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Enhancing Knowledge and Preventive Behavior Against Tuberculosis Through Family Based Interactive Education in Cihanjuang Rahayu Village, West Bandung

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Abstrak: Tuberkulosis (TB) tetap menjadi masalah kesehatan masyarakat yang serius di Indonesia, di mana tingkat prevalensi yang tinggi sering kali terkait dengan kurangnya kesadaran masyarakat tentang pencegahan, penularan, dan kepatuhan terhadap pengobatan. Program Pengabdian kepada Masyarakat (PkM) ini bertujuan untuk meningkatkan pengetahuan dan memperkuat perilaku pencegahan di kalangan penduduk Desa Cihanjuang Rahayu, Bandung Barat, melalui intervensi pendidikan berbasis keluarga yang interaktif. Desain quasi eksperimental dengan penilaian pra dan pasca tes diterapkan pada 45 peserta berisiko tinggi, termasuk kepala keluarga dan anggota keluarga inti. Sesi pendidikan berfokus pada gejala TB, etika batuk yang benar, ventilasi rumah, dan penerapan model Pengobatan Langsung Terawasi Keluarga (F-DOTS). Hasil penelitian menunjukkan peningkatan signifikan dalam pengetahuan (rata-rata pra-tes = 58,2; pasca-tes = 87,9; $p < 0,001$) dan perilaku pencegahan (rata-rata pra-tes = 65,1; pasca-tes = 90,3; $p < 0,001$). Hasil ini menunjukkan efektivitas strategi pembelajaran interaktif seperti diskusi kelompok, simulasi, dan studi kasus berpusat pada keluarga dalam mendorong perubahan perilaku. Pendekatan berbasis keluarga sangat berharga, karena anggota keluarga memainkan peran kunci dalam mendukung kepatuhan pengobatan dan menjaga lingkungan rumah yang sehat. Kesuksesan program ini menunjukkan perlunya mengintegrasikan inisiatif pendidikan serupa ke dalam

Kata Kunci: Perubahan perilaku, Pemberdayaan masyarakat, Intervensi berbasis keluarga, Pendidikan

kesehatan, Pencegahan tuberkulosis

program jangkauan Puskesmas lokal untuk mempercepat target eliminasi TB Indonesia pada tahun 2030.

Abstract: *Tuberculosis (TB) remains a major public health concern in Indonesia, where high prevalence rates are often linked to limited community awareness of prevention, transmission, and treatment adherence. This Community Service Program (PkM) aimed to improve knowledge and strengthen preventive behaviors among residents of Cihanjuang Rahayu Village, West Bandung, through an interactive family based educational intervention. A quasi experimental design with pre and post test assessments was applied to 45 high risk participants, including family heads and core household members. Educational sessions focused on TB symptoms, proper cough etiquette, home ventilation, and the implementation of the Family Directly Observed Treatment Short course (F-DOTS) model. Findings revealed significant improvements in knowledge (mean pre test = 58.2; post test = 87.9; $p < 0.001$) and preventive behavior (mean pre test = 65.1; post test = 90.3; $p < 0.001$). These outcomes demonstrate the effectiveness of interactive learning strategies such as group discussions, simulations, and family centered case studies in promoting behavioral change. The family based approach was especially valuable, as family members play a pivotal role in supporting treatment compliance and maintaining healthy home environments. The program's success suggests the need for integrating similar educational initiatives into local primary health center (Puskesmas) outreach to accelerate Indonesia's TB elimination target by 2030.*

Keywords: Behavioral change, Community empowerment, Family based intervention, Health education, Tuberculosis prevention

Introduction

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis and remains one of the leading causes of global morbidity and mortality. According to the World Health Organization (WHO), Indonesia ranks second after India among countries with the highest TB burden worldwide (WHO, 2023; WHO 2024). The challenge of TB control in Indonesia lies not only in case detection and drug availability but also in social and behavioral determinants, particularly in densely populated areas where housing sanitation and ventilation are inadequate (WHO, 2022).

Cihanjuang Rahayu Village, located in West Bandung Regency, represents one such area with relatively high population density. Its geographical and socioeconomic conditions correlate with increased TB transmission risk factors, such as limited exposure to sunlight inside homes, poor air circulation, and the common habit of

multiple family members sharing sleeping spaces. In this context, the community's low level of knowledge regarding modes of transmission, early symptoms, and the importance of completing treatment at minimum of six months becomes a major barrier to prevention and early case detection (Dinas Kesehatan Provinsi Jawa Barat, 2024).

Previous studies have shown that many newly diagnosed or suspected TB patients often delay seeking medical attention because they mistake chronic cough for a seasonal illness. Moreover, the social stigma attached to TB frequently leads to self isolation, which in turn hampers case reporting and contact tracing efforts (Tambunan, 2023). Such misconceptions and stigma contribute to the persistence of undiagnosed cases within the community, allowing the disease to spread silently among household members. Therefore, targeted health education and family based awareness interventions are essential to correct misinformation, reduce stigma, and encourage early medical consultation for suspected TB symptoms (Saripah et al., 2025).

To address these challenges, a health education approach that goes beyond passive lectures is needed, one that is interactive and behavior change oriented, focusing on the smallest social unit, the family. The family serves as the micro environment that determines the success of both prevention through environmental modification and treatment adherence through the role of the Pengawas Menelan Obat (PMO), or treatment supervisor (Syamsi et al., 2024; Ulva & Hikmi, 2024). Within the household setting, family members play a crucial role in monitoring symptoms, ensuring medication compliance, and reinforcing hygienic practices that reduce transmission risks. Therefore, empowering families through structured, interactive education can significantly strengthen community based TB control and contribute to achieving sustainable public health outcomes (Agustin et al., 2025).

This Community Service Program (PkM) was therefore designed to deliver family based interactive education, emphasizing the transformation of knowledge into tangible preventive actions such as improved coughing etiquette, optimal sunlight utilization, and a deeper understanding of the referral system within primary healthcare.o not indent the first paragraph of every new section but indent the first paragraph of every new subsection. The target population or community is highlighted, explaining the context in which the target population takes shelter. Discussing the facts or phenomena in the target population that are the basis for implementing community empowerment activities. Things that have been done by other parties in overcoming the problem. The research objective and target of

community empowerment activities are related to problems, challenges or community needs.

The specific objectives of this program were to:

1. Analyze the level of community knowledge in Cihanjuang Rahayu Village about TB before and after the educational intervention.
2. Increase the adoption of preventive behaviors related to household conditions and daily family interactions.
3. Provide an interactive health education model that can be replicated by local health cadres and the Puskesmas.

Method

This Community Service Program (PkM) employed a participatory health education approach. To evaluate its impact, a quasi experimental design was used with a one group pre test and post test model (Tambunan, 2025). This design allowed for the assessment of intervention effectiveness by comparing participants' knowledge and behavior before and after the educational activities. Location of PkM is Cihanjuang Rahayu Village, Parongpong sub district, West Bandung Regency. The location was selected based on data from the local Puskesmas indicating a high number of TB suspected cases and households with ongoing TB treatment.

The program was conducted over four effective weeks, covering needs assessment, intervention, and post intervention evaluation, during the period of month October to November year of 2024. The primary target group consisted of core family members, including heads of families, housewives, and adult family members who interact frequently within the home environment. A total of 45 participants were recruited based on the following inclusion criteria: (a) Residents of neighborhoods (RW) with active or recent TB cases, within the past two years and; (b) Willingness to participate and complete all questionnaires. The implementation was divided into three as described in the the *table 1.*

Tabel. 1 Community Service Program Implementation Stage

Stage	Time Frame	Key Activities	Description/Focus
A. Preparation and Assessment	Week 1	Coordination	Conducted initial coordination meetings with the Village Head, Health Cadres, and Puskesmas staff to validate TB case data and determine the program schedule.
		Material development	Designed educational modules (presentations, flip charts, and short videos) tailored to community literacy levels. Emphasized the Healthy Home for TB Prevention concept, focusing on ventilation, cleanliness, sunlight exposure, and coughing etiquette.
		Instrument evaluation	Developed and validated a knowledge questionnaire (15 multiple-choice items) and a preventive behavior questionnaire (10 Likert-scale items) aligned with the national TB program. Instruments were pilot-tested in a neighboring village.
B. Interactive Education Intervention	Week 2-3	Session 1: Basic knowledge and transmission	Conducted brainstorming to assess prior knowledge, followed by interactive explanations on TB symptoms, myths vs. facts, and early case detection. Duration: 120 minutes.
		Session 2: Preventive behavior and family role (F-DOTS)	Focused on practicing proper coughing etiquette, discussing household environmental modifications (e.g., rearranging furniture for better sunlight), and introducing the Family-Based Directly Observed Treatment Short-course (F-DOTS) approach. Duration: 120 minutes.

		Interactive learning methods	Included role-playing (cough simulation), group discussions, infographics, short educational videos, and active Q&A sessions to reinforce engagement and understanding.
C. Evaluation and Follow-Up	Week 4	Post-Test Measurement	Administered the same knowledge and behavior questionnaires after intervention to measure learning outcomes and behavior changes.
		Data Analysis	Data analyzed using SPSS. Conducted normality testing and Paired Sample T-tests to compare pre- and post-test mean scores, assessing statistical significance of improvements.

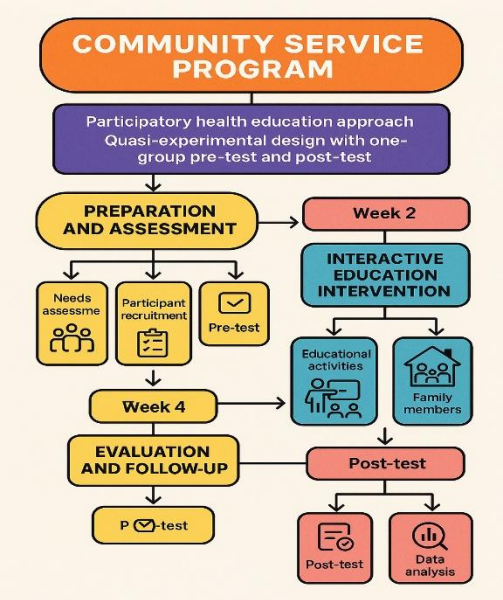

Figure 3. Flowchart PkM

Result And Discussion

A total of 45 participants completed all stages of the program, including pre test and post test assessments as described in Table 2. The majority of participants were women (77,8%), who typically hold a central role in household health management and sanitation decisions, and therefore possess high potential as Pengawas Menelan Obat (PMO) or treatment supervisors.

Tabel. 2. pre test and post test assessments as described

Characteristics	Frequency (N=45)	Percentage (%)
Gender:		
Male	10	22,2
Female	35	77,8
Education level:		
Elementary/No schooling	7	15,5
Junior high school	17	37,8
Senior high school	19	42,2
Higher education	2	4,5
Family TB history:		
History of TB contact	17	37,8
No TB contact	28	62,2

The comparative analysis showed a significant improvement in participants' knowledge levels after receiving the interactive educational intervention.

Tabel. 3 Comparison of Mean Knowledge and Behavior Scores (Pre test vs. Post test)

Variable	Mean pre test score (SD)	Mean post test score (SD)	Increase	t-value	P-value
Knowledge (Scale 0–100)	58.2 (11.5)	87.9 (6.8)	51.0%	-21.45	< 0.001*
Preventive Behavior (Scale 0–100)	65.1 (9.8)	90.3 (5.1)	38.7%	-18.78	< 0.001*

Note: Statistically significant at $\alpha = 0.05$ (Paired Sample T-test)

On the knowledge dimension, the mean score increased from 58.2 (fair/low) to 87.9 (good). The most notable improvement occurred in participants' understanding of transmission pathways through aerosol droplets and proper sputum handling. Before the intervention, 75% of participants still believed that TB could be transmitted

through shared eating utensils, but this number dropped sharply to 12% after the educational sessions.

A significant improvement was also observed in preventive behavior scores, which rose from 65.1 to 90.3. The most visible and measurable behavioral changes included:

1. Cough etiquette: After simulation exercises, participants consistently demonstrated the ability to cover their mouths with their elbows or tissues when coughing, unlike before the intervention, when many used their hands or left their mouths uncovered.
2. Home environment modification: Several participants reported taking immediate actions after the educational sessions, such as moving bulky furniture away from windows and ensuring windows remained open for at least four hours daily to optimize air circulation and exposure to ultraviolet light, which helps kill TB bacteria.
3. Role as PMO: Families with ongoing TB treatment showed a stronger understanding of the importance of being supportive PMOs and of maintaining daily medication compliance records.

The results strongly support the hypothesis that family based interactive education effectively enhances health literacy and promotes preventive behavioral change in TB endemic communities. The $p < 0.001$ significance level confirms that improvements in both knowledge and behavior were not random but directly attributable to the intervention. The 51% increase in knowledge scores can be attributed to the interactive methods applied. Unlike conventional lectures, interactive education actively engages participants through role playing and case studies. This approach aligns with Social Learning Theory (Rumjaon & Narod, 2025), which explains that behavioral change occurs through observation, imitation, and experiential learning called self efficacy. When participants simulated proper coughing etiquette, they gained confidence in applying it in real life situations (Kahar et al., 2023).

Focusing on the family unit was a key factor in achieving behavioral transformation. In TB control, families serve two essential functions (Sakar, 2025; Alinaitwe et al., 2025):

1. Environmental filter: Families regulate household risk factors such as ventilation and occupancy density. Improved knowledge among housewives about ventilation directly contributes to a healthier living environment for all members.

2. Support system for treatment adherence (F-DOTS): Non adherence to treatment remains a major barrier to TB control, often leading to multidrug resistant TB (MDR-TB). By training family members as PMOs, the program ensures continuous medication adherence under the supervision of those who care most.

This program successfully created community level change agents. Health cadres who participated in the sessions now possess both educational modules and facilitation skills to continue TB education independently. However, sustainability remains a key challenge. Although both knowledge and behavioral intention scores increased significantly, maintaining long term preventive behaviors such as consistently opening windows or automatically practicing cough etiquette in public requires periodic reinforcement and supervision (Gurusinga et al, 2024). Therefore, follow up home visits by health cadres and integration of TB education into monthly Posyandu (community health posts) are strongly recommended (Septiyaningsih et al., 2024).

Figure 2. Coordination with cadres

Figure 3. Interactive learning activity

Conclusion

The implementation of the Community Service Program (PkM) titled "Enhancing Knowledge and Preventive Behavior Against Tuberculosis Through Family Based Interactive Education in Cihanjuang Rahayu Village, West Bandung" successfully achieved its objectives. The interactive educational intervention demonstrated a highly significant improvement ($p < 0.001$) in participants' knowledge and measurable adoption of TB prevention behaviors among 45 family participants. The family based approach proved effective in transferring essential understanding of TB transmission, proper cough etiquette, and healthy home environmental practices. Furthermore, it strengthened social support systems for TB patients and effectively reduced the risk of household transmission in densely populated areas. This study underscores that community based family education can serve as a replicable and sustainable model for TB prevention and control at the local level.

Based on the results of this program, several recommendations are proposed to ensure sustainability and strengthen public health interventions:

1. Integration with primary health centers (Puskesmas): It is recommended that the Parongpong Sub district Puskesmas adopt this interactive educational module as part of routine health cadre training and use it as a mandatory outreach material in TB prone areas.
2. Long term monitoring: A follow up study should be conducted within 3–6 months to measure knowledge retention and the consistency of newly adopted preventive behaviors among families.
3. Empowerment of health cadres as facilitators: Additional training should be provided to Cihanjuang Rahayu health cadres on interactive facilitation techniques, enabling them to conduct independent educational sessions without relying on academic teams.
4. Focus on adolescent groups: Future interventions should expand to include school aged adolescents, who often serve as potential transmitters in public or school settings and possess strong potential to become change agents within their households.

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References

Agustin, I., Azwaldi, Noviani, I., Febriani, L., & Wulansari, N. (2025). Empowering families in pediatric tuberculosis treatment: Enhancing adherence through education and support. CHIPROF, 4(1), 291–298. Retrieved November 4, 2025, from https://www.rumahprof.com/index.php/CHIPROF/article/view/92

Alinaitwe, B., Shariff, N. J., & Boddupalli, M. B. (2025). Treatment adherence and its association with family support among pulmonary tuberculosis patients in Jinja, Eastern Uganda. Scientific Reports, 15, Article 11150. https://doi.org/10.1038/s41598-025-96260-8

Dinas Kesehatan Provinsi Jawa Barat. (2024). Setiap 5 menit, 2 warga Indonesia meninggal karena TBC: Dinkes Jabar perkuat deteksi dini dan pendampingan komunitas [Every 5 minutes, 2 Indonesian residents die from TBC: West Java Health Office strengthens early detection and community assistance]. Retrieved November 2, 2025, from https://ppid-diskes.jabarprov.go.id/informasipublik/detail_berita/RkVsVnRsenRVais2alhjYTdNME1lQT09

Gurusinga, R., Yunus, A., & Putra, T. (2024). Edukasi etika batuk yang benar dalam upaya pencegahan penularan penyakit TB paru di Puskesmas Galang [Education on correct cough ethics in an effort to prevent the transmission of pulmonary TB disease at Galang Health Center]. Jurnal Pengabdian Kepada Masyarakat, 4(1). https://doi.oeg/10.35451/jpk.v4i1.2179

Kahar, F., Sugihantono, A., Irnawati, Yusuf, M., Wikandari, R. J., Kurniasiwi, P., Salam, A., & Wadood, A. (2023). Community empowerment through program mentoring health promotion model (HPM) and training in correct sneezing etiquette as an effort to prevent cases of tuberculosis (TBC). Prosiding Seminar Nasional UNIMUS, 6, 1298–1312.

Rumjaun, A., & Narod, F. (2025). Social learning theory—Albert Bandura. In B. Akpan & T. J. Kennedy (Eds.), Science education in theory and practice (pp. 85–99). Springer. https://doi.org/10.1007/978-3-031-81351-1_5

Saripah, I., Supriadi, S., Kamil, M., Pramudia, J. R., & Boriboon, G. (2025). The dynamics of family support and social challenges in the management of pulmonary tuberculosis patients: A case study in Bandung City. Media Penelitian Dan Pengembangan Kesehatan, 35(1), 239–244. https://doi.org/10.34011/jmp2k.v35i1.2571

Sarkar, M. (2025). Tuberculosis infection prevention and control. Indian Journal of Tuberculosis, 72(3), 394–400. https://doi.org/10.1016/j.ijtb.2024.08.011

Septiyaningsih, N. E. P., Mandagi, A. M., Ramadhan, S., & Septianingrum, S. T. A. P. (2024). Empowerment of tuberculosis cadres with participatory socialization as an effort to improve the TB suspect's achievements at the Sempu Public Health Center. Journal of Community Empowerment for Health (JCOEMPH), 7(2), 100–104. https://doi.org/10.22146/jcoemph.90429

Syamsir, S. B., Permatasari, H., Rachmawati, U., Herlinah, L., Setiawan, A., Supriyatno, H., & Natashi, D. (2024). Tuberculosis care through family-based nursing care: A case study approach. Journal of Pubnursing Sciences, 12(01), 1–9. https://doi.org/10.69606/jps.v2i01.102

Tambunan, E. H. (2023). Exploring the experiences of family caregivers caring for patients with tuberculosis at home. Jurnal Ners, 7(2), 1741–1749. https://doi.org/10.31004/jn.v7i2.20525

Tambunan, E. H. (2025). Buku ajar metodologi penelitian keperawatan [Nursing research methodology textbook]. Diva Pustaka.

Ulva, F., & Hikmi, N. (2024). Optimalisasi peran keluarga sebagai pengawas menelan obat pada pasien TB paru [Optimizing the role of the family as an observer of taking medication in pulmonary TB patients]. JPIK (Jurnal Pengabdian Ilmu Kesehatan), 3(1). https://doi.org/10.33757/jpik.v3i1.58

World Health Organization. (2022). Global Programme on Tuberculosis and Lung Health. Retrieved November 2, 2025, from https://www.who.int/teams/global-programme-on-tuberculosis-and-lung-health/tb-reports

World Health Organization. (2023). Tuberculosis (TB) (Fact sheet). Retrieved November 2, 2025, from https://www.who.int/news-room/fact-sheets/detail/tuberculosis

World Health Organization. (2024). Indonesia takes leadership role in tackling TB with development of new vaccine candidates. Retrieved November 2, 2025, from https://www.who.int/indonesia/news/detail/13-11-2024-indonesia-takes-leadership-role-in-tackling-tb-with-development-of-new-vaccine-candidates