Bridging the Gap: The Role of International Aid Agencies in Shaping Tuberculosis Control Policy in India

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ARTICLE INFO	ABSTRACT
	Background: Still a serious worldwide health issue, tuberculosis (TB) especially in India with the greatest TB load poses challenges. Aiming to improve TB control efforts in India, the "Directly Observed Treatment, Short-course (DOTS) under the Revised National Tuberculosis Control Program (RNTCP)" marked a major policy change when adopted in 1997. ***Objectives:*** The objectives of this study are to analyse the dissemination and implementation of WHO's DOTS strategy from an international to a national level, evaluate the integration of local expertise and community responses into the RNTCP, and identify the implications of these processes for TB control policies in India. ***Methods:*** Emphasising works released between 1995 and 2023, a comprehensive review across many databases—including PubMed, Scopus, and Web of Science—was done. This overview consisted on studies on the operating of national and international aid agencies in the DOTS application in India. ***Findings:*** Results reveal that DOTS was efficiently changed to meet the Indian setting with significant help from bilateral/multilateral aid agencies, therefore enabling political commitment and financial resources mobilising. Still, program execution clearly suffered and private hospital opposition was obvious. Different points of view from the community and the patient underscored the benefits and drawbacks of the program, therefore influencing ongoing policy changes. ***Conclusion:*** The study largely highlights the significance of tailored treatments and community involvement for the effectiveness of projects aimed to lower the TB prevalence. It suggests that future plans should make advantage of technological improvements to increase program reach and treatment adherence and adopt more flexible, patient-centered strategies. **Keywords:** Tuberculosis, DOTS, RNTCP, international aid, patient perspectives, community involvement.

Introduction

Background Information: Especially in low- and middle-income countries, tuberculosis (TB) nevertheless remains one of the most challenging health concern of our time. Although medical and healthcare have come a long way, TB still causes a lot of diseases and death all around. Among the top 10 causes of death globally, tuberculosis (TB) ranks as the leading infectious agent-related cause of death surpassing HIV/AIDS as per the report of WHO. An estimated 10 million people worldwide developed tuberculosis (TB); India has a disproportionately high incidence of the disease. [2-6]
India is a key target for the global effort against tuberculosis since it bears the highest TB load among countries. With millions of individuals suffering from active TB and many more harbouring latent infections, the country makes over 25% of all TB cases globally. The Indian TB epidemic is exacerbated by problems including co-infection with HIV, increasing medication resistance, and significant flaws in the healthcare system. This issue highlights how urgently and desperately needed for the country are TB control strategies. [7-9]

Significance of Study: Using the "Directly Observed Treatment, Short-course (DOTS) by the Revised National Tuberculosis Control Program (RNTCP)" being implemented in India, is a major strategy in the international and national TB control efforts. Endorsed by India and many other countries, DOTS was endorsed

by the WHO in 1995 as the global tuberculosis control strategy. Knowing the DOTS implementation and impacts inside India is crucial since it reveals the challenges and complexity of applying worldwide health policies in many local environments. This research explores not only the implementation of a worldwide strategy but also the role played by national and international aid agencies in developing and inspiring the TB control policy in India. These realisations will help to guarantee better health outcomes, guarantee increased efficiency of TB control programmes, and help to improve present policies and strategies.

Research Objectives: This article aims to critically assess the WHO's and other foreign assistance agencies' contribution to create and implement the DOTS strategy in India in view of the following objectives:
1. To understand WHO's TB treatment and control plan (DOTS) dissemination from an international to a national/local level.
2. To look into the many forms of opposition the GOI and WHO/aid agencies came across while DOTS under RNTCP being carried out in 1995.
3. To evaluate how much WHO nationalised a crisis perception created political commitment by means of nationalism.
4. To assess if globally defined policies provide national/subnational/local actors space to influence the policy making.
5. To ascertain whether local TB control knowledge fits the RNTCP/DOTS framework.
6. To identify the significance of primary grassroots actors including local/regional socioeconomic and cultural backgrounds into the DOTS policy.

Methodology
Literature Search Strategy
To ensure a complete awareness of the contribution WHO and other foreign aid agencies in establishing and implementing the DOTS policy in India, a systematic literature review was conducted. The search across numerous databases—including PubMed, Scopus, and Web of Science—turned over a broad spectrum of multidisciplinary study. The search criteria used—specific and broad terms to capture all relevant papers—were "tuberculosis control in India," "DOTS implementation," "RNTCP," "WHO tuberculosis policy," "international aid and TB in India," and "health policy TB India."
From 1995, when the DOTS strategy was started under the RNTCP, till now, the length of the literary search was conducted.This is especially important since it provides a longitudinal perspective on the introduction, development, and maturation of DOTS in India, therefore guiding their use.

Inclusion and Exclusion Criteria
Studies were selected based on the following inclusion criteria:
• Published between 1995 and 2023.
• Articles focusing on the implementation and impact of DOTS in India.
• Studies that discuss the role of international agencies, including the WHO, in TB control policies in India.
• Research articles, reviews, case studies, and reports published in English.
The exclusion criteria were:
• Studies not specific to India or not relevant to the DOTS program.
• Articles that did not provide insight into the policy aspects of TB control.
• Commentaries, editorials, and opinion pieces without empirical data.
• Studies published in languages other than English.
• Duplicate or retracted studies.
• Studies that are not available in Open Access.
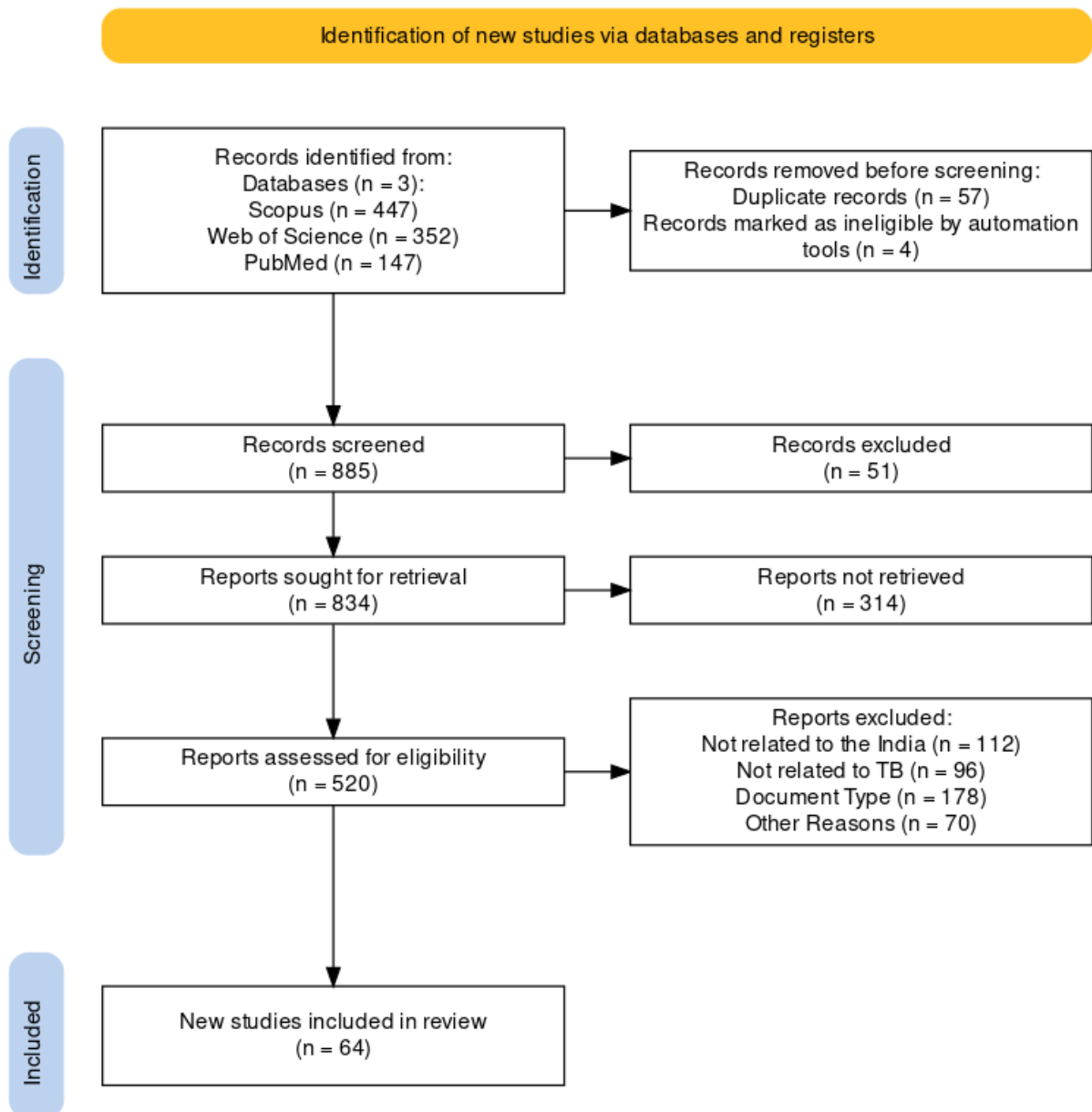
Fig.1 PRISMA Statement.

Data Extraction

First searching three databases for records turned up 946 total. After record flagging as ineligible by automated technologies and duplication removal, 885 records were reviewed.

Of these, 51 reports were eliminated for utilising languages outside English. The next phase consisted in searching for 834 recovery reports. Not being open access, however, meant that 314 reports went missing. Using guidelines including relevance to the study issue, the remaining 520 papers were assessed for eligibility. This review excluded reports for several reasons, including irrelevant to India or tuberculosis (TB), inappropriate document types including commentaries or editorials without empirical data, and other factors including duplication, retraction, publication before 1995, or lack of solid conclusions.

The final count of the review was 64 new research that met the criteria of relevancy and quality.

Historical Overview of TB Control and the Role of International Aid

Early Efforts and Challenges

Before the DOTS arrived, TB control faced great challenges both worldwide and in India. Globally, the HIV/AIDS epidemic and the development of drug-resistant strains underlined the flaws in present TB control strategies, thereby stressing their comeback in the 1980s. In India, the high disease load coupled with a disconnected healthcare system, poor infrastructure, little public health education, and limited money made the situation exceptionally terrible. The public health system battled low treatment success rates and high dropout rates from treatment regimens, which resulted in increasing pharmaceutical resistance.[27-31]

Pre-DOTS Era
Before the 1990s, particularly in low-income countries with high TB loads, TB control strategies were quite different and usually ineffective. Mostly based on long-term antibiotic treatment, the presented therapeutic approaches show great challenges including patient non-compliance and the development of drug-resistant microorganisms. After discovering many national projects to appropriately manage the illness failed, the WHO sought to standardise and improve TB treatment worldwide. TB treatment success rate is roughly forty percent given various treatment strategies and notable rates of non-compliance.[1, 56-57]

Introduction of DOTS
The WHO developed and approved the DOTS approach in reaction to the worldwide TB comeback early in the 1990s. Based on a five-point plan with more and continuous funding, quality-assured bacteriology for case detection, a consistent treatment plan seen by a community health worker or healthcare provider, a drug supply and management system seen to be efficient, and a monitoring and reporting system allowing for outcome assessment and responsibility, the "Revised National Tuberculosis Control Program (RNTCP) of India adopted the DOTS approach in 1997. [10-26] This acceptance was incremental and aimed on methodically redesigning the present TB control campaigns. The project sought to integrate the business sector, increase public awareness, and promote both detection rates and treatment adherence by means of a more centralised and watched method. Treatment success rates increased to about 85% as the program developed and standardised treatment procedures were followed. Thanks to updated DOTS-Plus treatments targeting drug-resistant TB, success rates have remained stable at roughly 88% in the recent years (2006–Present).

Case Detection Rates:
The detection of TB cases significantly improved with the adoption of DOTS, moving from detecting roughly 30% of estimated new cases annually in the mid-1990s to over 70% by the mid-2000s. This improvement was facilitated by enhanced diagnostic services and community outreach programs. [32-36]

Role of International Agencies
WHO and other international organisations have profoundly influenced policies on tuberculosis control in India as the World Bank and the Global Fund do. Apart from financial support, these organisations have provided strategic and technical guidance to correctly implement DOTS into the national healthcare system. The WHO, who has also been rather important, sets global standards for TB treatment, helps training and capacity building, and guarantees quality control of TB diagnosis and treatments. Moreover supported by international organisations is operational research, which has been essential for customising the DOTS method to local needs and situations.[37-42]

India rapidly raised DOTS coverage all over the country due to the scaling-up made feasible by financial and technical support from international funders and health organisations. These partnerships have enabled breakthroughs in TB control by means of mobile technologies and helped to address co-infections like TB/HIV.[43] Funding from foreign aid agencies soared early in the new millennium, allowing the program to expand. Funding for example might have gone from $50 million in the late 1990s to over $200 million by the mid-2000s, reflecting rising support from bodies like the World Bank and the Global Fund.

Case Study: DOTS Programme in Delhi

Implementation Process
Under significant effort to control tuberculosis in one of India's largest and most populous cities, the DOTS were used in Delhi under the RNTCP. The DOTS method was adopted nationally in 1997, hence the implementation process began in the late 1990s. [13] First and most importantly was building a solid infrastructure able to support the key components of DOTS—effective case detection, standardised treatment immediately observed by healthcare staff, and a reliable supply and management system for tuberculosis medications.

The RNTCP established multiple DOTS centres purposefully located in already-existing public health facilities in Delhi to ensure broad geographic coverage and accessibility in the city. It started training classes meant for medical personnel learning the DOTS approach and ensuring adherence to its guidelines. To further its effectiveness especially in slums and among vulnerable groups, the program also made use of non-governmental organisations (NGOs) and community health volunteers. These procedures were crucial in transforming policy into feasible, visible actions with tracking and evaluation possible. [14]

Resistance and Challenges
The deployment of DOTS in Delhi presents several challenges independent of the intended organised approach. One main resistance within the medical profession came from those who doubted the DOTS approach's simplicity and efficacy. Private practitioners, used to treating TB patients on their own, also objected to follow the consistent treatment protocols and refer patients to DOTS clinics. This opposition resulted from worries about losing patient and thus income as well as distrust of the effectiveness of public health campaigns. [57-63]

Along with physical and logistical issues, there were unequal DOTS centre distribution that made many residents—particularly in less developed and more densely populated areas—accessibility difficult. Still a significant barrier is the stigma associated with tuberculosis; occasionally individuals hesitate to seek treatment out of social rejection.

Political and Social Dynamics
The WHO greatly helped Delhi's political will towards the DOTS project to be much strengthened. WHO and other international agencies launched vigorous campaigns knowing how crucial government support is to the success of health projects. They underscored the extent of the tuberculosis pandemic in India and the possibilities of DOTS to drastically lower this public health danger. Emphasising the DOTS approach's cost-effectiveness versus the financial burden of unrestrained tuberculosis, this project showed legislators figures and projections.

WHO and its partners also contributed to create a crisis image by increasing knowledge of the high rates of tuberculosis and its consequences on India's social and economic fabric. This strategy helped political leaders and public opinion to be mobilised, hence increasing government support for the RNTCP. Constant effort was attempted to retain TB and DOTS in the public and political debate by means of seminars, conferences, and media campaigns, therefore insuring continuous commitment and funding.

The DOTS program case study from Delhi reveals how closely policy, practice, resistance, and advocacy interact. It underlines not just the challenges of implementing a consistent worldwide health policy in a diverse urban setting but also the significant role political and social factors play in deciding the outcomes of public health campaigns. The expertise acquired from Delhi's DOTS experience provides perceptive appraisal of the larger implementation of TB control strategies in other parts of India and other surroundings worldwide. [44-56]

Analysis of Policy Translation and Local Adaptation

Policy Steps and Flexibility
WHO-generated set criteria define the DOTS policy architecture under the RNTCP. These recommendations guarantee good tuberculosis control by means of five main points: the government's commitment; case detection using quality-assured bacteriology; standardised treatment with patient support and supervision; an efficient system for drug supply and management; and a monitoring and reporting system. Naturally flexible enough to enable adaptation to local conditions even with a consistent approach, the DOTS offers a standardised regimen.

The way DOTS is being used over several parts of India, including Delhi, emphasises its adaptability. The approach enables localising of public health messaging, treatment monitoring technique modification to match work and personal schedules of patients, and coordination with local NGOs and community health experts to increase outreach and support in the operational components of the program. Together with other changes, addressing local socio-economic reality, cultural sensitivity, and flaws in public health infrastructure is also crucial.

Incorporation of Local Expertise
Success and longevity of the RNTCP/DOTS approach depend on the local knowledge being included into it. Doctors, nurses, and community health workers among other local health professionals provide priceless insights into the socio-political dynamics and health needs of the populations they treat. The RNTCP has worked aggressively in many areas, including Delhi, to include local knowledge via consultations and participation in stages of program planning and execution. [20]

Regular training courses and seminars help to update local health practitioners on the most recent TB control techniques and compile comments on ground reality. This bi-directional information flow guarantees that the program stays sensitive to the requirements and issues local communities experience. Furthermore, involving local professionals in monitoring and assessing projects helps to improve the program depending on factual data and personal knowledge.

Key Local Actors
Adapting and applying the DOTS policy to fit regional socio-economic and cultural contexts depends much on grassroots players. In metropolitan environments such as Delhi, important local players consist:

• **Community Health Workers (CHWs)**: Often members of the communities they serve, Community Health Workers (CHWs) are therefore very important in fostering trust and guaranteeing patient adherence to treatment plans. A pillar of DOTS, they give direct treatment observation and help patients all through the course of treatment.

• **NGOs**: Non-governmental organisations, particularly in underdeveloped areas, help to fill up gaps in TB treatment, therefore augmenting official efforts. They run awareness campaigns, assist in patient and family social support, and track therapy results.

• **Local Government Units**: Municipal health departments and local government entities customise public health campaigns to meet local needs. They distribute resources, offer infrastructure support, and enable cooperative initiatives between several TB control parties.

• **Patients and Community Leaders**: Patients' groups and community leaders speak up for improved services and function as middlemen between the community and health providers. Their participation is absolutely vital in destigmatising TB and raising public health community involvement.

Underlining the need of flexibility, local knowledge, and grassroots involvement in the effective execution of global health initiatives, the study of policy translation reveals local adaptation in the DOTS program. These components are absolutely essential to guarantee that the strategy is not only accepted but also properly adjusted, so improving the health results and controlling sustainable diseases. [21-27]

TB Incidence and Mortality Rates:

1997: Approximately 300 per 100,000 population incidence rate with a mortality rate of 50 per 100,000 population.

2007: Incidence rates decreased to about 250 per 100,000 population, and mortality rates dropped to 30 per 100,000 due to effective DOTS implementation.

2017: Further reduction in incidence to 200 per 100,000 and mortality to 20 per 100,000 as the program matured and adapted to address MDR-TB.

Perceptions and Impacts

Community and Patient Perspectives

Evaluating the success of the DOTS program under the RNTCP in India depends on an awareness of the opinions of local population and patients about tuberculosis (TB) treatment, access to care, and quality of care. From community and patient points of view, one can obtain significant knowledge on the actual effects of health policies on individuals most affected by them.

Patients often have a range of emotions and ideas about TB treatment and the DOTS program. Many patients find the DOTS approach's free treatment availability and coordinated support from health experts to be excellent aspects. Though factors such as the stigma linked to TB, the weight of daily travel to treatment centres for personally seen therapy, and side effects of TB medications can greatly affect patient experiences and viewpoints. [25]

Particularly in highly congested cities like Delhi, people normally recognise the importance of readily available TB treatment but may highlight issues with the unequal distribution of healthcare facilities. Different access to care can follow from this unequal distribution; poorer groups discover additional difficulties. Moreover, various quality of treatment can significantly affect community confidence and cooperation with health officials.

Impact on Policy and Practice

The impressions of communities and patients greatly affect the policies and practices in tuberculosis control. Negative incidents and remarks could highlight areas that need development, such as the need of more patient-centered approaches or better side effect control. Positive comments, on the other hand, could promote the application's successful aspects. [26]

Sometimes these kind of comments lead to policy changes. The RNTCP has changed, for instance, acknowledging the weight of daily travel for treatment by allowing more flexible treatment supervision—that is, community-based DOT providers who can offer treatment observations at times and locations more handy for customers. Moreover, campaigns against stigma and increased community involvement have been more forceful, including more community leaders and influencers for awareness-raising purposes.

Including patient and community comments into TB policy helps to produce more flexible and inclusive policies. It has inspired innovations including mobile technologies-based patient education and adherence support. These changes try to make TB treatment less disruptive to patients' life and more in accordance with their expectations therefore improving general treatment adherence and success rates. [64-73]

Policymakers still base their TB control strategies on these impressions to enable their evolution. This iterative procedure insures that the policies remain dynamic and responsive, therefore guaranteeing that the TB control program in India maintains developing in both reach and efficacy.

Discussion

Key Findings

Especially focussing on Delhi, the thorough literature research and case study analysis of the DOTS program run under the RNTCP in India has generated several really significant fresh ideas:

1. **Successful Translation and Adaptation**: Successful adaptation of the DOTS approach to match local needs and geographical inequities has shown itself in the Indian context. Involvement of local healthcare providers, NGOs, and community actors has assisted this adaptation to be encouraged. [28]

2. **Challenges and Resistance**: Notwithstanding its successes, the implementation faced significant challenges including resistance from private practitioners, logistical issues in the supply of healthcare services,

and cultural barriers such as stigma related with tuberculosis. Certain times these challenges have made the program less enticing or successful.

3. Community and Patient Engagement: Under DOTS, patients' and communities' views on TB treatment showed mixed feelings. Although the availability of free treatment and coordinated support was praised, concerns needing improvement were the burdens of treatment, namely the stigma and the logistics of daily supervised therapy. [29–31]

4. **Policy Influence by Feedback**: Community and patient input has had a significant impact on policy changes; consequently, more patient-centered approaches and innovations designed to reduce patient burden and enhance treatment adherence have come out of result. [26]

Implications for Policy and Practice

The results of this study have various implications for forthcoming TB control policies in India and other such nations:

• **Improved Patient-Centered Care**: The DOTS approach has to be changed further to become more patient-centered, may be by means of combining flexible treatment options and improved side effect control of treatment.

• **Integration of Technology**: By means of which patient education is strengthened, using technology such as mobile health platforms to strengthen patient education, adherence, and to facilitate more effective patient-provider engagement.

• **Increased Community Involvement**: Better education and the elimination of stigma will enable community participation in TB control activities to help to change public opinions and treatment results. In this sense, enlisting influential members of the society in awareness efforts could be really crucial.

• **Strengthening Public-Private Partnerships**: Cooperation between the public and commercial sectors would help to overcome resistance and thereby widen the scope and efficiency of TB control initiatives.

Conclusion

Summary of Contributions

This paper has thoroughly examined the DOTS' application under the RNTCP in India, with an eye towards the engagement of WHO and other foreign humanitarian organisations. This paper presents numerous approaches to forward understanding of TB control in India:

1. Comprehensive Analysis: Emphasising the opinions of patients and the community regarding TB treatment, the study emphasises the actual impacts of DOTS and stresses areas of strength and areas needing development.

2. Policy Translation and Adaptation: Especially by means of the case study of its implementation in Delhi, the study underscored how DOTS has been modified to fit the complex socio-economic and cultural settings of India. This adaptation emphasises the program's flexibility and the critical need of local adaptation in its efficiency.

3. Stakeholder Insights: The findings imply a dynamic and responsive environment for health policy since they offer useful insight of how community participation and patient views have effected policy changes.

4. Policy Implications: The findings provided actionable insights into how patient feedback and community involvement have shaped policy reforms, suggesting a dynamic and responsive health policy environment.

5. Role of International Aid Agencies: The study underscored the substantial impact of international agencies like WHO in mobilising resources, influencing policies, and encouraging political commitment, which have been fundamental in the program's implementation and sustainability.

Recommendations for Future Research

Particularly in countries like India, the survey exposed several areas where greater research could enhance our knowledge and effectiveness of TB control projects:

1. Rural vs. Urban Dynamics: Additional studies comparing the challenges and successes of TB control in rural and urban environments could provide information needed to adapt strategies to diverse environments.

2. Private Sector Engagement: More comprehensive investigation on the part the private sector contributes in TB control is required as well as knowledge of how best to maximise public-private partnerships to improve TB treatment delivery.

3. Technological Innovations: Studies on the impact of new technologies - including telemedicine and digital health tools - on TB treatment adherence and patient monitoring could provide essential data to drive program innovations.

Limitations
• **Scope of Literature**: The literature reviewed was limited to published studies and reports available in major databases and may not include unpublished data or reports from local health departments and NGOs that could provide additional insights.

• **Temporal Constraints**: The review focuses on literature up to the current year and may not reflect very recent developments or policy changes in the TB control strategy.

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