

# A comparative study of factors for interruption of antitubercular treatment among defaulters in urban and rural areas of Kamrup District, Assam

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## ABSTRACT

**Background:** Defaulting from treatment is an important challenge for tuberculosis (TB) control. As per the Revised National Tuberculosis Control Programme quarterly reports of Kamrup District (Assam), among the registered cases default rate was 13.3%(2008) & 13.1 % (2009). **Objectives:** To elicit reasons & factors responsible for interruption of treatment from a cohort of TB defaulters of urban & rural areas in Kamrup District. **Methods:** The cross-sectional study was conducted among 1/3rd of all defaulters who were put on Directly Observed Treatment Short-course chemotherapy in 2011 under 1 urban Tuberculosis Unit (TU) & 2 rural TUs of Kamrup District. From these 3 TUs, total 210 patients interrupted treatment in 2011; so 70 defaulters (35 from 1 urban TU & 35 from 2 rural TUs) were interviewed in their residences by using a pretested and predesigned schedule. Study was conducted in January - June, 2012. **Results:** Majority of the defaulters was illiterate (51.4%) in rural areas but in urban areas majority studied upto high school level (37.1%). Maximum defaulters were in the age group 25-44 years (55.7% in urban areas & 62.9% in rural areas). The number of defaulters decreased uniformly with increasing income in the rural areas & but not so in urban areas. More number of new cases defaulted in rural areas (82.8%) compared to urban areas (57.1%). Improvement in symptoms was found to be the most common reason (45.7% in urban areas & 40 % in rural areas), leading to treatment interruption. **Conclusions:** Early improvement in symptom was the most common reason leading to treatment interruption. Continuous health education should be provided to TB patients emphasizing the need to continue treatment despite early improvement in symptoms.

**Keywords:** Defaulter, DOTS, interruption of treatment, RNTCP, tuberculosis

## Introduction

Tuberculosis (TB) is one of the most important public health problems in developing countries. India is the highest TB burden country accounting for one-fourth (25%) of the global incidence.<sup>[1]</sup> The Revised National Tuberculosis Program (RNTCP) based on the internationally acclaimed

Directly Observed Treatment Short-course (DOTS) strategy has made rapid strides since its implementation. RNTCP covered the entire country in March 2006. Since 2007–08, annually, around 20 million symptomatic persons are screened by microscopy for TB and about 1.5 million persons are put on TB treatment. Now rapid molecular diagnostic tools like CBNAAT and Line Probe Assay are available throughout the country. In 2017, 7,32,449 patients have been tested using these methods, and 38,854 rifampicin-resistant/multidrug-resistant (MDR)-TB patients have been diagnosed.<sup>[1]</sup> Incomplete antituberculosis treatment is the reason for the emergence of MDR strains of TB bacillus that emerged in the early 1990s, extensively drug-resistant (XDR) strains emerged in 2006, and recently totally

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drug-resistant (TDR) strains emerged in 2012 in India.<sup>[2]</sup> Studies done already reveal that the reasons leading to interruption of treatment appear to be related mostly to the patient himself. The primary care provider being in direct communication with the patient is in a position to tackle many of the issues related to treatment default. India is a vastly diverse and densely populated country that has been efficiently covered by a network of primary care physicians and thus they become valuable assets in terms of prevention of treatment interruption and the subsequent emergence of drug-resistant TB. Kamrup district reported high default rates of 13.3% and 13.1%, respectively in 2008 and 2009<sup>[3-5]</sup> Though there are many studies<sup>[6-9]</sup> done in different parts of the country on factors responsible for defaulting among TB patients, no such studies are available from this part of the country. So, this study was envisaged with the objective of comparative analysis of factors and reasons responsible for interruption of treatment among a cohort of defaulters in one urban and two rural tuberculosis units (TU) of Kamrup district, Assam.

## Materials and Methods

### Ethical approval

The study was approved by the Institutional Ethics Committee of Gauhati Medical College, Guwahati on 15-12-2010.

### Study setting and Patient selection

The study was carried out as a part of a larger RNTCP evaluation study in Kamrup District. There are six TUs in Kamrup district, two in urban areas and four in rural areas. Randomly, one urban TU (Guwahati TU) and two rural TUs (Boko and Rangia) were selected for the study. One-third of all types of TB patients defaulting treatment in 2011 were interviewed for the study. As per the data provided by Medical Officer- Tuberculosis Control (MO-TC) of these three TUs, a total of 208 TB patients (Guwahati TU = 104, Rangia TU = 56, and Boko TU = 48) defaulted treatment in 2011. Hence, 70 ( $208 \times 1/3 = 69.3$ ) default cases were evaluated in the study. By using proportional allocation sampling, 35 cases were selected randomly from the urban TU (Guwahati TU) and 35 cases from rural TUs (17 cases from Boko TU and 18 cases from Rangia TU). Patients were traced and interviewed at their residences or working places.

### Type of study

As this study was based on one time interview of defaulters in the community, it is a community-based cross-sectional study.

### Inclusion criteria

TB patients (registered in 2011) interrupting treatment for more than 8 weeks consecutively after initiation of treatment were included in the study.

### Data collection tool

Data was collected using a pretested and predesigned schedule. The information recorded in the schedule included personal data,

sociodemographic data, past and present history of diagnosis of TB and antitubercular treatment (ATT), and also the reasons for discontinuation of ATT.

### Study period

January to June 2012.

### Data analysis

Microsoft Excel and SPSS 17.0 (trial version) software packages were used for data entry and analysis. A Chi-square test was applied for the significance of the association.

## Results

The analysis pertains to the study group of 70 TB defaulters residing in urban and rural areas of Kamrup district who interrupted treatment consecutively for more than 2 months.

The age distribution of defaulters was similar in urban and rural areas [Table 1]; their percentage increased with age up to a maximum of 65.7% (urban) and 62.9% (rural) in the age group of 25–44 years and declined thereafter. However, the age distribution of defaulters with their area of residence is statistically nonsignificant ( $P > 0.1$ ).

Table 2 shows the educational status of defaulters. In urban areas, the number of defaulters increased with increasing

**Table 1: Age distribution of defaulters in urban and rural areas**

Age group (in years)	Urban (n=35)	Rural (n=35)
<24	7 (20%)	4 (11.4%)
25-34	13 (37.1%)	6 (17.1%)
35-44	10 (28.6%)	16 (45.8%)
45-54	4 (11.4%)	6 (17.1%)
>54	1 (2.9%)	3 (8.6%)

$\chi^2=5.93$ , Degrees of freedom (d.f.) = 3,  $P=0.11$

**Table 2: Education status of the defaulters in urban and rural areas**

Education status	Urban (n=35)	Rural (n=35)
Illiterate	5 (14.3%)	18 (51.4%)
Primary school	9 (25.7%)	12 (34.3%)
High school	13 (37.1%)	3 (8.6%)
10+2/College	8 (22.9%)	2 (5.7%)

$\chi^2=17.62$ , d.f. = 2,  $P<0.001$

**Table 3: Socioeconomic status of the defaulters (based on BG Prasad's classification modified for December 2011)**

Class	Per Capita Income (INR)	Urban (n=35)	Rural (n=35)
Upper class	$\geq 4200$	-	-
Upper middle	2100-4199	5 (14.3%)	2 (5.7%)
Lower middle	1260-2099	14 (40%)	4 (11.4%)
Upper Lower	630-1259	11 (31.4%)	13 (37.1%)
Lower	$\leq 629$	5 (14.3%)	16 (45.7%)

educational status up to high school level and then decreased. In rural areas, the number of defaulters decreased uniformly with increasing educational status. The difference is statistically significant. ( $P < 0.001$ )

Table 3 shows the socioeconomic status of defaulters based on BG Prasad's Classification<sup>[10]</sup> which was modified for December 2011. The majority of the defaulters of urban areas belong to lower-middle and upper lower classes (71.4%) whereas the majority of the defaulters of rural areas were in upper-lower and lower classes (82.8%). The association of social class and area of residence of the defaulters is significantly associated ( $\chi^2 = 12.7$ , d.f. = 2,  $P < 0.05$ ).

The majority of the defaulters have been treated with category I regimen before they interrupted treatment [Table 4]. In urban areas, the majority were new sputum smear-positive (34.3%) followed by treatment after default (TAD) cases (31.4%) while in

rural areas the majority were new sputum positive cases (48.6%) followed by new extrapulmonary cases (22.8%).

Around 69% of urban patients and 86% of rural patients stopped treatment by the end of the 3<sup>rd</sup> month of treatment [Table 5]. Maximum interruptions were found to occur in the 2<sup>nd</sup> and 3<sup>rd</sup> months of treatment.

Among the 70 patients, 85 responses for treatment interruption were obtained [Table 6]. The most common reason stated by urban patients was a feeling of improvement in symptoms (45.7%), followed by the overlapping of DOT timing with duty hours (34.3%). The most common reason stated by rural patients was an improvement in symptoms (40%), followed by the toxicity of the drugs (22.9%).

## Discussion

The age distribution pattern in the present study was similar to other studies<sup>[6-8]</sup> which have shown peak levels of defaulting at ages 25–44 years. Maximum defaulters were in the age group 25–44 years because they are the earning members of the family, which led them to stop taking treatment rather than to leave their earning of the day.

In rural areas, the number of defaulters decreased uniformly with increasing educational status but the opposite happened in urban areas.<sup>[11]</sup> In urban areas majority studied up to high school level. The majority of the defaulters were illiterate (51.4%) in rural areas which are in concordance with the findings of Vijay *et al.*

The number of defaulters decreased with increasing income in rural areas and but not in urban areas. Overlapping of DOT timing with duty hours and traveling due to business purposes may be the reasons behind more urban defaulters from the lower-middle-class background even with good literacy status.

The majority of the defaulters, both in urban and rural areas, were treated with category I regimen before they interrupted treatment which is similar to the findings by Santha *et al.*<sup>[12]</sup> Since maximum cases were new, the possibility of treatment interruption by TB patients is higher among new cases. Retrieval actions might be inadequate in urban areas and so a high proportion (31.5%) of cases defaulted two or more than two times after initiation of treatment.

**Table 4: Distribution of defaulters as per their initial treatment category**

Category	Types of patients	Urban (n=35)	Rural (n=35)
New	New Sputum Positive (NSP)	12 (34.2%)	17 (48.6%)
	New Sputum Negative (NSN)	3 (8.6%)	4 (11.4%)
	Extrapulmonary (EP)	5 (14.3%)	8 (22.8%)
	Total	20 (57.1%)	29 (82.8%)
Retreatment	Treatment after Default (TAD)	11 (31.5%)	5 (14.3%)
	Relapse	2 (5.7%)	-
	Failure	-	-
	Others	2 (5.7%)	1 (2.9%)
	Total	15 (42.9%)	6 (17.2%)

**Table 5: Distribution of defaulters as per the month at which they interrupted treatment**

Month at which treatment was interrupted	Urban (n=35)	Rural (n=35)
1 <sup>st</sup> month	3 (8.6%)	6 (17.1%)
2 <sup>nd</sup> month	12 (34.3%)	16 (45.7%)
3 <sup>rd</sup> month	9 (25.7%)	8 (22.9%)
4 <sup>th</sup> month	7 (20%)	4 (11.4%)
After 4 <sup>th</sup> month	4 (11.4%)	1 (2.9%)

**Table 6: Distribution of defaulters as per the reasons\* cited for interruption of treatment**

Reasons	Urban (n=35)	Rural (n=35)
	Total Responses=50	Total Responses=45
Improvement in symptoms	16 (45.7%)	14 (40%)
Overlapping DOT timing with duty hours	12 (34.3%)	5 (14.3%)
Going out of station	8 (22.9%)	6 (17.1%)
DOT centre far away	4 (11.4%)	2 (5.7%)
Too many drugs for a long period	3 (8.6%)	5 (14.3%)
Toxicity of the drugs	3 (8.6%)	8 (22.9%)
Deterioration/no improvement in symptoms	2 (5.7%)	4 (11.4%)
Unawareness of total duration of treatment	2 (5.7%)	3 (8.6%)

\*Multiple responses

In the study, around 69% of urban patients and 86% of rural patients had stopped treatment by the end of the 3<sup>rd</sup> month; and maximum interruptions were found to occur between 2<sup>nd</sup> and 3<sup>rd</sup> months. Other studies<sup>[6,9,12]</sup> have also reported that the maximum number of patients interrupted their treatment by the end of 2<sup>nd</sup> or 3<sup>rd</sup> month.

On evaluating the reasons for discontinuation of treatment, an early improvement was stated by the majority (45.7% in urban areas and 40% in rural areas). A study<sup>[6]</sup> among 201 defaulters in Delhi revealed early improvement as the commonest reason for treatment interruption. A study<sup>[7]</sup> from Jharkhand and Arunachal reported that improvement in symptoms (40% and 56%), intolerance to drugs (20% and 9%), and other factors caused defaults in some patients. Going out of station, side effects due to anti-TB drugs, and unsuitable DOT timings were the main reasons for patients to default in the study by Vijay *et al.*<sup>[9]</sup> However, few studies<sup>[8,13,14]</sup> reported toxicity following treatment was the most common reason for discontinuation of treatment.

A study done among 90 TB patients in Justice K S Hegde Charitable Hospital, Managaluru) revealed similar reasons for default with a feeling of well-being (41.7%) and side effects (25%) as the most common causes of defaulting treatment.<sup>[15]</sup>

Another study<sup>[16]</sup> done in South Africa noticed that treatment default was less likely among cases >24 years old compared to younger cases & the likelihood of treatment default was lower among patients who had been on treatment for longer than 2 months compared to those in the first 2 months of treatment. Defaulters were mostly of the TB retreatment category. These findings are in contrast with the findings of the current study. The study was done on a population with high TB and HIV prevalence settings which may be one of the reasons for this contrasting result.

Another study<sup>[17]</sup> done in Darjeeling district of West Bengal revealed that 75% of default occurred in the intensive phase, alcohol consumption (29.1%) being the commonest reasons for default followed by adverse effects of drugs (25.3%) and long-distance from DOT centers (21.5%). Other reasons noticed were inadequate knowledge and inadequate patient-provider interaction. Although this study revealed alcoholism as the most common cause of interruption of treatment, other reasons and treatment defaulting in the first 2–3 months seem to be universal factors about treatment discontinuation among TB patients.

## Conclusion

The present study revealed discontinuation of treatment of TB was more in young and middle-aged persons (25–44 years). The number of defaulters decreased uniformly with increasing income in the rural areas but not so in urban areas. New TB patients defaulted treatment more compared to old TB patients. Most patients stopped treatment by the end of the 3<sup>rd</sup> month of treatment. An early improvement was stated by the majority as the cause for discontinuation of treatment in this study.

Nonadherence to treatment is common human behavior and this behavior can be changed by establishing a human bond between the patient and the treatment provider via a quality assured DOTs. As interruption frequently occurs in the 2<sup>nd</sup> or 3<sup>rd</sup> month of treatment, which coincides with an improvement in symptoms, it is imperative to provide continuous health education to patients explaining the treatment plan before initiation of treatment and emphasizing the need to continue treatment despite improvement.

Every noncompliant case should be retrieved as early as possible and he/she should be brought back under treatment. Defaulting, which was more common in new patients, could be avoided by providing family support for DOT. Family cooperation has been identified as a possible protective factor against defaulting in Ethiopia.<sup>[18]</sup>

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## Conflicts of interest

There are no conflicts of interest.

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