

Challenges and Opportunities in Implementing Tuberculosis Prevention Therapy in Developing Countries: A Scoping Review

Brigadini Ayuning Putri^{1*}, Martha Irene Kartasurya², Bagoes Widjanarko³

Diponegoro University, Indonesia^{1,2,3}

Email: brigadiniayuptr@gmail.com*

ABSTRACT

Tuberculosis Prevention Therapy (TPT) is an effort to prevent tuberculosis (TB) in people who have close contact with TB-positive patients. However, the challenges and opportunities in implementing TPT have not been fully explored. This study aims to examine the challenges and opportunities in implementing TPT within health services in developing countries. A systematic search was conducted using electronic databases (Scopus, PubMed, Science Direct, ProQuest) for literature published between 2015 and 2025. Following the PRISMA-ScR guidelines, 10 articles from various developing countries were included in the final analysis. Studies available in English with quantitative or qualitative designs and free full-text access were selected. The findings reveal that limited access to health services, inadequate health resources, insufficient knowledge, and adverse social environments constitute the primary challenges to implementation. Conversely, stakeholder support and strategic development of health services present significant opportunities to improve TPT uptake and completion. These insights provide evidence-based guidance for policymakers and healthcare practitioners to formulate targeted strategies that address implementation barriers and leverage existing opportunities to reduce the TB burden in resource-limited settings.

KEYWORDS

Developing Countries; Therapy Prevention Tuberculosis; Tuberculosis



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INTRODUCTION

Tuberculosis (TB) is an infectious disease that remains a major global health problem. The World Health Organization (WHO) reported that in 2023 there were 10.8 million TB cases worldwide, with most cases occurring in developing countries such as India, Indonesia, China and other developing countries (WHO, 2024). TB sufferers in developing countries are more common in men and children with a significant mortality rate. Efforts to reduce the number of TB cases require prevention through Tuberculosis Prevention Therapy (TPT). TPT prevents TB bacterial infections from developing by reducing the risk of active TB disease by 24-86% in at-risk populations (Ministry of Health of the Republic of Indonesia, 2020).

TPT has been shown to be significantly effective in reducing TB disease in people who have close contact with exposed individuals and are at high risk, as determined by a positive tuberculin test result. Therefore, WHO recommends screening and treatment (Santesso et al., 2016). In areas with high TB prevalence, with various challenges such as access to health services, health resources, and community stigma, effective screening and treatment are still controversial due to the complexity of implementing health policies. (WHO, 2024; Campbell & Menzies, 2022)

In Indonesia specifically, the 2023 Ministry of Health report indicates that TPT coverage remains far below national targets, with significant barriers in both urban and rural settings. This gap highlights the urgent need for comprehensive analysis of implementation challenges

and opportunities. According to research conducted by Appiah et al. (2023), many communities in developing countries maintain negative perceptions toward TB patients, which significantly impedes their participation in TPT programs. This indicates that social and cultural elements must be carefully considered when designing and implementing TPT interventions. To achieve optimal TPT coverage, access to quality health services is essential. However, in many developing countries, particularly rural areas, access to health facilities and TPT medications remains severely limited. Compounding factors such as poverty, low educational attainment, and inadequate awareness regarding tuberculosis prevention further exacerbate these access barriers (Souza et al., 2021; Wysocki et al., 2016).

The urgency of this research stems from the persistent gap between WHO's End TB Strategy targets and actual TPT implementation outcomes in developing countries. While TPT is a proven intervention, systematic barriers prevent its scale-up, resulting in preventable TB cases and continued disease transmission. The novelty of this study lies in its comprehensive synthesis of implementation challenges and opportunities across diverse developing country contexts, providing an integrated framework that addresses service delivery, human resources, knowledge systems, and social determinants simultaneously.

Early identification of TB-exposed individuals constitutes the initial step in the TPT care cascade. Access to contact screening and TPT service delivery can be enhanced through active contact tracing and decentralization of patient-centered contact management services to the community level (Vasiliu, Salazar-Austin, et al., 2022; Eshetu et al., 2025). However, there is limited research that comprehensively examines both the challenges and opportunities for TPT implementation across diverse developing country contexts, particularly studies that integrate multiple implementation domains including health systems, human resources, knowledge barriers, and social factors. Therefore, this study aims to systematically identify and analyze these multifaceted factors influencing TPT implementation.

This research is expected to provide valuable insights for policymakers, program managers, and healthcare practitioners in formulating evidence-based strategies to overcome implementation barriers and leverage existing opportunities. By identifying critical success factors and persistent challenges, this study contributes to strengthening TPT programs and ultimately reducing the TB burden in developing countries. The benefits extend to improved TPT coverage, enhanced treatment completion rates, and more efficient resource allocation for TB prevention initiatives.

METHOD

This research began with the initial stage, namely conducting a data-based article search (Scopus, PubMed, Science Direct, and Proquest) The method used in the literature search uses the PCC criteria method (Population, Concept, Context). The population in this study were patients undergoing TPT treatment. The concept in this study is the implementation of TPT, while the context in this study is the challenges and opportunities in implementing TPT in developing countries. Article searches were carried out using the keywords " tuberculosis " OR "TB" OR " mycobacterium tuberculosis " AND " prevention " OR " intervention " OR " control " AND " therapy " OR " treatment " OR " management " OR AND " implementation " OR " adoption " OR " execution " OR " application " AND " challenges " OR " barriers " OR " issues " AND " opportunities " OR " benefits " OR " advantages " .

The next stage is the systematic filtering of articles using the Preferred guidelines. reporting Items for Systematic Review and Meta- Analyses extension for Scoping Review (PRISMA- ScR). After screening, inclusion and exclusion criteria were applied. The inclusion criteria for this study were (1) articles within the last ten years (2015-2025); (2) articles discussing the implementation of TPT in developing countries; (3) articles with patient populations undergoing TPT; (4) articles with qualitative or quantitative research types. The exclusion criteria applied were articles with scoping research. review, meta- analysis, systematic review, literature reviews, as well as articles that cannot be fully accessed.

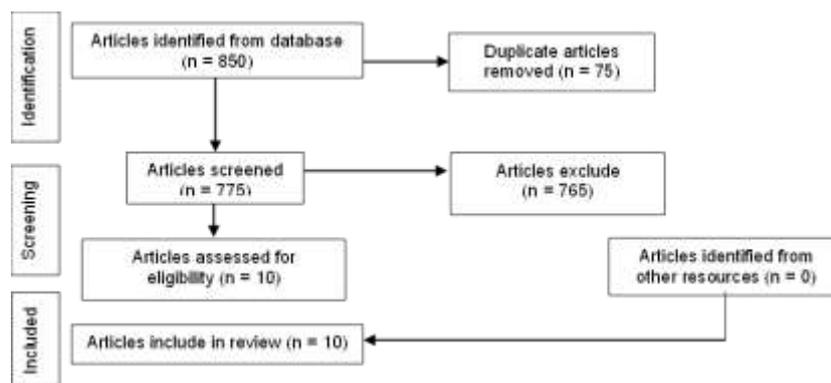


Figure 1. PRISMA-ScR Flow Diagram for Article Selection Process

RESULT AND DISCUSSION

The article search stage yielded 764 articles matching the keywords. After conducting the article search, article screening was conducted, including the title, abstract, and full text. Ten articles that met the inclusion criteria were included in the scoping This review used qualitative and quantitative research methods. The articles extracted came from developing countries, namely Ethiopia, India, Uganda, Cambodia, Cameroon, Peru, Kenya, South Africa, and Southeast Asia.

Based on the ten articles in this study, there are 6 articles that show that there are limited access to health services. for handling TPT (Amuge et al., 2024 ; Amisi et al., 2021 ; Yuen et al., 2021; Samudyatha et al., 2023 ; Alvi et al., 2024 ; Eshetu et al., 2025). There are 2 research articles that show that public opinion about TB can affect TPT treatment (Samudyatha et al., 2023 ; Amuge et al., 2024). Lack of awareness and understanding of people about TPT can also affect the implementation of TPT provision as stated in 4 research articles (Alvi et al., 2024 ; Amuge et al., 2024 ; An et al., 2023 ; Vasiliu, Tiendrebeogo, et al., 2022). Health workers who play an important role in the implementation of TPT are still a challenge in the implementation of TPT in several developing countries as stated in 6 research articles (Ginderdeuren et al., 2019 ; Amisi et al., 2021 ; Vasiliu, Tiendrebeogo, et al., 2022 ; An et al., 2023 ; Samudyatha et al., 2023 ; Alvi et al., 2024).

Table 1. Research Findings

Article Title, Author, Year	Study design	Subject	Challenges	Opportunities
Eshetu, et al.2025 Community-Based Tuberculosis	Qualitative	Patient TPT recipients: 301	Limited access to health services	Taking a community-based approach

Article Title, Author, Year	Study design	Subject	Challenges	Opportunities
Preventive Treatment Among Children and Adolescents Household Contacts in Ethiopia				
Yasir, et al. 2024 Situation Analysis of Early Implementation of Programmatic Management of Tuberculosis Preventive Treatment among Household Contacts of Pulmonary TB Patients in Delhi, India	Qualitative	Patient TPT recipients : 301	Lack of drug availability Budget constraints Lack of training for health workers	I do regular training and create a special team Conducting centralized drug procurement
Pauline, et al. 2024 Facilitators and barriers to initiating and completing tuberculosis preventive treatment among children and adolescents living with HIV in Uganda : a qualitative study of adolescents, caretakers and health workers	Qualitative	Provider service health : 10 Teenager contact close with TB patients : 10 PMO (Supervisor) Drink Medicine): 30	Negative societal stigma regarding TB and HIV Limited access to health services Lack of parental safety and support	Availability of social support, youth-friendly services Taking a community-based approach
Samudyatha, et al. 2023 outcomes and Challenges in the Programmatic Implementation of Tuberculosis Preventive Therapy among Household Contacts of Pulmonary TB Patients: AMixed - Methods Study from a Rural District of Karnataka, India	Quantitative and qualitative	Patient TPT recipients : 301 PMO (Supervisor) Drink Medicine): 28	Limited information provided by health workers Negative stigma in society regarding TB Logistical limitations	Do regular training Strengthening health systems to improve screening and monitoring in a way periodically Taking a cross-sectoral approach
Yom, et al. 2023 They don't have symptoms – why do they need to take medicine? Challenges in tuberculosis preventive treatment among children in Cambodia : a qualitative study	Qualitative	Provider service health : 16 PMO (Supervisor) Drink Medicine): 28	Limited information provided by health workers Lack of knowledge from caregivers and parents	Building partnerships with various communities
Anca, et al. 2022 Feasibility of a randomized clinical trial evaluating a community intervention for household tuberculosis child contact management in	Quantitative and qualitative	Contact child close with TB cases : 1500	Lack of compliance during TPT treatment Lack of health resources	Taking a community-based approach Full training and support for health workers

Article Title, Author, Year	Study design	Subject	Challenges	Opportunities
Cameroon and Uganda Courtney, et al. 2021 Toward patient-centered tuberculosis preventive treatment: preferences for regimens and formulations in Lima, Peru	Qualitative	Patient TPT recipients : 46	Lack of drug availability	Development new, child-friendly regimen with a short duration
James, et al. 2021 Closing the loop in child TB contact management: completion of TB preventive therapy outcomes in western Kenya	Qualitative	Children receiving TPT: 553	Low level of TPT completion Limited data and health workers Referrals to health services are inadequate Lack of understanding about TPT	Clinic-based interventions Implementing a screening program There is support from international programs such as REACH Taking a community-based approach
Sandip, et al. 2020 The potential impact of preventive therapy against tuberculosis in the WHO South-East Asian Region: a modeling approach	Quantity	11 countries	Lack of health resources Lack of knowledge	involvement can create a compliant environment for implementing TPT Focus on household close contacts as a whole in the community
Eva, et al. 2019 Health system barriers to implementation of TB preventive strategies in South Africa primary care facilities	Qualitative	Patient TPT recipients : 925	Logistical limitations Lack of health resources	Clear delivery of information by health workers to patients Clear process regarding reporting on TPT receipts

Discussion

Main themes in scoping the review that has been analyzed through the article is access to health services, health worker resources, lack of awareness and understanding of TPT, as well as public opinions or views regarding TPT. TPT can be implemented effectively with behavioral changes using the main B-COM model (' Capability ', ' Opportunity ', and ' Motivation ') in patients, providers, and the health service system (16).

Access to health services

Good, integrated healthcare services are crucial for people undergoing treatment. Access to healthcare services, including contact investigations, drug logistics, access to healthcare services, and data monitoring, can reduce the burden of TB and improve people's quality of life.

System service health

Contact investigation is often a challenge in TPT implementation due to limited information from health workers and stigma from the surrounding community, necessitating community-based contact investigation. These community interventions have a significant impact. Previous studies have shown that Community interventions can increase TPT coverage among child contacts within the household. (Datiko et al., 2017 ; Hall et al., 2015 ; Yassin et al., 2020 ; Tefera et al., 2019)

The basis of community intervention is the explanation and counseling provided by TB officers at the first visit with the index case. (9) Community-based interventions helped increase the number of screened contacts by 10-fold among contacts in the study by Eshetu et al. (2025). Community interventions can facilitate community access to health services, provide support to people undergoing treatment so that they are compliant with treatment until they can complete treatment. (Eshetu et al., 2025 ; Vasiliu, Tiendrebeogo, et al., 2022)

Management logistics drug

In some developing countries, drug availability is a challenge in addressing TPT treatment. The challenge of drug availability is universal, affecting India and other countries. (Singh et al., 2017 ; (Makova et al., 2022 ; Ryckman et al., 2023) The challenge of drug shortages can be addressed through increased financing and centralized drug procurement, which will improve supply chain stability. However, to reduce stockouts, this should also include providing a dedicated budget for local purchasing. Research also highlights that long-term drug administration can hinder treatment adherence. Patients on TPT treatment desire a short-acting TPT treatment that is preferred by children. (Eshetu et al., 2025 ; Yuen et al., 2021) Improving adherence to this medication can be achieved by administering short-term medication, namely 3HP (Isoniazid and Rifapentine) or 3HR (isoniazid and rifampicin). More than 98.0% of household close contacts were initiated on 3HR, as a dispersible tablet that dissolves in water to produce a fruit-flavored liquid. (11) This regimen can be proposed as a potential solution for TPT acceptance and adherence because it is a child-friendly, short-term treatment program that increases completion rates and is cost-effective. (Makova et al., 2022 ; Ryckman et al., 2023 ; Campbell & Menzies, 2023 ; Alvi et al., 2024 ; Heuvelings et al., 2017 ; Szkwarko et al., 2017 ; Vasiliu, Salazar-Austin, et al., 2022 ; Eshetu et al., 2025)

Recording and reporting

The TPT form is a systematic documentation tool for recording every step in the prevention process. This form ensures that all important information is neatly recorded, from identifying high-risk individuals, such as those close to TB patients, to initiating and completing therapy. This is crucial for monitoring treatment outcomes and progress. Research in South Africa highlighted potential inaccuracies in TPT implementation, based on recorded data caused by inadequate health resources. This is crucial because register-based data on TPT uptake serves as the basis for evaluation and strategic action by the Ministry of Health and the WHO (Ginderdeuren et al., 2019). Research by Samudyatha et al. (2023) suggests that healthcare management documentation in India should be strengthened with individual-level data at every step of the cascade. Provision should be made for such documentation in NIKSHAY to facilitate real-time monitoring and action.

Health resources

Effective contact identification and screening require support from healthcare professionals. Previous research has found that many healthcare professionals lack competence, lack confidence, or are even understaffed, with high workloads. This can lead to high dropout rates in contact identification, decreased program compliance, and concerns about the effectiveness of TPT, including potential side effects during treatment.

Research in Lesotho found that caregivers of children who are PMOs are not overly concerned about medication side effects, but they should receive adequate education from healthcare professionals. This information delivery is a concern that some healthcare professionals fail to address (Hirsch-Moverman et al., 2018; Yuen et al., 2021). Research by Vasiliu et al. (2022) also found that healthcare workers preferred by PMOs are those who are well-trained, responsible, and polite in explaining all activities related to the TPT process. This is important because it can build trust among TPT service recipients (Vasiliu, Tiendrebeogo, et al., 2022). Research shows that capacity building through knowledge transfer alone is not enough; it requires mentoring visits, staff motivation, and a participatory environment (Ginderdeuren et al., 2019).

Given the shortcomings of existing health workers, opportunities for improvement can be created by providing training manual guidelines, recruiting new health workers specifically for TPT to meet the increased workload resulting from the introduction of TPT, as well as effective contact tracing, screening, and increased compliance in the program (Hirsch-Moverman et al., 2020), and regular training that can address the shortage of human resources for TPT implementation. More comprehensive training for health care providers responsible for TB, along with public awareness campaigns about TPT, is essential (Alvi et al., 2024). Simple and informative information regarding the risks and benefits of TPT should be disseminated through leaflets and community education sessions, with emphasis on the high risk of developing severe TB disease, especially in children who do not receive TPT (An et al., 2023).

Knowledge

Research in Central India, Ethiopia, Zimbabwe and South Africa shows that lack of knowledge is a major barrier to TPT implementation (Singh et al., 2017; Makova et al., 2022; Fentahun et al., 2020). This knowledge has a significant impact on the community because they are worried about TPT treatment because TPT is given to people who do not show symptoms, the duration of treatment and the side effects experienced during treatment (Alvi et al., 2024). In addition, it can make people afraid of stigma or discrimination from others and low community participation in screening children for latent TB infection and providing TPT (Masini et al., 2020).

Knowledge regarding TPT needs to be improved to align information, resolution, and treatment success. Efforts to improve knowledge for PMOs and those receiving TPT include effective counseling and education, comprehensive education campaigns targeting patients and community members, which can be conducted through mass media, and cross-sectoral approaches. (Barss et al., 2020 ; Alvi et al., 2024 ; Samudyatha et al., 2023) This effort can help in misunderstanding, increasing understanding and awareness of the benefits of TPT is a priority for maximizing the implementation of TPT. (Surie et al., 2019 ; An et al., 2023)

Social environment

Index patients' refusal to undergo contact tracing visits by health workers was due to fear of stigma about TB and discrimination by household members and neighbors. Index patients were hesitant to allow the health team to visit their homes because it would attract attention from the surrounding community. Health workers tried to overcome these barriers by counseling index patients regarding confidentiality and the contact tracing process, symptom screening, and the need for TPT for their contacts. A consistent cross-sectoral approach should be adopted to spread awareness about Tuberculosis and TPT among health workers and the general public (Samudyatha et al., 2023).

Social support is crucial in determining the initiation and completion of TPT. There is a need to provide integrated, youth-friendly services to facilitate the initiation and completion of TPT (32). Youth-friendly services should be accessible, acceptable, appropriate, and delivered in a safe and responsible environment by supportive health care providers. These services include promotive, preventive, curative, and referral health services (Masini et al., 2020 ; Amuge et al., 2024).

Despite a careful search strategy, some studies may have been missed because the selected literature was only in English. This can be considered a limitation of this review. One of the strengths of this study is the review of recent articles. with diverse subjects so that can provide input to stakeholders' interest in implementation of TPT to find the best way to increase access service health, sources Power health, knowledge, and environment social in order to maintain the quality of service health.

CONCLUSION

The implementation of TPT in developing countries still faces various challenges, such as limited access to health services, lack of public knowledge, stigma against TB patients, and a lack of health resources. Although TPT can reduce TB cases, its success depends heavily on collaboration between governments, health workers, patients, and communities. A more holistic and effective strategy such as conduct clear and interesting educational programs, training power health periodic, involvement stakeholders' interest as well as improvement access service health needed to reduce the burden of TB in the community. Further research is expected to explore this in more depth. about quality service TPT can thus help formulate more effective service strategies to reduce the burden of TB in developing countries

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