



Indirect costs in the treatment of Tuberculosis under DOTS

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Abstract

Introduction: Tuberculosis (TB) causes enormous social and economic disruption and hampers nation's development. DOTS strategy under RNTCP is one of the largest public health programs found to be beneficial against TB. The key component of DOTS is that each dose during continuous phase of treatment should be administered to patients under the supervision of a DOT provider, either from the community or the health system. This may sometime leads to loss of wages or incurs transportation charges for treatment in the program.

Material and methods: A cross sectional study was conducted in 2 randomly selected DOTS centre of Jalandhar. Total number of patients registered during third quartile of 2014 was 107, out of which 102 patients can be contacted. Information regarding indirect costs i.e. wage loss, expenditure on transportation and extra nutrition was collected from all the patients. The data so collected was entered in analyzed using SPSS 16 software.

Results: Overall mean expenditure of category 1 and 2 patients treated under DOTS was Rs. 2072/- and 2319/- month. The major share of indirect costs (3/4th) can be attributed to wage loss due to decreased capacity to work or work absenteeism. Majority of the patients (79%) preferred to take additional nutrients, which contributes to around one fourth of the total indirect costs. Travel costs as means of indirect expenditure were minimal (1.5%).

Conclusion: Around half of the patients had undergone decrease in their monthly income. The major share of indirect costs (74%) can be attributed to wage loss due to decreased capacity to work.

Recommendations: The patients registered under RNTCP should be covered under some food subsidy schemes with the help of Government sector/ NGOs. Patients unable to continue with their jobs should be assisted by social security schemes/ insurance coverage.

Key words

DOTS, Indirect cost, RNTCP, Tuberculosis, Work absenteeism.



Introduction

Tuberculosis (TB) puts enormous social and economic disruption and hampers nation's development [1, 2]. India accounts for one-fifth of the global TB burden, with 1.8 million developing the disease each year and of them about 800,000 are infectious. Nearly 0.4 million are dying due to TB annually which translates to two deaths every three minutes [3]. The disease is most prevalent in the age group of 15 to 54 years [4, 5] which is the highly economically productive period of an individual's life with important consequences for the household when the individual falls sick with TB. Generally burden of TB is measured by morbidity and mortality which are key considerations [6]. However, only focusing on morbidity and mortality effects provides an incomplete picture of the adverse impact of ill health on human welfare.

On an average, 3-4 months of work time are lost if an adult has TB, resulting in a loss of about 20-30% of annual household income [6]. An average of 15 years of income is lost if an individual dies of the disease. Thus, tuberculosis causes enormous social and economic disruption and hampers the development of the country [1]. Besides, projections from earlier studies conducted prior to the implementation of Revised National Tuberculosis Control Programme (RNTCP) in south India, indicate that despite being offered free diagnosis and treatment by government, the projected out of pocket expenditure incurred by tuberculosis patients annually was more than US\$ 3 billion [7].

Directly Observed Treatment Short course (DOTS) strategy is one of the largest public health programmes found to be beneficial against TB. This strategy has been successful in reducing death rates and increasing cure rates in India [7, 8]. Since evidence supporting this has

mainly come from cost effective analysis (excluding patient costs) against historical controls [9, 10, 11], there is a need to carry out studies on patient costs [12]. One of the key components of RNTCP (DOTS) is that each dose of anti-tuberculosis drugs should be administered to patients under the supervision of a DOT provider, either from the community or the health system. This may sometime leads to loss of wages or incurs transportation charges for treatment in the programme [13].

Therefore, we undertook a study to estimate the indirect costs to patients on account of tuberculosis treated in DOTS programme in Jalandhar city of Punjab, India.

Material and methods

Study design: Cross sectional study.

Study population: All the patients of categories I and II who were registered in third quartile of 2014 in 2 randomly selected DOTS centre of Jalandhar were selected for study.

Sample size: Total number of patients registered during the study period was 107, out of which 102 patients were contacted.

Study method: A pre-tested, semi-structured questionnaire was prepared, and patients were interviewed on one to one basis after seeking prior informed verbal consent. Information regarding indirect costs i.e. wage loss, expenditure on transportation and extra nutrition was collected from all the patients. The data so collected was entered in Microsoft Office Excel Sheet and analyzed using SPSS 16 software.

Results

A total of 83 patients were registered under category 1 while remaining 19 were under category 2 as per **Table - 1**. Out of total 102 patients, 52.9% had no wage loss. Distribution based on source of indirect costs was as per

Table - 2. The remaining patients (47.1%) had a monthly wage loss ranging from Rs. 650/- to Rs. 11,210/- with a median value of Rs. 2120/- per month as per **Table - 3.**

Out of the total 85.3% had no expenses on transport, as walking was the most common way of reaching DOTS centre. The cost for remaining 14.7% ranged from Rs. 150/- to Rs. 450/- with a median value of Rs. 186/- per month. Most of the patients (93.1%) required to travel less than 2 km to reach the DOTS centre.

A total of 77.5% patients were taking additional nutrition after being diagnosed with T.B. The expenditure of these patients ranges from Rs. 300/- to Rs. 2890/- with median value of Rs. 720/- per month.

The wage loss and expenditure on nutrition and transport was more in patients under category 2 compared to category 1. Overall mean expenditure of category 1 and 2 patients treated under DOTS was Rs. 2072/- and Rs. 2319/- per month as per **Table - 4** and **Table - 5.**

Discussion

Evaluation of any program is important both at macro and micro levels; macro level helps in enabling major policy decisions while operational efficiency of any program is judged by micro level evaluation. The present study was conducted with the aim of micro-level performance appraisal of RNTCP at DOTS centres of Jalandhar District to focus on some of the important aspects of program which are quite overlooked majority of times but are very important from patient's perspectives. So the present study was done keeping in view the fact that in spite of tremendous efforts by the Government of India to increase the compliance for DOTS, there are still quite high prevalence of defaulters, one of the important reasons for this

is the indirect costs the patients are forced to bear even after availing the free of costs DOTS treatment.

One of the goals of the RNTCP is that patient should not lose wages or incurs expenditure for travel. Extra efforts were, therefore, made to provide decentralized services for diagnosis and treatment closer to patient's residence [13]. Our findings confirm that travel costs for treatment were definitely lower. This refutes the findings reported earlier that patients taking DOT might incur increased costs [14]. According to study carried out by Suhadev M, et al. [15] in rural Tamil Nadu 73% of the respondents came from rural areas with the mean distance of 245 km from the health centre spending approximately Rs. 80/- towards their transport charges, however it is encouraging to note that in the present study most of the patients had to cover a distance less than 2 km. Our findings were also supported by Shalini S, et al. [16] who found that almost half of the patients had to cover a distance of approx. 2-3 km.

In present study, out of total 102 patients, 52.9% had no wage loss while remaining 47.1% patients had a monthly wage loss of Rs. 2120/- per month. Suhadev M, et al. [15] also found that 54% percent of working patients did not lose workdays on account of illness. Muniyadi M, et al. [17] reported that 54% of patients did not lose workdays and indirect cost due to work absenteeism was Rs. 1776/- per month. The loss of workdays exceeding 60 was observed in 12% of patients.

It has long been known that there is an association between TB and malnutrition. Malnutrition enhances the development of active TB, and active TB makes malnutrition worse. The wasting commonly found in patients with active TB is most likely the result of a combination of factors, including decreased



appetite and food intake, and increased losses and altered metabolism associated with the inflammatory and immune response. During drug treatment of active TB without supplementary nutrition, nutritional status usually improves but remains limited to fat mass with no significant change in protein mass. Thus protein metabolism continues to be altered even during treatment, and that clinical and functional recovery from TB lags behind microbial cure. Therefore, nutritional support during TB treatment is often recommended [18]. In our study a total of 77.5% patients were taking additional nutrition costing them Rs. 300/- to Rs. 2890/- with median value of Rs. 720/- per month.

Conclusion

Around half of the patients had undergone decrease in their monthly income. The major share of indirect costs (74%) can be attributed to wage loss due to decreased capacity to work. Majority of the patients (79%) preferred to take additional nutrients, which contributes to one fourth of the total indirect costs. Travel costs as means of indirect expenditure were minimal (1.5%).

Recommendations

The patients registered under RNTCP can be covered under food subsidy schemes with the help of Government sector/ non-Government organizations (NGOs). Patients unable to continue with their jobs should be assisted by social security schemes/ Insurance coverage. This may ensure better adherence to treatment and helps us in achieving our ultimate goal of tuberculosis free India.

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Table – 1: Distribution based on category of treatment.

Category	No. of patients	%
I	83	81.4%
II	19	18.6%
Total	102	100.0%

Table – 2: Distribution based on source of indirect costs.

Source of Indirect Costs	No. of patients	%
Wage loss	48	47.1%
Nutrition costs	79	77.5%
Transportation costs	15	14.7%

Table – 3: Category wise distribution of indirect costs.

Indirect costs	Category	Median loss (Rs.)	Range (Rs.)
Wage loss (n-48)	I	1890/-	650 - 11,210/-
	II	2300/-	
Nutrition costs (n-79)	I	650/-	300 - 2890/-
	II	980/-	
Transportation costs (n-15)	I	175/-	150 - 450/-
	II	200/-	

Table – 4: Overall burden of indirect costs under DOTS (Category I).

Indirect costs (n-83)	Mean loss (Rs.)	% Contribution
Wage loss	1490/-	71.9%
Nutrition costs	550/-	26.5%
Transportation costs	32/-	1.5%
Total costs (per month)	2072/-	100.0%

Table – 5: Overall burden of indirect costs under DOTS (Category II).

Indirect Costs (n-19)	Mean loss (Rs.)	% Contribution
Wage loss	1761/-	75.9%
Nutrition costs	523/-	22.6%
Transportation costs	35/-	1.5%
Total costs	2319/-	100.0%