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## **Original Research Article**

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# A study of treatment outcomes of pulmonary tuberculosis and extrapulmonary tuberculosis patients in a tertiary care centre

V. H. Ramya\*, G. Gayathri, V. Gangadharan

Department of Chest Medicine, Saveetha Medical College and Hospital, Chennai, India

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\*Correspondence: Dr. V. H. Ramya,

E-mail: ramya.vh.rr@gmail.com

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#### **ABSTRACT**

**Background:** Directly observed treatment remains one of the most widely-accepted global health interventions for tuberculosis. Tuberculosis treatment outcome is one of the performance indicators of the programme set by World Health Organization.

**Methods:** This study was conducted in a tertiary care centre Chennai. A retrospective analysis of the profile and treatment outcome of all tuberculosis patients registered from January 2015 to December 2015 at DOTS centre under RNTCP was conducted. Data on treatment outcomes was analysed using appropriate statistical methods and percentages were calculated.

**Results:** Out of 118 TB cases, 59.3% had pulmonary while 40.7% had extra-pulmonary TB. Sputum positive PTB is more common than sputum negative which is 74.2% and 25.8% respectively. Frequency of TB lymphadenitis is being the common presentation among extra pulmonary TB cases, followed by TB pleurisy. Success rate (cure rate plus treatment completion rate) for new cases was 63.1% and for retreatment cases was 36.9% while the overall success rate was 81%.

**Conclusions:** Effective measures have to be taken in the programme to move forward to help in the eradication of TB. Tuberculosis mostly affects males of the economically productive age group and causes economic losses. The success rate of new cases was higher compared to retreatment cases though the overall success rate was lower compared to the RNTCP norms. Proper education on DOTS can help in improving the success rate and cure rate.

**Keywords:** DOTS, Treatment outcome, Tuberculosis, Tertiary care centre

## INTRODUCTION

Tuberculosis (TB) still remains an important public health problem throughout the world contributing to significant morbidity and it is one of the top ten causes of mortality in India. India contribute to the majority of TB burden nearly one-fourth of global tuberculosis and is the highest TB burden country in the world. The World Health Organisation statistics for 2015 gave an estimated incidence of 2.2 million cases of TB for India out of a global incidence of 9.6 million. The probable causes of increase in TB incidence are due to poverty, malnutrition, poor living conditions with overcrowding, war, lack of

drugs, underfunding of national tuberculosis programmes (NTPS), and non-adherence to programme policies. These factors may cause increased transmission of TB bacilli among the community and/or to an increased risk of conversion from latent to overt clinical TB.<sup>4</sup>

Early diagnosis and proper treatment are necessary to minimize the transmission of TB bacilli and finally to achieve elimination of TB. If TB is detected early and adequately treated with a combination of medicines for 6 to 9 months; the patients become non-infectious and declared cured. The important problems for TB control are human immunodeficiency virus (HIV), diabetes

mellitus co-infection and drug resistance.<sup>5,6</sup> HIV co-infection is the strongest risk factor for progression of latent TB infection to TB disease.<sup>7</sup>

Diabetes mellitus is another most important risk factor associated with tuberculosis (TB). Diabetes mellitus (DM)-tuberculosis is usually associated with the poor glycemic control in DM patients. Screening for DM and if required, subsequent glycemic control may help in improving the outcome of TB treatment. Diabetes doubles the risk of treatment failure, death, and relapse in patients with TB.<sup>8</sup>

Having a constant surveillance on the outcome of treatment is necessary to evaluate the effectiveness of the intervention and for comparison.

#### **METHODS**

This study was carried out in a tertiary care hospital in Chennai. Patients diagnosed as pulmonary and extra pulmonary tuberculosis are enrolled in this study. A retrospective analysis of the profile and treatment outcome of all tuberculosis patients registered from January 2015 to December 2015 at DOTS centre under RNTCP was conducted. The registration documents reviewed contain basic information such as patient's age, sex, address, tuberculosis type, and treatment outcome.

According to RNTCP – DOTS, the case definitions, and treatment outcome definitions were used. 10

## Statistical analysis

Data collected was analyzed using SPSS statistical package after data cleaning and ensuring data validity through random checks and double entry of data.

## **RESULTS**

Over the period of one year, 130 TB patients were registered for DOTS at this DOTS cell in a tertiary care centre. Out of which 12 patients (i.e. around 9.2%) failed to reach their respective PHC to get registered in DOTS to receive ATT. Hence 118 cases are included in this study.

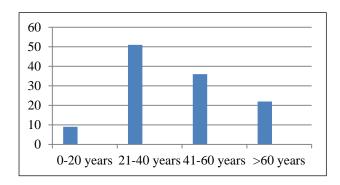


Figure 1: Age wise distribution of TB cases.

Out of the total 118 patients, 78 (66.1%) were males and 40 (33.9%) were females (Figure 2). The total mean age group for male patients is  $46.0\pm22$  years while that of the female group is  $41.0\pm17$  years and the total mean age group is  $43.0\pm1.9$  years.

In the present study, with respect to age, 51 (43.2%) and 36 (30.5%) were belonging to the age group of 20-40 years and 40-60 years respectively and least (7.6%) was geriatric population (Figure 1).

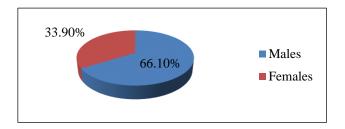


Figure 2: Sex wise distribution of TB cases.

Table 1: Distribution of cases according to the type of TB.

| Type of TB     | Frequency | %     |
|----------------|-----------|-------|
| Pulmonary      | 70        | 59.3% |
| Extrapulmonary | 48        | 40.6% |
| Total          | 118       | 100%  |

Out of 70 PTB cases, 52 (74.2%) were sputum smear positive and 18 (25.7%) were sputum smear negative (Table 2).

Table 2: Sputum status at the start of treatment in pulmonary case.

| Sputum status   | Frequency | %     |
|-----------------|-----------|-------|
| Sputum positive | 52        | 74.2% |
| Sputum negative | 18        | 25.8% |
| Total           | 70        | 100%  |

Table 3: Types of presentation in extrapulmonary TB cases.

| Type of EP TB       | Frequency | %     |
|---------------------|-----------|-------|
| Lymph node TB       | 25        | 52.1% |
| Tb pleural effusion | 16        | 33.3% |
| Tb abdomen          | 2         | 4.1%  |
| Tb bone             | 2         | 4.1%  |
| Tb skin             | 1         | 2.1%  |
| Tb breast           | 1         | 2.1%  |
| Tb chest wall       | 1         | 2.1%  |
| Total               | 48        | 100%  |

Extra pulmonary cases presented in wide varied diagnosis involving many parts of the body. Among 48 extra pulmonary cases, 25 were TB lymphadenitis, 17 were TB pleurisy (pleural effusion), and other presentations were

like involving abdomen, bone, skin, breast, chest wall (Table 3).

Out of the 118 cases registered, 102 (86.4%) were new cases and 16 (13.6%) were retreatment cases. Of the retreatment cases; 9 were "relapse", 6 were treatment "defaulters" and one was "treatment failure" (Table 4).

Table 4: Distribution of cases according to category at the commencement of treatment.

| Tb category             | Frequency | %     |
|-------------------------|-----------|-------|
| New                     | 102       | 86.4% |
| Relapse                 | 9         | 7.6%  |
| Treatment after default | 6         | 5.0%  |
| Failure                 | 1         | 0.84% |
| Total                   | 118       | 100%  |

The treatment outcomes in the study; 40 (33.8%) were cured, 55 (44.4%) completed the treatment; 6 (5.08%) expired during the course of treatment; 7 (6.9%) had treatment failure; 3 (2.5%) defaulted the treatment and remaining 6 (6.7%) were transferred out (Table 5).

Table 5: Distribution of total TB cases based on treatment outcome.

| Treatment outcome   | Frequency | %     |
|---------------------|-----------|-------|
| Cured               | 40        | 33.8% |
| Treatment completed | 55        | 46.6% |
| Expired             | 6         | 5.1%  |
| Failure             | 7         | 5.9%  |
| Default             | 3         | 2.5%  |
| Transfer out        | 6         | 5.1%  |
| Total               | 118       | 100%  |

With respect to treatment outcomes, the total success rate was 81% while it was 63.1% and 56.8% separately for new and retreatment cases respectively (Table 6).

Success rate: The tuberculosis treatment success rate is the percentage of all new tuberculosis cases (or new and

Table 6: Success rate in new and retreatment cases.

| TB case category | Outcome        |                  | Total |
|------------------|----------------|------------------|-------|
|                  | Successful (%) | Unsuccessful (%) | (%)   |
| New              | 63.1%          | 36.9%            | 100%  |
| Retreatment      | 56.8%          | 43.2%            | 100%  |

Table 7: Cure rate among new sputum positive cases.

| Cure rate | Frequency | Percentage | Total |
|-----------|-----------|------------|-------|
|           | 40        | 76.9%      | 100%  |

relapse cases for some countries) registered under a national tuberculosis control programme in a given year that successfully completed treatment, with or without bacteriological evidence of success ("cured" and "treatment completed" respectively). The success rate is more in new cases than in extra pulmonary cases. One of the objectives of the national strategic plan is to achieve 90% success rate of all new and 85% for retreatment cases.

Cure rate: Total percentage of patients in new sputum positive cases presented with end treatment sputum negative for AFB is considered as cure rate. The expected target for cure rate as per guidelines is 95% but cure rate in our study is 76.9 %.<sup>19</sup>

#### **DISCUSSION**

TB still continued to be an ongoing growing epidemic day by day especially in a developing country like India. Present study aimed at looking into the integrity of the referral system and monitoring and follow-up of the cases and to throw more light on grass root level as to whether the patient reached the respective centre or not. Being a medical college, it is not just a responsibility to refer the patients to the respective TB unit, but to go a step to advance a step further to track the patients being referred. Out of 130 patients referred, 11 patients were lost to follow-up that depicts a lacuna in the referral system and this gap has to be filled by employing latest technology via smart phones where an application can be developed integrating all the field staff with the medical officer who is referring to the concerned field staff instantly to ensure that not even single patient is missed out.

As seen in many studies done by Akarkar NS, Saili S, Pradhan et al, age wise distribution of TB cases affects that dominance of disease in the middle age group patients which greatly has an impact on the economy of the family.<sup>12</sup>

TB is more common in male in our study which was similar to the study done by Veeramani G, Madhusudhan et al. Since male are exposed more to external environment than female patients, there is increased burden on the male population. <sup>13-15</sup>

The volume of TB cases diagnosed shows the burden on pulmonary cases and a large proportion of cases are sputum positive pulmonary tuberculosis. Similar report having pulmonary TB cases are more when compared to extra pulmonary is seen in the study done by Costa AL Da et al. 16 Based on this result the programme activities have to be intensified in the form of active surveillance than what we are following now in the form of passive surveillance. Many studies have shown an improved case finding in active surveillance than in passive surveillance.<sup>18</sup> Among extra pulmonary cases, as reflected in many of the studies, TB lymphadenitis has continued to be the large proportion of cases among extra pulmonary tuberculosis as this presentation is seen in many studies like in a study done by Sharma Sk and Mohan A.17 With the advent of molecular diagnostic

techniques like genexpert, still, more extra pulmonary and microbiological confirmation of sputum negative TB cases can be made better.

The occurrence of new cases (both pulmonary and extra pulmonary cases) in large proportion reflects the fact that our TU is an endemic zone and a huge burden of undiagnosed hidden TB cases in the community.

Patients outcome was obtained on having a constant follow up of the patients in treatment outcome part; the cure rate is lower in terms of RNTCP guideline. <sup>19</sup> In sputum positive cases the end treatment sputum samples and chest X-ray should be collected to ensure their cure. The total success rate is also lower on comparing to RNTCP norms which requires more thrust on field staff to ensure completion of treatment and confirming further by end of treatment sputum testing to reach the target success rate.

Limitation of this study, a large proportion of reported cases (i.e., 118 cases) with missing information were excluded from the study while information on other factors such as education, occupation, housing, and other sociocultural factors that could also affect the treatment outcome was not captured in the register.

#### CONCLUSION

The present study showed that treatment outcome of TB patients at our DOTS cell did not meet the target success rate as recommended by WHO. Effective measures have to be taken in the programme to move forward to help in the eradication of TB. Tuberculosis mostly affects males of the economically productive age group and causes economic losses.

The success rate of new cases was higher compared to retreatment cases though the overall success rate was lower compared to the RNTCP norms. Proper education on DOTS and importance of treatment completion, psychological support, monitory benefits like paying for his transport, loss of wages through NGO's can help in improving the success rate and cure rate to reach the targets set by WHO.

This study thrusts on intensification of the programme strategies to move ahead in the course of eradication of the disease.

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