ORIGINAL RESEARCH ARTICLE

A Study on Financial Outlay of Tuberculosis Patient's Registered at District Tuberculosis Centre of District Bareilly

Abhinav Pandey[1*,] Abhijeet[2], Rajendra Pal Singh[3], Palak Goyal[2], Huma Khan[3], Ravi Kumar[4]

ABSTRACT

Introduction: Despite being a fully treatable infectious disease, tuberculosis remains among the major causes of death. Early diagnosis and antibiotic treatment are essential for stopping the spread of TB. Treatment is now more challenging and expensive due to the emergence of drug-resistant strains. This study aims to explore the household out-of-pocket expenses of TB patients, as well as their socioeconomic status and knowledge of direct benefit transfer.

Materials and Methods: A cross-sectional study of 18 months was carried out at the District Tuberculosis Centre (DTC) in Bareilly, Uttar Pradesh. The study population included patients with pulmonary TB of all ages who underwent CBNAAT testing. A questionnaire was used to gather data via an interview schedule from the study participants. Statistical analysis was done using SPSS version 25 and Chi-square test was applied.

Results: 57.9% of DR and 70.5% of DS TB patients had out-of-pocket expenses of more than Rs. 5,000, while total expenditures of Rs. 500 or less were observed in 7.6 and 6.7% of the DR and DS TB patients, respectively. Our study found that most (46.1%) of DR TB patients responded that a cash benefit was given for their treatment.

Conclusion: Out-of-pocket expenditure is a barrier in the successful treatment of patients. The high cost of treating drug-resistant tuberculosis can lead to non-adherence and further spread of the disease. The awareness about direct benefit transfer is crucial.

Keywords: Financial toxicity, Drug-resistant tuberculosis, District tuberculosis Centre.

How to cite this article: Pandey A, Abhijeet, Singh RP, Goyal P, Khan H, Kumar R. A Study on Financial Outlay of Tuberculosis Patient's Registered at District Tuberculosis Centre of District Bareilly. SRMS J Med Sci. 2023;8(1):11-15.

Source of support: Nil

Conflict of interest: None

[1]Assistant Professor, [2]Junior Resident, [3]Professor, [4]Statistician,

Department of Community Medicine, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India.

Corresponding Author: Abhinav Pandey, Department of Community Medicine, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India, e-mail: dr.abhinav501@gmail.com

INTRODUCTION

Despite being a fully treatable infectious disease, tuberculosis remains among the major causes of death.[1] Prisons and refugee camps are examples of overcrowded, poorly ventilated environments with higher transmission risk. Droplet infection and droplet nuclei generated by sputum-positive patients with pulmonary tuberculosis are the primary modes of transmission for tuberculosis (PTB).[2] Early diagnosis and antibiotic treatment among patients are essential for preventing TB's spread and enhancing outcomes. Antibiotics can be used to treat TB; however, the treatment has become more challenging and expensive due to the emergence of drug-resistant strains of the illness.

India has the highest TB prevalence rate in the entire world. India reported an alarming increase in TB-related cases by 11 and 19% in 2019 and 2021, respectively, compared to the previous year.[3] The financial burden of tuberculosis can be significant, especially for countries like India with high TB prevalence rates. In addition to the cost of antibiotics, the emergence of drug-resistant strains has made treatment more challenging and expensive. Many TB patients and families are still facing very high direct and indirect costs due to TB illness and care-seeking, hampering access and putting people at risk of financial ruin or further impoverishment.[4]

This study as a whole emphasizes the financial burden patients face when treating TB, especially in nations like India with high prevalence rates and drug-resistant strains. The financial burden of the illness can be significant for patients and their families, with many facing high direct and indirect costs. The aim of the study is to explore the household out-of-pocket expenses, socioeconomic status and knowledge of direct benefit transfer among TB patients registered at District Tuberculosis Centre, Bareilly. The study's objectives are to assess the financial outlay among TB patients registered at District Tuberculosis Centre, Bareilly; to explore the knowledge of direct benefit transfer scheme among tuberculosis patients and to estimate the out-of-pocket expenditure incurred by tuberculosis patients.

MATERIALS AND METHODS

A cross-sectional study with study duration of 18 months. This study was conducted from February 2021 to July 2022.

Study Area

DTC, Bareilly, Uttar Pradesh

Study Population

Patients with pulmonary TB who registered at the DTC Bareilly and underwent testing by the CBNAAT

Inclusion Criteria

- Patients diagnosed with pulmonary tuberculosis (TB) of all age groups, including pediatric patients.
- Patients who have registered at the DTC in Bareilly, Uttar Pradesh.
- Patients who have undergone testing using the cartridge-based nucleic acid amplification test (CBNAAT) for tuberculosis.
- Patients who are residents of the study area, i.e., district Bareilly.

Exclusion Criteria

- Patients with an extrapulmonary TB diagnosis
- Patients for any reason were unavailable for interview on two subsequent visits.
- Pulmonary TB patients who were not willing to take part in the study.
- Patients who died before initiating the study or during the study period

Study Tool

A predesigned, pretested, semi-structured questionnaire was used to gather data from the study participants, and it was used as part of a carefully planned interview schedule.

Sample Size

Using the formula for finite population- Yamane's formula

$$n = \frac{N}{1 + N(e^2)}$$

n = Sample Size
N = Total population size i.e., 1952
e = Margin of error 5% (0.05) at 95% confidence level
    Sample size came out to be 332, after adding 10% non-response rate which is 33.2, final sample size is 365

Sampling Method

Stratified random sampling with equal allocation. Two strata were formed, one is of drug-sensitive and other is drug-resistant. A separate list of drug resistant and drug sensitive patients were made using a random number table.
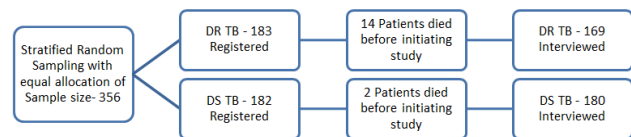
Flowchart 1: Study design

Study Design

A separate list of drug-resistant and drug-sensitive patients was created using a random number table. A face-to-face interview was conducted with each patient who had signed up for DOTS at DTC and was receiving treatment for drug-resistant and drug-sensitive tuberculosis after obtaining informed consent to ensure their voluntary participation in the study. In patients under 18, an interview was conducted in the presence of parent/guardian and relevant questions were asked from them (Flowchart 1).

Ethical Clearance

Ethical clearance was taken from the Institutional Ethical Committee. Before interviewing patients at the relevant health facility, prior written consent was obtained from the district tuberculosis officer.

Statistical Analysis

The data was compiled using Microsoft Excel version 2010 and presented in tabular form. Data analysis was done with the help of standard statistical software (SPSS) version 25, and the Chi-square test was applied to find out the associations between the variables to validate the findings of the study.

RESULTS

As per the demographic distribution of the sample population, rural areas accounted for 82.8% of the population, while urban areas accounted for only 17.2% (Table 1). This helps explain why most tuberculosis patients came from rural areas. This association between the residential locality of TB patients and DR TB was found to be statistically insignificant. According to the modified BG Prasad classification scale for 2020, 32.1% of respondents belonged to socioeconomic status class IV, while 27.2% belonged to class III (Figure 1).

The majority (46.1%) of DR TB patients believe they receive a cash benefit for their treatment, whereas the majority (43.8%) of DS TB patients believe they receive a travel allowance. Almost the same proportion of respondents (11.6% in DS TB and 13% in DR TB) believed that this cash benefit was given for nutritional support. The relationship between DR TB patients and patient knowledge of government cash benefits is statistically insignificant (Figure 2).

Table 1: Socio-demographic profile of respondents

| Variables	Particular	Total (N= 349)	
		frequency	percentage
Locality	Urban	60	17.2
	Rural	289	82.8
Age	Less than 18	39	11.2
	19–29	120	34.4
	30–39	45	12.9
	40–49	48	13.8
	50–59	68	19.5
	More than 60	29	8.3
Caste	General	147	42.1
	OBC	172	49.3
	SC	30	8.6
Religion	Hindu	220	63.0
	Muslim	129	36.9
Sex	Male	194	55.6
	Female	155	44.4
Marital Status	Married	215	61.6
	Unmarried	134	38.4
Education	Illiterate	115	32.9
	Primary	39	11.2
	Middle	41	11.7
	10th Pass	86	24.6
	12th Pass	40	11.5
	Graduate and above	28	8.1
Occupation	Professional	7	2.0
	Skilled Worker	25	7.2
	Semi-skilled worker	60	17.2
	Unskilled worker	127	36.3
	Student	70	20.1
	Unemployed	60	17.2
Socioecono-micstatus*	Class I	10	2.9
	Class II	48	13.8
	Class III	95	27.2
	Class IV	112	32.1
	Class V	84	24.1
Family Type	Nuclear family	225	64.5
	Joint family	83	35.5
Housing	Kutcha	71	20.3
	Semi- pucca	183	52.4
	Pucca	95	27.2
Overcrowding**	Yes	187	53.6
	No	162	46.4

*As per modified B.G. Parsad 2020
**On the basis of per person per room

Along with this, the majority of DR and DS TB patients had out-of-pocket expenses of more than Rs. 5,000 (57.9%
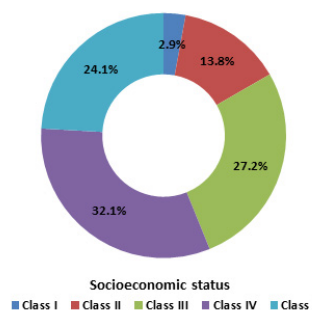
(*As per Modified B.G. Parsad Classification of Socioeconomic Status 2020)

Figure 1: Distribution of TB patients according to their socioeconomic status
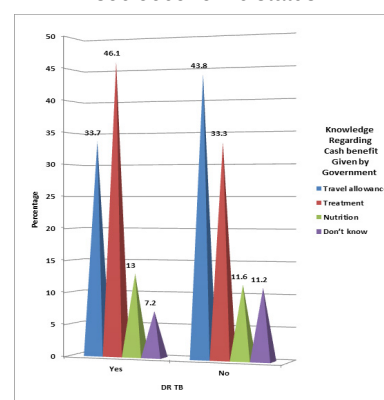
Figure 2: Bar graphs showing the distribution of DR and DS TB patients according to knowledge regarding cash benefits given by the government

in DR and 70.5% in DS TB). In contrast, total expenditure of Rs. 500 or less was observed in approximately 7.6 and 6.7% of the DR and DS TB, respectively. The relationship between DR TB patients and out-of-pocket treatment costs was found to be statistically significant. Out-of-pocket treatment costs were found to be statistically significant (Table 2 and Figure 3).

DISCUSSION

The current study interviewed 349 TB cases. Among them, 169 had DR TB and 180 had DS TB. The relationship between TB patients' residential location and DR TB was found to be statistically insignificant. In a study, Yadav SK *et al.* (2016) discovered that the majority of participants (52%) lived in urban areas, 35% lived in peri-urban areas, and about 13% lived in rural areas.[5] The socioeconomic

Table 2: Out-of-pocket expenditure during the course of treatment among TB patients

DR TB	Out of pocket expenditure for treatment				Total
	<500	500–2000	2000–5000	>5000	
Yes (%)	13 (7.6)	35 (20.7)	23 (13.6)	98 (57.9)	169
No (%)	12 (6.7)	15 (8.3)	26 (14.5)	127 (70.5)	180
Total	25 (7.2)	50 (14.3)	49 (14.0)	225 (64.4)	349

χ^2 = 11.626 df (3)
p-value 0.009
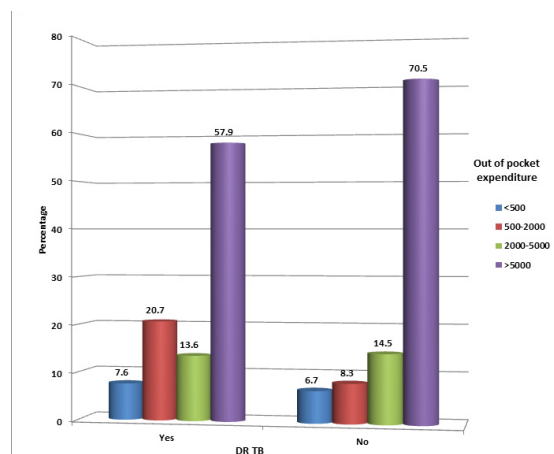
Figure 3: Bar graphs showing out of pocket expenditure during the course of treatment among TB patients

status (modified B.G. Prasad classification 2020) of the majority of drug-resistant patients (40.8%) was from class III, followed by 30.2% from class IV, and the least number of respondents (3%). The *p-value* was found to be highly significant statistically. Similar results were concluded in a study by Porwal C *et al.* (2013) done in the Delhi region on incidence and risk factors for XDR TB, where a significant association was found between XDR TB and socioeconomic status (p 0.013).[6]

Similar findings were observed in a study conducted in Surat by Yadav SK *et al.* (2016),[5] where socioeconomic status was determined using a modified per capita monthly income. The higher number of study participants were from socioeconomic class IV (35%), followed by class V (27%), class III (25%), and class II (12%) and class I (1%). Gaude GS *et al.* (2014) found a similar result. Low socioeconomic status was found to have a statistically significant association with the development of MDR in 52.2% of the cases.[7]

In our study, most (46.1%) of DR TB patients responded that a cash benefit is given for their treatment, followed by respondents who felt that this cash benefit is given for travel allowance (33.7%), and only 13% knew it was given for nutritional support. This implies that a cash benefit is given to patients, but they are not properly informed about the usage of this cash amount, which challenges the important role of nutrition in the treatment and prognosis of this disease. There seems to be a lack of proper communication and education to inform them about the actual purpose of the cash benefit. There are several misconceptions about the cash benefits that TB patients may have. This can lead to many patients not applying for it or not using it effectively, even if they do qualify for it. There is a need to create user-friendly guides or brochures that explain the benefits in plain language.

In our study, more than half of patients spent Rs. 5000 during the course of treatment as an out-of-pocket expenditure, while one-third (34.3%) of DR TB patients spent Rs. 500 to 5000, and only 7.7% spent Rs. 500 or less during the course of treatment. This shows that the majority of the respondents had out-of-pocket expenditures somehow for symptomatic treatment, diagnosis, and travel. It enlightens that for DOTS to be more effective and compliant, more efficacies should be laid on covering such expenses. Out-of-pocket expenses for DR TB patients can be a significant barrier to effective treatment. No study with similar results was conducted previously.

CONCLUSION

A patient with pulmonary tuberculosis in India may have to spend significant money on travel, diagnosis, and symptomatic treatment, which can be a major barrier to compliance with the DOTS programme. The high cost of treating drug-resistant TB can also lead to non-adherence and further spread of the disease if left unchecked. Therefore, it is imperative that the government and healthcare organizations inform TB patients regarding financial support.

In addition to raising awareness about financial support, efforts can be made to improve access to healthcare services in rural areas, where patients may face additional challenges in accessing care. By addressing these issues, we can help ensure that TB patients in India have access to the care they need to recover from this serious illness.

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