

Tuberculosis and Financial Hardship in India: Understanding the Economic Burden on Patients and Households

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ABSTRACT

Tuberculosis (TB) remains an important public health and socioeconomic challenge in India. Poverty and TB have a bidirectional relationship, with socioeconomic disadvantage increasing vulnerability to TB while TB can further worsen household finances. This narrative review explored the financial burden of TB and its economic consequences for patients and households, focusing on direct and indirect costs, catastrophic expenditure, income loss and socioeconomic inequalities. Original research studies and systematic reviews from India and other countries were considered. The review indicates that socioeconomic disadvantage, undernutrition, poor housing and limited access to health care can increase vulnerability to TB and contribute to delays in diagnosis and treatment. Despite free TB services under the National TB Elimination Programme, patients and households continue to experience transportation and food costs, loss of wages, reduced productivity, borrowing and asset depletion. The financial burden is particularly high among poorer households and patients with drug-resistant, extrapulmonary or severe TB. Nikshay Poshan Yojana provides important nutritional support, although gaps in coverage, timeliness and adequacy remain. Strengthening financial protection,

livelihood support and timely care is essential to reduce the economic impact of TB and support equitable TB elimination in India.

Keywords: Tuberculosis; Financial burden; Socioeconomic inequalities; Catastrophic expenditure; Out-of-pocket expenditure; Poverty; Social protection

INTRODUCTION

A substantial socioeconomic challenge along with a major infectious disease burden is represented by tuberculosis (TB) in India. In TB, financial status plays an important role in accessing diagnosis and treatment, the ability to continue treatment, and the capacity of households to recover following treatment. Additionally, TB may disrupt pre-existing socioeconomic conditions through direct expenditure, loss of income and productivity, borrowing, asset depletion, and disruption of education and livelihoods. The relationship between poverty and TB is therefore bidirectional, whereby poverty increases vulnerability to TB while TB itself can lead affected households further into poverty.^{1,2,3}

An important determinant of TB in India is poverty, and momentum towards TB elimination is associated with addressing socioeconomic inequalities. National survey-based evidence has demonstrated a higher prevalence of TB among

multidimensionally poor individuals than among those who were not multidimensionally poor. In one analysis, TB prevalence was 480 per 100,000 among the multidimensionally poor compared with 250 per 100,000 among the non-poor. Multidimensional poverty was associated with 1.82 times higher odds of TB.⁴ Wealth-based inequalities have also been documented using nationally representative demographic and health survey data, indicating that TB burden is higher among socioeconomically disadvantaged households.⁵

METHODS

This narrative review aimed to explore the role of financial burden among individuals affected by tuberculosis (TB), with particular focus on the economic consequences of TB and its impact on patients and households. Relevant literature, including original research studies and systematic reviews, was considered from both India and other countries to provide a broader understanding of the issue. Literature was identified through searches of major electronic databases using keywords and combinations of terms related to tuberculosis, financial burden, economic costs, catastrophic expenditure, out-of-pocket expenditure, income loss, and socioeconomic impact. Studies examining the direct and indirect costs associated with TB, financial hardship, loss of productivity, and household economic consequences were considered. Findings from the selected

literature were synthesised to identify major themes, patterns, and gaps in the existing evidence

RESULT

From Table 1, it is evident that poor households are more likely to experience overcrowding, inadequate ventilation, food insecurity, undernutrition, indoor air pollution, poor sanitation and limited access to health services. These conditions can increase exposure to Mycobacterium tuberculosis as well as susceptibility to progression from infection to active disease. In India, wealth-based inequalities in TB prevalence have been associated with household environmental conditions, including the use of unclean cooking fuel, inadequate sanitation and limited access to electricity.⁵ many articles on social determinants of TB in India have similarly highlighted undernutrition, poor housing, rural disadvantage, limited access to health care, caste and surrounding environment as important contributors to TB inequalities.² Individuals from economically vulnerable households may postpone seeking care because of anticipated consultation, diagnostic, transportation and wage-loss costs. Such delays may prolong the period of infection resulting in increase disease severity and subsequently increase the economic burden associated with diagnosis and treatment. Thus, poverty should be regarded not merely as a background characteristic but as a determinant that operates across the entire TB care.^{2,4}

Table 1. Pathways linking financial status and tuberculosis in India^{2,4,5}

Socioeconomic determinant	Pathway	Potential consequence
Household poverty	Limited access to nutritious food, adequate housing and health care	Increased vulnerability to TB
Undernutrition	Impaired nutritional status and host resilience	Increased susceptibility and progression to active TB
Poor housing	Overcrowding and inadequate ventilation	Increased risk of TB transmission
Indoor air pollution	Exposure to smoke and unclean cooking fuels	Increased respiratory vulnerability
Limited health-care access	Delayed consultation, diagnosis and treatment	Prolonged infectiousness and greater disease severity
Employment insecurity	Loss of wages and reduced productivity	Increased indirect economic costs
Limited financial	Dependence on borrowing and asset	Increased risk of impoverishment

reserves	depletion	
Structural socioeconomic disadvantage	Differential exposure and access to care	Persistent inequalities in TB burden

Table 2 indicates that financial consequences of TB begin before treatment initiation and may continue long after treatment completion. The economic burden can broadly be divided into direct medical costs, direct non-medical costs, indirect costs and coping costs. Direct medical costs include expenditure on consultations, diagnostic investigations, medicines outside programme-provided services, hospitalisation and management of comorbidities. Direct non-medical costs include transportation, accommodation, food and other expenses associated with accessing health services. Indirect costs arise from loss of wages, reduced productivity, inability to work and time spent by patients or caregivers seeking and receiving care. Coping costs include borrowing, reducing household

consumption, selling or mortgaging assets and other forms of financial dissaving.^{3,6} A systematic review of Indian studies demonstrated that TB-related patient costs remain substantial despite the availability of free diagnostic and treatment services. Among drug-sensitive TB patients treated in public facilities, the mean total cost was approximately INR 22,500, with direct costs accounting for approximately 45.5% of total costs. Catastrophic costs were reported among 7–32.4% of patients with drug-sensitive TB, while the estimate was substantially higher among patients with drug-resistant TB.⁶ Another review estimated that indirect costs constituted the largest component of the overall economic burden, highlighting the importance of lost wages and productivity in determining the financial consequences of TB in India⁹.

Table 2. Financial burden across stages of care for TB patients

Stage of care	Major sources of financial burden	Examples
Symptom onset and pre-diagnosis	Direct and indirect costs	Consultations, diagnostic tests, transport and wage loss
Diagnosis and treatment initiation	Medical and non-medical expenditure	Investigations, repeated visits, travel, food and income loss
Treatment period	Direct non-medical and indirect costs	Transportation, nutritional expenditure, wage loss and caregiver time
Hospitalisation and severe disease	Increased direct and indirect costs	Hospital expenditure, travel and prolonged absence from work
Post-treatment period	Persistent financial consequences	Outstanding loans, borrowing and asset depletion
Household level	Intergenerational and social consequences	Educational disruption, reduced household income and delayed economic recovery

The provision of free TB diagnosis and treatment through the National TB Elimination Programme (NTEP) has reduced some direct medical expenditures; however, it has not eliminated the financial consequences of TB. Patients and households continue to incur expenditure on transportation, food, nutritional supplements, investigations, consultations, medicines outside programme provision, hospitalisation and other non-medical

requirements. Loss of income and productivity can further increase total household costs.^{6,10} From Table.3 the Indian evidence demonstrates substantial variation in estimates of catastrophic costs. The four-state cohort reported catastrophic costs among 30–61% of participants depending on the methodology used to value indirect costs.⁸ A national study of persons notified under NTEP reported that approximately

45% experienced catastrophic costs, with the economic burden disproportionately affecting poorer income groups.¹⁰ Studies from Chennai and Western India reported catastrophic costs of approximately 31% and 4%, respectively, while a recent study from South-East Delhi reported catastrophic costs among 24.27% of patients registered under NTEP.^{11,12,13}

These estimates should not be considered directly interchangeable because studies differ in geographical setting, population characteristics, TB type, duration of follow-up, definition of catastrophic expenditure, measurement of household income or expenditure, and methods used to estimate indirect costs. Indeed, methodological choices can substantially alter the estimated prevalence of catastrophic expenditure.⁸

Table 3. Evidence from Indian Studies on catastrophic TB-related costs in India

Study	Setting/population	Catastrophic cost estimate	Major finding
Chatterjee et al., 2024	Four-state cohort	30–61%	Estimates varied according to methods used to calculate indirect costs; substantial costs occurred before treatment initiation
Jeyashree et al., 2024	National NTEP population	~45%	Catastrophic costs disproportionately affected poorer households
Muniyandi et al., 2020	Chennai	31%	Free TB care did not eliminate household financial burden
Malik et al., 2025	South-East Delhi	24.27%	Catastrophic expenditure persisted among patients receiving NTEP services
Rupani et al., 2020	Rural and semi-urban Western India	4%	Lower estimated catastrophic expenditure, but borrowing and financial hardship persisted
Hassan et al., 2026	Extrapulmonary TB	>90% in meningitis; ~80% in pleuritis	Severe EPTB was associated with very high financial burden and impoverishment

Indirect costs are particularly important in India because TB frequently affects individuals during economically productive years. Loss of employment, reduced working hours, inability to undertake physically demanding work and time spent by caregivers can generate substantial household losses. A national analysis of TB-related expenditure found that more than two-thirds of TB cases occurred among individuals in the economically productive age group of 14–59 years. The same study reported greater financial burden, hardship financing and catastrophic expenditure among individuals receiving care in private hospitals.¹⁴

The economic consequences of TB are not distributed equally across households. Poorer households generally have fewer savings, lower access to formal credit and fewer assets that can be used to absorb unexpected expenditure. Consequently, a similar absolute TB-related cost can have markedly different consequences depending

on household socioeconomic status. Recent evidence from Lucknow further supports this relationship. Among drug-sensitive TB patients registered under NTEP, approximately 18% experienced catastrophic expenditure, and recurrent TB, first consultation in a private facility and lower socioeconomic status were significant predictors of catastrophic expenditure.¹⁵ Similarly, longitudinal evidence from rural India has demonstrated substantial financial hardship associated with hospitalisation, lower household income and delays in diagnosis despite registration under NTEP.¹⁶ These findings indicate that monitoring only the average cost of TB care may conceal important socioeconomic inequalities. Evaluation of TB programmes should therefore consider not only whether financial burden decreases overall but also whether the burden is equitably distributed across socioeconomic groups.

The financial consequences of TB may be particularly severe among patients with

drug-resistant TB, extrapulmonary TB, recurrent disease and those requiring hospitalisation. A systematic review of patient costs in India reported catastrophic costs among 68% of patients with drug-resistant TB compared with 7–32.4% among drug-sensitive TB patients.⁶

Extrapulmonary TB may also generate considerable financial hardship because of complex diagnostic pathways, specialist consultations and hospitalisation. A prospective Indian cohort published in 2026 found that more than 90% of patients with TB meningitis and approximately 80% of those with pleuritis experienced catastrophic health expenditure, while up to 42% of patients were pushed below the poverty line. Lower socioeconomic groups experienced a disproportionate burden.¹⁷ These findings demonstrate that financial vulnerability varies substantially by clinical manifestation and severity of TB.

Hospitalisation is another important driver of expenditure. National survey-based analyses have shown greater out-of-pocket expenditure, hardship financing and catastrophic expenditure among patients using hospital-based care, while the duration of hospitalisation further increases financial burden.¹⁴ This highlights the importance of preventing severe disease and ensuring timely diagnosis, particularly among socioeconomically vulnerable populations. The consequences of TB may also extend to other members of the household. Recent evidence from the RePORT India cohort reported educational disruption in approximately 14% of TB-affected

households. Households experiencing educational disruption also demonstrated greater multidimensional poverty and less stable recovery of household income after treatment.¹⁸ Such findings indicate that the economic impact of TB may extend beyond immediate treatment expenditure to affect education, household resilience and future socioeconomic opportunities. These long-term effects are important because successful treatment does not necessarily imply immediate socioeconomic recovery. Household debt, asset depletion and employment disruption may continue after microbiological cure, suggesting that financial protection should extend beyond the period of anti-TB treatment.

India introduced the Nikshay Poshan Yojana (NPY) in 2018 as a direct benefit transfer intended to provide nutritional support to persons receiving TB treatment. National programme data demonstrated improvement in coverage from 56.9% in 2018 to 76.1% in 2022, while the median time to receipt of the first payment declined from approximately 200 days to 91 days.¹⁹

From Table.4 it is evident that implementation barriers further limit the effectiveness of financial support. Qualitative research has identified long approval processes, banking barriers, administrative workload and perceived inadequacy of benefits as important challenges to effective delivery.²¹ Improving financial protection therefore requires not only increasing benefit amounts but also ensuring timely, accessible and operationally simple delivery.

Table 4. Nikshay Poshan Yojana – Benefits & Gaps

Component	Benefits	Gaps
Nikshay Poshan Yojana	National direct benefit transfer for nutritional support	Benefit may be insufficient relative to total household costs
Coverage	National coverage has improved	Vulnerable patients may remain unreachable
Timeliness	Median time to first payment has improved	Delays remain clinically and financially relevant
Financial protection	Existing benefit provides limited protection against catastrophic costs	Greater benefit adequacy may be required
Implementation	Direct transfer provides an established delivery mechanism	Banking and administrative barriers persist
Equity	Poorer households experience greater	Uniform benefits may not adequately

	financial burden	reflect differential need
Post-treatment protection	Financial hardship may continue after treatment	Support is predominantly treatment-period focused

The economic consequences of TB extend beyond individual households to the broader economy. TB disproportionately affects individuals during economically productive years, resulting in lost employment, reduced productivity and premature mortality. National analyses have demonstrated substantial financial burden among economically productive populations and greater impoverishment associated with hospitalisation and private-sector care.¹⁴

STRENGTH

The available evidence supports a shift from a disease-centred approach towards a patient- and household-centred model of TB care. Free diagnosis and treatment remain fundamental, but they are insufficient to ensure financial protection because a substantial proportion of household losses arise from transportation, food, income loss, caregiving and delays in diagnosis. Financial protection should therefore be integrated into TB programme design and monitoring rather than treated as a separate component.

Limitations

Particular attention should be given to households with low socioeconomic status and patients experiencing high-cost forms of TB. Financial-protection indicators should be monitored alongside treatment coverage and treatment outcomes to determine whether TB programmes are reducing not only disease burden but also the economic consequences of illness.

Although the evidence base on TB-related financial burden in India has expanded, several gaps remain. Much of the available evidence is cross-sectional or geographically concentrated, limiting understanding of long-term household recovery. There is also limited evidence on how financial burden differs according to gender, employment type, household

composition, disability and dependence on informal employment. Furthermore, evidence regarding the comparative effectiveness and cost-effectiveness of alternative social-protection approaches remains limited.

CONCLUSION

Financial status is both a determinant and a consequence of tuberculosis in India. Poverty, undernutrition, poor housing, restricted access to health services and livelihood insecurity increase vulnerability to TB, while TB can generate substantial direct and indirect costs, productivity losses, indebtedness, asset depletion and educational disruption. Evidence from India consistently demonstrates that catastrophic financial costs persist despite free TB services under NTEP and are disproportionately concentrated among economically disadvantaged households. Importantly, the economic burden begins before treatment initiation and can persist well beyond treatment completion. Patients with drug-resistant TB, severe extrapulmonary TB, recurrent disease and those requiring hospitalisation may experience particularly severe financial consequences. Although Nikshay Poshan Yojana represents an important national social-protection intervention, evidence indicates continuing gaps in coverage, timeliness and adequacy.

Achieving equitable TB elimination therefore requires financial protection to be considered an integral component of TB care. Earlier diagnosis, timely and adequate social protection, livelihood preservation and sustained post-treatment support are likely to be essential for preventing TB from becoming a long-term economic shock. Addressing the economic vulnerability associated with TB is therefore not only a social-protection priority but also an important component of achieving

sustainable and equitable TB elimination in India.

Declaration by Authors

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