

## Original Research Article

# Profile and outcome of childhood tuberculosis treated with DOTS at a tertiary care hospital in central India: an observational study

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### ABSTRACT

**Background:** Children contribute a significant proportion of the tuberculosis (TB) burden in India and suffer severe TB related morbidity and mortality, particularly in endemic areas. Diagnosis and management of pediatric TB especially Extra pulmonary (EPTB) is challenging. The present study was designed to study clinical, laboratory characteristics and outcome of childhood tuberculosis.

**Methods:** A retrospective analysis of 90 cases of TB in children within 2 year period was conducted at Pediatric Department and DOTS center at a tertiary care hospital from January 2015 to December 2016.

**Results:** In the present study 20% of the total TB patients attending DOTS OPD were Children. Most common symptoms were Fever (53.3 %), Cough (46.6%), abdominal pain (18.8%), lymphadenopathy (13.3%), osteo-articular symptoms (13.3%), weight loss (10%), CNS related complaints like convulsions and unconsciousness (6.6%). History of contact was present in 10 cases (11%). Sputum examination was positive in 9 cases (10%) who were predominantly older children above 12 years. Mantoux test was positive in 9 cases (10%). Only one patient was HIV positive. Extra pulmonary tuberculosis (EPTB) patients were more common than pulmonary. 47 out of the 90 cases (52%) were receiving DOTS for EPTB. Out of the 90 cases 84 (93.3%) were on New Category 1 treatment and 6 (6.6%) were on Cat 2 treatment. Out of the total 90 cases 3 defaulted, 3 died, rest completed treatment with good compliance and no side-effects and were declared cured.

**Conclusions:** In present study, it was found that extra-pulmonary tuberculosis (EPTB) patients are more common than pulmonary tuberculosis in pediatric age group. Sputum positivity yield is very low in pediatric age group. Success of treatment with DOTS is good (94.4%). No adverse effects of ATT were observed.

**Keywords:** Children, DOTS, Outcome, Tuberculosis

### INTRODUCTION

Tuberculosis (TB) continues to be one of the most devastating and widespread infections in the world.<sup>1</sup> World Health organization (WHO) has suggested a category based treatment of TB.<sup>2</sup> Recently, Revised National Tuberculosis Control Programme (RNTCP), in association with Indian Academy of Pediatrics (IAP), has categorized various types of TB according to the existing WHO guidelines.<sup>3</sup> Directly Observed Treatment Short

(DOTS) course strategy aims at treatment of adult patients of tuberculosis to prevent them from disseminating the infection. Though children with tuberculosis do not contribute significantly in spread of infection in the community, but they suffer greatly from its morbidity and mortality. Hence it is important to include children as beneficiaries of the DOTS strategy.<sup>4</sup>

Not many studies have been done to study the efficacy of DOTS treatment in children in our country; hence this

study was undertaken to study the clinical profile of children with tuberculosis presenting to the DOTS centre and also study the efficacy of DOTS therapy on various types of childhood TB.

## METHODS

This retrospective hospital based observational study was conducted at DOTS centre and Pediatric Department of our College. Duration of the study was from January 2015 to December 2016.

### Inclusion criteria

- All newly diagnosed tuberculosis cases from 0-16 years started on DOTS treatment.
- All pediatric cases with relapse, treatment failure or defaulters.

### Exclusion criteria

- Patients with tuberculosis on DOTS treatment > 16 years age.
- Children with tuberculosis on Antitubercular treatment (ATT) other than DOTS regimen.

Ethical clearance for the study was obtained from the institute. All those cases which satisfied the inclusion/exclusion criteria were included in the study.

The information was gathered from the patient proformas and 'registers' of the DOTS Medical officer from the DOTS centre and in-patient records from the Medical Records Department. Demographic information, signs/symptoms, investigations including sputum positive/negative, HIV positive/ negative, Mantoux test, Chest X-ray or other relevant imaging findings were recorded. Follow-up of cases whether completed/defaulted/ failures was also recorded. Data was entered onto a computerized excel spreadsheet and subsequently analyzed using SPSS 17 software.

## RESULTS

Total 462 patients were enrolled for DOTS treatment in the duration of two years. Out of which 90 patients (20%) were children. The Mean age of patients was 9.2 years SD [ $\pm 5.5$ ] (range 3 months -16 years). There were more male children (60%). Male to Female ratio was 1.5: 1. Thirty out of the 90 (33%) patients were below five years age. Most common symptoms were Fever (53.3%), Cough (46.6%), abdominal pain (18.8%), lymphadenopathy (13.3%), osteo-articular symptoms (13.3%), weight loss (10%), CNS related complaints like convulsions and unconsciousness (6.6 %) as listed in the Table 1. History of contact was present in 10 cases (11%). Sputum examination was positive in 9 cases (10%) who were predominantly older children above 12 years. Mantoux test was positive in 9 cases (10%). Only one patient was HIV positive. Extra pulmonary

tuberculosis (EPTB) patients were more common than pulmonary. 47 out of the 90 cases (52%) were receiving DOTS for EPTB. Abdominal tuberculosis was the most common presentation of Extra-pulmonary tuberculosis (EPTB). Out of the 47 EPTB cases 17 were that of abdominal tuberculosis, eight were of cervical/generalized lymphadenopathy, 12 of osteo-articular tuberculosis (Pott's spine, osteomyelitis, elbow joint TB) and six of CNS TB (five Tubercular meningitis and one Tuberculoma). Other rare presentations of EPTB included 1 each of skin tubercular lesion, tubercular pericarditis, and tubercular psoas abscess.

**Table 1: Clinical symptoms of pediatric TB patients (n=90).**

Symptoms	No. of children	Percentage
Fever	48	53.3
Cough	42	46.6
Pain in abdomen	17	18.8
Loss of weight	9	10
CNS symptoms	6	6.6
Lymphadenopathy	12	13.3
Osteo-articular	12	13.3

Out of the 44 pulmonary cases eight were of Primary complex, three of Pleural effusion (Unilateral), two of miliary tuberculosis and rest 21 of primary progressive disease. Four main investigations done to diagnose TB were Mantoux test, chest radiograph, sputum/ gastric lavage microscopic examination, and complete blood count with ESR. CT brain was done in all 6 cases of suspected CNS tuberculosis which showed tuberculoma in one case and findings suggestive of meningitis in the rest five cases. Fine needle aspiration cytology (FNAC) of lymph nodes was done in 4 patients with cervical lymphadenopathy. Adenosine deaminase (ADA) was done along with routine microbiological and biochemical examination of pleural fluid in the 2 cases with pleural effusion and ascitic tap fluid in one case of ascitis, TB-PCR of ascitic tap fluid was carried out in 1 case who came with abdominal tuberculosis with mild ascitis, while Gene-Xpert (CBNAAT: Cartridge based Nucleic acid Amplification test) was sent in three cases of EPTB which detected MTB in two cases; one of ascitic fluid of a patient with Tubercular pericarditis and multisystem involvement and other from FNAC of spondylodiskitis lesion from a patient with Pott's spine.

Out of the 90 cases 84 (93.3%) were on New Category 1 treatment and 6 (6.6%) were on Cat 2 treatment. Out of the total 90 cases 3 defaulted, 3 died, rest completed treatment with good compliance and no side-effects and were declared cured.

## DISCUSSION

India accounts for the highest burden of tuberculosis cases in the world. While primary tubercular infection can occur at any age, but children get infected easily in

areas of high prevalence and high population density.<sup>5</sup> The extent of tuberculosis problem in children is a reflection of infectious pool of adult sputum smear positive cases in the community.

In the present study, the maximum numbers of patients were in the age group of 11-16 years (45 %).<sup>6-8</sup> Only 30 cases (33%) belonged to the below 5 years age group. Other studies have reported maximum number of patients in 1-5 years age group.<sup>9</sup> The probable reasons for this disparity may be due to the differences in the study population, low host resistance, increased prevalence of malnourishment. There were more male patients (60 %) in the study as reported by Shreshtha et al.<sup>10</sup> Higher incidence of TB in male children in the index study may be because male children are more likely to be brought for treatment at a hospital due to gender bias in the society.

The frequently found symptoms were fever (53.3%), cough (46.6%), abdominal pain (18.8%), lymphadenopathy (13.3%) as seen in other studies.<sup>9-11</sup>

EPTB was more common in the present study, this could be due to

- hospital based study
- development of EPTB was influenced by the factors including age, nutritional and immune status of the child and virulence of the organism and size of the infecting dose.

Mantoux was positive in only 9 cases (10 %). Vijaysekaran et al have found that in their study Mantoux positivity in childhood TB varies from 21.2% to 53%.<sup>12</sup> Sputum examination was found to be positive in 9 cases (10%) similar to other studies. Older children were significantly associated with positive AFB. Low smear positivity in the index study may be due to paucibacillary nature of the disease. Only one case (1%) of tuberculosis was HIV positive due to the low seroprevalence of HIV in this region. Similar to findings by Agarwal et al, Lahiri et al, who in their study among pediatric tuberculosis patients observed a prevalence of 0.83%, 0.8% respectively.<sup>13,14</sup>

**Table 2: Comparison of profile of pediatric TB patients with other studies.**

	Bai S et al <sup>9</sup>	Sivanand et al <sup>8</sup>	Indumathi et al <sup>7</sup>	Shrestha et al <sup>10</sup>	Sreeramareddy et al <sup>11</sup>	Current study
Duration	1998-99	2000-05	2005-08	2007-09	2003-08	2015-16
Mean age		7.91	7.6			9.2
M: F	1.5: 1		0.8: 1		1:1	1.5: 1
P: EP (%)	73:27	47:53	52: 48	22:78	46:54	48:52
AFB (+) %		15	12	8.33		10
Cure rate (%)		84.8	95	60		94.4
Mantoux (+) %	93.3	66		48.3		10
Side-effects			None			None

In the index study, 94.4% of the study population completed treatment and was declared cured. Three patients defaulted and two children, one of abdominal TB and other of TB Meningitis died and 6 cases were on Category 2 treatment. In other studies, the completion/ cure rates varied from 80% to 94.9% as shown in Table 2.<sup>4,7,15,16</sup> Higher treatment completion rates in the present study was due to strict adherence to DOTS strategy under RNTCP, the medicines were available without break and good compliance of the patients. There were no adverse effects due to anti-tubercular drugs in the present study. Similar findings were noted by Indhumati et al. The limitations of present study are hospital based study, small sample size and retrospective nature of the study.

**CONCLUSION**

In present study, we found that extra-pulmonary tuberculosis (EPTB) patients are more common than pulmonary tuberculosis in pediatric age group. Sputum

positivity yield is very low in pediatric age group. Success of treatment with DOTS is good (94.4%). No adverse effects of ATT were observed.

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