



Treatment Outcome of Tuberculosis in Children Put Under Directly Observed Therapy Short Course in a Tertiary Care Hospital- A Retrospective Cross Sectional Study

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Abstract

Tuberculosis in childhood is a marker for transmission of disease in the community. Data regarding the treatment outcome of childhood tuberculosis is limited. We retrospectively analyzed the disease course and treatment outcome of patients registered under RNTCP in a tertiary care hospital. Children under the age of 15 years registered for treatment were included in the study. Besides analyzing the demographic data, clinical profile, categorization of patients in to new cases and previously treated cases, and treatment outcome were determined. Of the 121 cases, 51 were extra pulmonary, 32 were smear positive pulmonary tuberculosis while 15 were smear negative pulmonary tuberculosis. Childhood TB accounts for 12.06% of the total TB cases. Median age was 13 years. 87 (88.76%) completed treatment, 4 (4.08%) defaulted, 3 died while 2 did not turn up for treatment after diagnosis of tuberculosis in them. As the nature of childhood tuberculosis is paucibacillary, diagnosis is challenging especially with high proportion of extrapulmonary cases.

Keywords: Pediatric tuberculosis, pulmonary TB, extra-pulmonary TB, outcome.

Introduction

The global burden of tuberculosis in children is not known. It is estimated that about 1 million cases of tuberculosis occur in children; of which 75% occur in high burden countries.^[1] Data on the burden of tuberculosis in India is not good as most studies have focused on pulmonary tuberculosis. No significant population based studies on extrapulmonary tuberculosis are available.^[2] It has been estimated that childhood tuberculosis

constitutes 10-20% of all TB cases in high burden countries, accounting for 8-20% of TB related deaths.^[3,4]

In 1997, RNTCP was launched as a national programme based on internationally recommended directly observed therapy (DOTS) and expanded across the country in a phased manner. The widespread implementation of DOTS strategy has proved to be an effective tool in control of TB.^[5]

Childhood tuberculosis is a marker of current transmission of the disease in the community and a result of poor tuberculosis control programme. Tuberculosis in childhood is most challenging in terms of diagnosis and management. Another aspect of childhood tuberculosis is the imperceptible and rapid progression of infection to disease.^[6] In our state, little is known about the epidemiology and treatment outcome of childhood tuberculosis. This study was undertaken to determine the disease course and treatment outcome of tuberculosis under RNTCP in a tertiary care hospital.

Material and Methods

This was a retrospective cross sectional study carried out in Sher-i- Kashmir Institute of medical sciences. Children under the age of 15 years diagnosed with any form of TB from the year 2009 to 2016 and enrolled for treatment under RNTCP were included in the study.

Diagnosis of tuberculosis in children was made as per RNTCP guidelines.^[7] Every attempt was made to microbiologically confirm the diagnosis of pulmonary and extra pulmonary tuberculosis. According to the programme, children having persistent cough and fever for more than 2 weeks duration or weight loss of 5% or no weight gain in 3 month should be subjected to sputum examination. If Mycobacterium is not detected or sample is not available, chest X-ray and tuberculin skin test (TST) is done. In case of suspected extrapulmonary tuberculosis, appropriate samples should be taken and processed for tuberculosis. If sample is not available diagnosis can be made on clinical grounds.

Patients confirmed to have tuberculosis bacteriologically or diagnosed on clinical grounds were classified into 2 categories; new cases: any new case of smear positive or negative pulmonary tuberculosis or extrapulmonary tuberculosis; previously treated case: any case of pulmonary tuberculosis patient who had been on anti tubercular treatment for more than 1 month, including relapse, default and treatment after

interruption. Treatment was provided as per the category and weight of the patient.

Socio -demographic data pertaining to age, sex, type of TB and outcome was obtained retrospectively. Outcome was classified as follows:

- a) Cured/ treatment completed-was registered as pulmonary smear-positive, completed treatment
- b) Default-has not taken drugs for more than 2 months consecutively any time after starting treatment
- c) Failure-was registered as pulmonary smear-positive CAT II (retreatment), and was smear-positive at five months or later of CAT II treatment or
- d) Died-was known to have died from any cause whatsoever while on treatment

Data analysis: Data will be entered in a Microsoft excel sheet. It was a retrospective study. Categorical variables will be summarized as frequency and percentage. Continuous variables will be summarized as mean and standard deviation. Data analysis will be done using EpiInfo 7.0.

Results

Over a period of 8 years, a total of 11857 samples were screened for tuberculosis and 1006 were diagnosed with tuberculosis (pulmonary as well as extrapulmonary). Of these, 121 were children. Therefore childhood tuberculosis contributed to 12.03% of the total cases.

The average age of the childhood tuberculosis was 11.4 years and the median age was 13 years. The age distribution of children with tuberculosis is given in Fig 1. Most of the children were 12 years and older. 56.12% of TB patients were females while 43.88% were males. Male to female ratio was 0.78.

Extrapulmonary cases accounted for more than half the cases of pediatric tuberculosis. 47/98 (48%) of the children had pulmonary tuberculosis while 51/98 (52%) had extrapulmonary tuberculosis. Among the children with pulmonary tuberculosis, 32 (32.65%) were smear positive

while 15 (15.35%) were smear negative. 93.88% of the patients registered for treatment were new cases while 6.12% cases were previously treated cases. 2 of the previously treated patients were relapse patients while 4 were taken as treatment after default

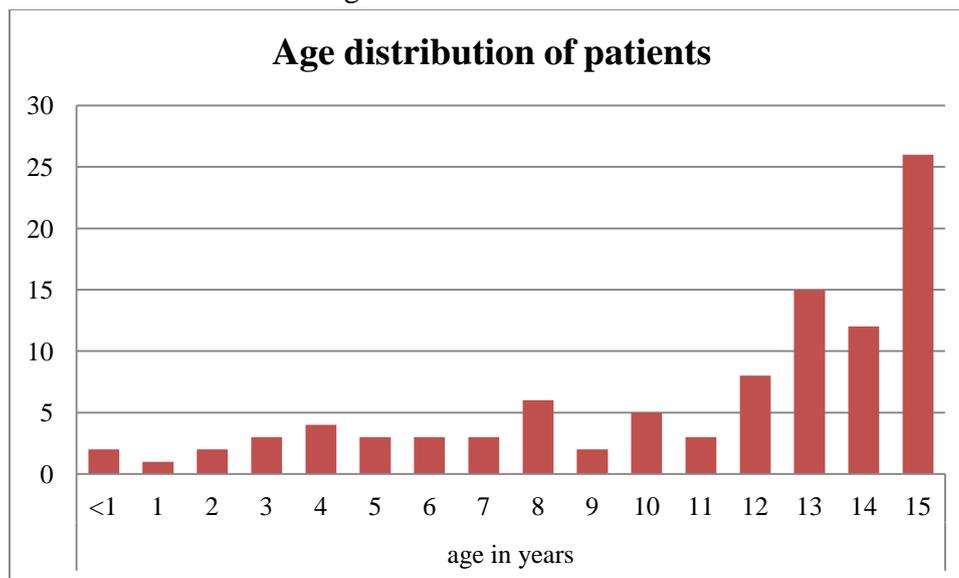
Among the children registered for treatment, 2 were initial defaulters who did not turn up for

treatment after diagnosis of tuberculosis while 2 were transferred out to other TB units. Of the 94 patients in whom the outcome was documented, 87 were successfully treated. 4 patients defaulted while 3 died during treatment. The outcome of all the patients is shown in table 1.

Table 1: Distribution of patients according to their treatment outcome

| Type of TB | Category | treatment completed/ cured | defaulted | failure | died | transferred out | not reported |
|----------------|--------------------|----------------------------|-----------|---------|------|-----------------|--------------|
| pulmonary | new | 42 | 1 | 0 | 0 | 0 | 1 |
| | previously treated | 3 | 0 | 0 | 0 | 0 | 0 |
| extrapulmonary | new | 41 | 2 | 0 | 3 | 2 | 1 |
| | previously treated | 1 | 1 | 0 | 0 | 0 | 0 |
| | | 87 | 4 | 0 | 3 | 2 | 2 |

Fig 1: Age distribution of children suffering from childhood tuberculosis



Discussion

To our knowledge it is the first study of its kind conducted with the aim of estimating the burden and treatment outcome of childhood tuberculosis in the Kashmir valley. In our study, childhood tuberculosis contributes to 12.03% of the total tuberculosis. Similar observations have been made in other studies. Marias et al estimated that 13.7% of the total TB patient were children.^[6] it has been estimated that the childhood tuberculosis accounts

for 10-20% of all the TB cases in high burden countries. However the proportion of childhood TB in our study is slightly higher than the national estimates.^[8]

Most of the tuberculosis cases were above the age of 10 years. This finding is consistent with the other studies.^[9,10] It could be possible that the diagnosis of TB in smaller children under 10 years of age could be missed. Possible reasons could be the difficulty in diagnosis and underdiagnosis of

such cases due to the paucibacillary nature of childhood TB. Also collection of an appropriate sample such as expectorated sputum, gastric aspirate for tubercular testing presents a significant challenge. Therefore, a high degree of suspicion is required for diagnosis of tuberculosis in pediatric population.

An unusual finding in our study was the increase prevalence of disease in females as compared to males. While some studies have demonstrated the presence of disease predominantly in male;^[10,11] other found an increased number of cases in females.^[6,9]

The proportion of children with extrapulmonary is higher than pulmonary tuberculosis. Several studies have suggested that the proportion of extrapulmonary tuberculosis could be used as a measure of cases detection. A high percentage of extrapulmonary tuberculosis could therefore be attributed to the underdiagnosis of pulmonary tuberculosis. Another plausible explaining for increased proportion of extrapulmonary tuberculosis is the selection bias. As this is a hospital based study, it is possible that children with pulmonary tuberculosis have been diagnosis at the peripheral health unit while other cases have been referred due to difficulty in diagnosis.^[8,12]

Regarding treatment outcome, 88.76% of the patients completed their treatment. The treatment success was 95.74% for pulmonary cases while it was 82.35% for extrapulmonary cases. Overall treatment success has been reported between 83-89% in similar studies. Therapeutic trials among children have found a favorable outcome of >90%. Mortality was seen in 3.06% of the cases, all of which were in extrapulmonary group. One child died due to tubercular meningitis. A default rate of 2.12 and 5.88% were respectively observed in pulmonary and extrapulmonary cases.

To conclude, the proportion of childhood tuberculosis in our was higher than the national estimate of 7%.^[13] paucibacillary nature of childhood tuberculosis in make the diagnosis challenging. Timely diagnosis of childhood TB

and treatment compliance is important for high success rate in TB cure.

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