visits to the homes of pulmonary TB patients, distribution of face masks, and dissemination of posters promoting TB transmission prevention through Clean and Healthy Living Behavior (PHBS).

The primary objective of this activity was to conduct a household contact investigation of pulmonary TB patients. Sputum samples were collected by health workers from Karpan Health Center from family members living in the same household as the TB patient.

Following the sputum collection process, data were gathered on household contacts who tested positive for TB infection. This was done by referring to the Performance Indicator Table of the Karpan Health Center Program as of December 2024, during follow-up home visits to families of confirmed TB patients. Details of the implementation can be found in Table 1.

**Table 1.** Implementation of Community Service Activities

| Nama Kegiatan | Bentuk Kegiatan |
|---|---|
| *Brainstroming* prevention of TB transmission through household contact | Karpan Health Center Health Officer discusses before examining TB patients who are household contacts |
| Education to prevent TB transmission through household contact | Karpan Health Center Health Workers conducted discussions and socialization with TB patients and their families |
| *Monitoring* and Evaluation | Karpan Health Center Health Officers discuss with TB patients and their families by looking at the results referring to the data of the Puskesmas Program Performance Indicator Table |

## 3. Results

**Table 2.** Performance Indicators of the Karpan Health Center Area Coverage Program in December 2024.

| KEGIATAN | SATUAN | TARGET | SASARAN | PENCAPAIAN (H) | | | CAKUPAN | GAP |
|---|---|---|---|---|---|---|---|---|
| | | (%) | (T) | BULAN LALU | BULAN INI | S.D BULAN INI | (H/T x 100%) | (TARGET-CAKUPAN (%) |
| Pelayanan orang Terduga TBC (Pelayanan SPM ) | % | 90 | 281 | 161 | 9 | 170 | 60,49 | 29,51 |
| Cakupan Pemberian Terapy Pencegahan TBC (TPT) pada kontak serumah | % | 70 | 40 | 7 | 0 | 7 | 17,5 | 52,5 |

Activity one (1) in the table above shows that there is a percentage of 29.51% of suspected patients, TB has not been reached, while for activity 2 (two) it is obtained that the percentage of families who have not been contacted is 52.5%.

## 4. Discussion

The outreach activity began with door-to-door visits by health workers from Karpan Health Center to the homes of tuberculosis (TB) patients. According to data obtained from the health center, there were nine suspected TB cases in Amantelu Subdistrict in December 2024, with a prevalence rate of 29.51%. These findings are presented in Table 2, reflecting the results of sputum screening and health assessments conducted by field officers.

Health education was carried out using leaflets and posters, distributed to each household. The posters focused on preventive behaviors in line with Clean and Healthy Living Behavior (PHBS) principles, which included: (1) eating nutritious food to boost immunity, (2) providing BCG vaccination for children under five to prevent severe TB (such as meningitis and miliary TB), (3) opening windows to allow sunlight and air circulation, (4) sun-drying bedding to reduce moisture, (5) regular physical exercise, and (6) avoiding smoking.

The leaflets contained educational subtopics such as: the nature of TB, its modes of transmission, clinical symptoms, PHBS in households, and prevention strategies. This approach aligns with Ifroh et al. (2019, as cited in Making et al., 2023), who noted that using communication, information, and education materials like leaflets is highly effective in raising public awareness and promoting healthy behaviors. Visuals based on daily life situations can significantly enhance people's understanding and influence their health-related actions.

However, as shown in Table 2, the coverage of TB Preventive Therapy (TPT) among household contacts remains low, at only 52.5%. This shortfall is likely due to weak collaboration between TB patients and healthcare workers during home contact investigations. Therefore, continuous education about the importance of sputum examination for suspected TB contacts is essential. Ongoing educational interventions are known to foster better hygiene practices and more responsible family behavior in preventing TB transmission (Ernawati et al., 2018).

Moreover, patients' knowledge regarding TB transmission methods remains limited, especially concerning behaviors that increase the risk of infection. This highlights the importance of government strategies such as the DOTS (Directly Observed Treatment Short-Course) program—a long-term TB treatment approach that requires sustained interpersonal communication, including friendly service and clear, consistent health information delivery (Yuliastri, 2016).

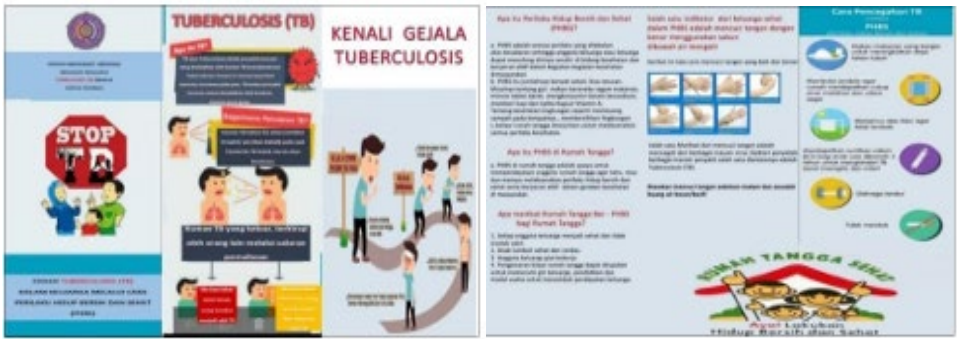


**Figure 1.** Leaflet


**Figure 2.** TB Prevention Poster through PHBS

Environmental factors also contribute significantly to TB prevention. Housing construction—particularly ventilation—plays a vital role. Good ventilation allows the expulsion of Mycobacterium tuberculosis into open air, where it can be destroyed by sunlight. Poor ventilation increases room humidity, which facilitates the growth of TB bacteria and other pathogens. Factors such as limited sunlight, the type of flooring, wall materials, and lack of adequate ventilation all contribute to an environment that supports bacterial survival (Setiadi & Adi, 2019).

## 5. Conclusions

This TB prevention program among household contacts in Amantelu Subdistrict demonstrated that structured community education, direct engagement through home visits, and the use of visual health communication tools are effective in increasing awareness and detecting potential TB cases. Despite moderate coverage (52.5%) of preventive therapy among household contacts, the initiative revealed key areas for improvement, such as the need for better patient-healthcare provider collaboration and more consistent public education on TB transmission. Environmental factors like adequate ventilation also play a significant role in reducing the risk of infection. Continuous and targeted education, supported by government strategies such as DOTS, remains essential in breaking the chain of TB transmission and achieving Indonesia's goal of TB elimination by 2030.

## Conflict of Interest

No conflicts of interest

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