

Research Article

Outcomes of Tuberculosis Preventive Treatment and Barriers in Its Initiation and Completion among Household Contacts of Pulmonary TB Patients: A Cross-Sectional Study in Shivamogga

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ABSTRACT

Background: Tuberculosis Preventive Treatment (TPT) is a crucial public health intervention to reduce progression from latent TB infection (TBI) to active disease. However, barriers in initiation and completion limit its impact.

Objectives: To assess TPT outcomes in Shimoga district, to determine post-TPT follow-up health status among recipients, and identify barriers to TPT implementation from a Household contact (HHC) and health care provider perspective.

Materials and Methods: A cross-sectional study was conducted among HHC of pulmonary TB patients initiated on TPT in 2022 and 2023. Data was collected from Nikshay and contact tracing registers, validated questionnaires, and interviews with HHCs and healthcare workers. Thematic analysis was used for qualitative data.

Results: The proportion of HHCs completing TPT increased from 80% in 2022 and 95% in 2023. Barriers included lack of awareness, stigma, and fear of side effects.

Conclusion: Increasing awareness, strengthening counselling efforts and addressing adverse drug reactions may improve TPT adherence and completion rates.

Keywords: Tuberculosis, Tpt, Household Contacts, Barriers, India.

INTRODUCTION

Tuberculosis (TB) remains a major global public health challenge, with India contributing significantly to the global burden ^[1]. The World Health Organization (WHO) recommends TPT for household contacts (HHCs) of pulmonary TB patients to prevent the development of active TB ^[2]. The National Tuberculosis Elimination Program (NTEP) aims to eliminate TB by 2025 through interventions such as TPT to prevent the progression from latent TB infection to active disease ^[3].

Despite its proven efficacy, uptake and adherence to TPT remain suboptimal due to various barriers ^[4, 5, 6]. This study assesses the outcomes of TPT, post-TPT follow-up, and explores barriers affecting implementation.

Study Design

A cross-sectional study using mixed Methodology.

Study Area

The study was carried out in Shivamogga district, Karnataka.

Study Population

- For TPT outcomes:** All HHCs of sputum-positive pulmonary TB patients aged >5 years in Shimoga district for the years 2022 and 2023.
- For post-TPT follow-up:** HHCs who completed TPT in 2022 whose contact details were available.

MATERIALS AND METHODS

3. **For barriers assessment:** Key staff of NTEP and HHCs who refused or discontinued TPT.

Study Period

The study was conducted over a period of 2 months.

Data Collection

1. Quantitative Data:

- Contact tracing records from the Senior TB Treatment Supervisors [STS] and TB Health Visitors [TBHVs] and NIKSHAY were used to extract details on screening rates, IGRA testing results, TPT initiation rates, and treatment outcomes.

2. Qualitative Data:

- Interviews with key NTEP staff TBHVs, STS, Senior TB Lab supervisors [STLS], District Program Coordinator [DPC] using open ended questions.

- Open-ended questionnaires were administered to HHCs who refused TPT.

Inclusion Criteria

- HHCs aged >5 years.
- HHCs of drug-sensitive pulmonary TB cases.

Exclusion Criteria

- HIV-positive HHCs
- HHC below 5 years of age

Ethical Considerations

Institutional ethical clearance and permission from District Tuberculosis Officer was obtained prior to data collection.

Statistical Analysis

Quantitative data were analysed using descriptive statistics. Qualitative data were analyzed using thematic analysis to identify key barriers.

RESULTS

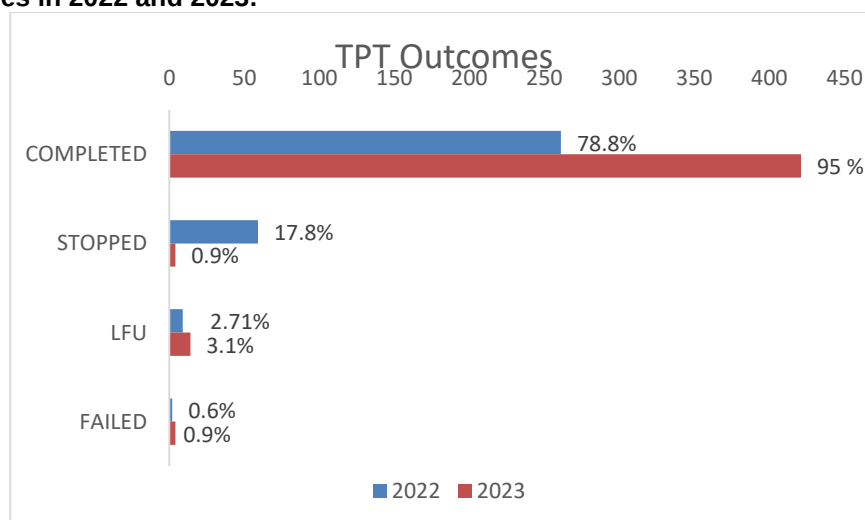
Table comparing TPT cascade of care for the years 2022 and 2023

Year	No. of HHC	IGRA Done	IGRA Positive	TPT Started	TPT Completed
2022	2411	1008 (41.8%)	366 (36.3%)	326 (89%)	261 (80%)
2023	2288	1422 (62.1%)	529 (37.2%)	440 (83.1%)	421 (95.6%)

In 2022, the number of household contacts (HHC) identified for potential TPT eligibility in Shivamogga district was 2411. Among these, 1008 underwent IGRA testing, with 366 testing positive for latent TB infection. A total of 326 HHCs initiated TPT, and 261 completed the treatment.

In 2023, the number of HHCs identified decreased to 2288. However, the number of individuals undergoing IGRA testing increased to 1422, with 529 testing positive. The number of HHCs initiating TPT was 440, and 421 completed the treatment.

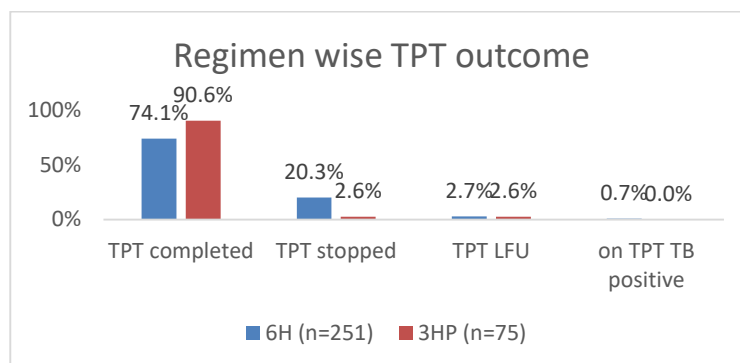
TPT Outcomes in 2022 and 2023:



In 2022, among the 326 who were initiated TPT, 261 (78.8%) completed treatment, 59 (17.8%) stopped treatment, 9 (2.71%) were lost to follow-up, and 2(0.6%) were considered to have failed treatment. Of the 59 who stopped TPT, 41 were on 6H Regimen were also on psychiatric medications, and

developed dizziness after TPT initiation.

In 2023, 440 were initiated TPT, of whom, 421(95.0%) completed treatment, 4(0.9%) stopped treatment, 14(3.1%) were lost to follow-up, and 4(0.9%) were considered to have failed treatment.



In 2022, among the 326 HHCs who initiated TPT, 251 were started on the 6H regimen and 75 on the 3HP regimen.

Of those on the 6H regimen, 51 stopped treatment, 186 completed it, 7 were lost to follow-up, and 2 tested positive for TB while on TPT.

Among the 75 started on 3HP, 68 completed, two stopped treatment and 2 were lost to follow up.

Post-Treatment Follow-Up:

Out of 261 HHC who completed TPT in 2022, 131 (50%) could be contacted over phone call to ask if they had developed symptoms, tested or treated for active TB in the period after TPT completion till the month of December 2024 and none of them developed symptoms, or tested or treated for active disease.

Barriers Identified

HHC Perspective

1. Lack of perceived necessity: "We are healthy; why should we get tested or take tablets?"
2. Fear of side effects: Concerns about nausea, dizziness, or drowsiness led some individuals to stop treatment.
3. Stigma: "People might think that we have the disease" was a common fear among those refusing treatment.
4. Economic burden: Loss of daily wages due to clinic visits discouraged participation.

Healthcare Provider Perspective

1. Lack of awareness: led to difficulty in convincing to get tested or treated
2. Unavailability of HHC: children were at school, and adults at workplace.
3. Repeated house visits: These led to stigma within communities.
4. Trust issues: Some families preferred private healthcare over government services.
5. Workforce motivation: remuneration expectations among ASHAs

DISCUSSION

This study provides insights into the coverage of TPT in Shivamogga district of Karnataka, post TPT follow-up and barriers to its implementation.

The cascade-of-care approach for TPT, as outlined in the Programmatic Management of TB Preventive Treatment (PMTPT) guidelines, involves sequential steps including contact tracing, screening, testing for tuberculosis infection (TBI), initiation of TPT, adherence support, and monitoring outcomes [3]. However, studies have shown that less than 20% of eligible individuals globally complete the entire cascade [7], similar attrition at every step of care was also evident in this study due to barriers such as limited awareness about TPT, lack of perceived necessity to get tested or treated as they felt healthy, stigma and fear of side effects which led to attrition at various stages of the cascade.

The results from Shimoga district showed that 78.8% of HHCs completed TPT in 2022 and 95% in 2023. These completion rates are

significantly higher than those reported by Samudiyatha et al., (2023), where only 77% of HHCs completed treatment [8]. This discrepancy may be attributed to differences in programmatic implementation strategies, availability of resources, and adherence support mechanisms.

Testing for TBI using IGRA was limited by perceived low risk among HHCs. Similar challenges have been reported globally, particularly in high-burden settings like India [4]. Addressing these operational barriers is critical to improving contact tracing and testing services.

In Shivamogga district, the introduction of shorter regimens like 3HP demonstrated promise with fewer adverse drug reactions (ADRs) and higher completion rates compared to the traditional 6H regimen. This aligns with evidence from Akolo et al. (2010) [9], which showed that shorter regimens improve adherence and reduce attrition.

Qualitative findings from this study reveal critical barriers to TPT uptake. Lack of awareness, fear of side effects, stigma associated with repeated house visits and the loss of daily wages, were recurring themes. Similar challenges have been reported in a multicentric study conducted in China [5]. Addressing these barriers requires targeted interventions such as awareness programs, community engagement sessions to reduce stigma, financial support mechanisms for HHCs experiencing economic hardship, and enhanced training for healthcare providers to improve counseling skills.

Despite these challenges, India's commitment to eliminating TB by 2025 through initiatives like "TB Mukht Bharat" provides a framework for scaling up TPT implementation. Leveraging these commitments alongside evidence-based strategies can accelerate progress toward achieving India's ambitious goals.

In conclusion, this study underscores the importance of addressing gaps in the cascade-of-care approach for TPT. Scaling up shorter regimens like 3HP, addressing social determinants of health are critical steps toward optimizing TPT implementation and reducing TB burden in the country.

Conclusion & Recommendations

To improve TPT uptake and adherence:

1. Enhance IEC campaigns focusing on dispelling misconceptions about TB preventive treatment.

2. Train healthcare workers on effective counseling strategies that address stigma and emphasize the benefits of shorter regimens like 3HP.
3. Provide financial incentives for ASHAs involved in screening activities.
4. Conduct pre-treatment evaluations for HHC with psychiatric conditions before initiating therapy.

Limitations

1. Post-TPT follow-up relied on telephonic interviews; thus, information on TB development may not be entirely reliable for all cases.
2. Only half of the total household contacts could be reached over phone call to collect data about health status post TPT

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