

# Profile of Tuberculosis in Paediatric patients

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## Abstract

**Introduction:** Tuberculosis (TB) is very important cause of infection related deaths worldwide and has been declared by WHO as a global health emergency. Around half million children fall ill with TB each year. Due to non-specific signs and symptoms TB in children may be overlooked. **Aims and objectives:** 1) To study the occurrence of TB in pediatric patients at tertiary care hospital KVG Medical College, Sullia, Karnataka. 2) To study the occurrence of TB in patients with and without BCG scar. 3) To study the occurrence of smear positive cases in pediatric age group. 4) To study the type of TB in pediatric patients. **Material and methods:** Specimens like sputum, bronchial lavage, lymph node aspirate, gastric lavage, CSF were collected depending on the site of disease. Specimens were stained by ZN staining method. Culture was done on LJ media. Tuberculin test was also done. Chest X rays of the patients were done presenting with pulmonary signs and symptoms. **Result:** In our study, 102 (0.98%) were positive. Age group of 5-9 years was the most commonly affected. Males (57.84%) were more affected than females (42.16%). BCG scar was found only in 20.59% cases. Smear positivity was seen in 22.89% cases. Extrapulmonary manifestations were more compared to pulmonary manifestations. **Conclusion:** As smear examination is negative in most of the patients, culture of *Mycobacterium tuberculosis* is important. This age group present with non-specific signs and symptoms and hence tuberculosis should always be considered as one of the differential diagnosis.

## Introduction

India holds major tuberculosis population globally. It accounts for 20% of the newly diagnosed 8.6 million TB cases annually [1]. According to WHO estimates sputum microscopy smear-positive TB in <14 years accounts for 0.6%–3.6% of all reported cases [2]. According to some studies, pediatric tuberculosis consists of total 8-20% deaths [3,4]. Localized forms of illness, e.g., intrathoracic lymphadenopathy, and localized CNS disease have been reported to occur more in children [5].

Children can't cough out sputum properly and so other samples like gastric lavage and broncho-alveolar lavage has to be collected which is other major problem. In children <5years specially, both diagnosis as well as treatment of tuberculosis is challenging. This is major problem where diagnostic facilities are limited. HIV and TB coinfection is difficult to treat and has high mortality and morbidity [6].

According to literatures, BCG vaccination helps in reducing both meningeal and disseminated tuberculosis [7].

## Methodology

After obtaining the Institutional Ethics Committee approval this Prospective study was conducted for a period of 3 years from 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2016 at KVG Medical college, Sullia, Karnataka. Study was performed only with informed consent from the patients/legal guardian or assent from the child aged over 7 years.

Patients aged<14 years coming with signs and symptoms of Tuberculosis i.e cough >2 weeks and/or no weight gain or loss (History of unexplained weight loss or no weight gain in past 3 months; loss of weight defined as loss of more than 5% body weight as compared to highest weight recorded in last 3 months) and/or history of contact with infected tuberculosis case were included in the study. Sputum samples were taken from the patients

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presenting with cough. If patient can't expectorate cough, gastric lavage was taken. In case of enlarged lymph nodes, lymph node aspirates were taken. In patients presenting with meningeal signs and symptoms, CSF was taken. All samples were subjected to ZN staining and culture was done on LJ media.

Chest X rays were done in patients presenting with pulmonary signs and symptoms. Tuberculin skin test using Purified protein derivative 1TU was done in all the suspected cases. Those having indurations >10 mm were considered as positive.

**The protocol was as follows-**Sputum smear examination was taken as the primary investigation of choice. If sputum smear was positive, patient was diagnosed as smear positive pulmonary TB and was initiated on TB treatment. If sputum smear came negative or not available, then the patient was prescribed a course of antibiotics for duration of seven days.

In case symptoms persist, chest X-ray and Tuberculin skin test (TST) was done. In sick looking patients with persistent symptoms of >2weeks duration, chest X ray and TST test was performed immediately. If both chest X ray and TST was positive, gastric lavage or bronchoalveolar lavage was taken and if it comes to be

positive it was taken as smear positive pulmonary TB and if negative smear negative pulmonary TB. If both chest Xray and TST were negative, alternate diagnosis was considered.

If in a suspected patient who has persistent symptoms and / or non-specific radiological shadows but were smear negative following 3 possible situations were considered-

1. If both TST and X-ray findings were negative, then TB is highly unlikely and an alternative diagnosis was looked for.

2. In situations where the CXR has persistence of non-specific shadows despite a course of antibiotics, alternative samples for TB (GA/IS/BAL) were sent to establish bacteriological diagnosis irrespective of the TST positivity. In case the alternative sample was AFB positive, it was taken as smear positive case. In case these samples were negative, then an alternative diagnosis was looked for. If no alternative diagnosis was established, the case was classified and treated as smear negative TB.

3. If only TST was positive and X-ray chest was not suggestive, then an extra- pulmonary site or an alternative diagnosis was suspected.

## Results

A total 10358 cases were suspected of Tuberculosis and amongst them 102 were positive.

**Table-1: Prevalence of tuberculosis.**

Total suspected	10358
Total positive	102
Occurrence	0.98%

Shows the occurrence of TB to be 0.98%

**Table-2: Age and Sex distribution in patients having TB.**

Age	Males	Females	Total
Birth-4 years	17(16.67%)	12(11.76%)	29(28.43%)
5years-9years	24(23.53%)	17(16.67%)	41(40.20%)
10years-14 years	18(17.65%)	14(13.73%)	32(31.37%)
<b>Total</b>	<b>59(57.84%)</b>	<b>43(42.16%)</b>	<b>102(100%)</b>

Amongst 102 positive cases, 57.84% were males and 42,16% were females. The male: female ratio was found to be 1.37:1.

Amongst 102 positive cases, sputum could be obtained in 83 cases.

**Table-3: Smear positives as done by ZN (Ziel and Nelson) staining**

Total smear positive	19(22.89%)
Total smear negative	64(77.11%)
Total sputum samples	83

The sputum by ZN staining was positive in 19 cases (18.63% of total cases).

Culture positive cases are shown in table 4

**Table-4: TB patients having culture positive on Lowenstein Jenson media**

Total culture positive	69(67.65%)
Total culture negative	33(32.35%)
Total samples tested for culture	102

Culture positivity was found in 67.65% of cases.

Tuberculin test positive cases are shown in Table 5.

**Table-5: TB patients having tuberculin test positive**

Total tuberculin positive	69(83.13%)
Total tuberculin negative	14(16.87%)
Total cases in which tuberculin test was done	83

Tuberculin test could be done in 83 cases and of which 69 (83.13%) cases were positive.

Type of tuberculosis prevalent in children-

**Table-6: Type of tuberculosis prevalent in pediatric age group.**

Type of TB	Percentage
Pulmonary	39(38.24%)
Lymph node	35(34.31%)
Meningeal	17(16.67%)
Disseminated	11(10.78%)

This result shows that Lungs and Lymph Nodes were the most common sites of TB in our patients.

Difference between occurrence in cases with BCG scars and without BCG scar-

**Table 7: Occurrence of tuberculosis in patients with BCG scar and without BCG scar**

Patients having TB and have BCG scar	21(20.59%)
Patients having TB and without BCG scar	81(79.41%)
Total	102(100%)

Data shows that 20.59% of TB cases had a BCG scar.

## Discussion

About 40% of the Indian population is estimated to be infected with TB bacteria, majority of which have latent TB [8]. In our study, out of 10358 clinically suspected tuberculosis cases, 102 were positive. So, the occurrence of tuberculosis in present study was 0.98%

(Table 1). According to Global tuberculosis control, the prevalence of TB in pediatric population is 0.6-3.6% [9]. Till 2012 TB burden in children was unknown, when it was first estimated to be 0.5 million cases (around 5%) and 64 000 deaths among children [10]. As per 2012

survey, globally around 2million deaths occurred due to TB[10]. Of the remaining 10256, most of our patients got benefitted either by antibiotic therapy or by treatment for some other differential diagnosis. According to statistics the prevalence of TB 2013 in Indian population was 2.6% [11].

In our study, 5-9 years age group was most affected age group and overall 52% cases were males (Table:2). Suryanarayana et al showed that majority of cases (34.80%) were in 5-9 years age group and 51% of males were affected compared to 49% females. which correlates well with our study [12].

We support their observation that such results might be due to the fact that this age group children are mostly school going with exploratory behaviour; and males are exposed more to the outside environment compared to females.

Since the bacilli enters the sputum making the patient infectious to others sputum smear testing is done. But for definitive diagnosis of tuberculosis, positive culture of a diagnostic specimen is very important [13].

The most frequent sample used from a patient with a persistent and productive cough is sputum. In our study, 22.89% cases were smear positive and 67.65% were culture positive (Table:3 and 4).

Childhood TB diagnosis is a major challenge, as bacteriologic confirmation is hardly achieved as sputum smear microscopy is often the only diagnostic test available. Positive findings with probable TB are found for around <10%–15% of cases [14]. According to a Chinese study in 1990 the smear positivity was 30% [15,16] Farjana Rahman et al in their study showed a culture positivity of 68.7%.[17] All the above findings correlates with our study results.

In our study tuberculin test was positive in 83.13% of cases (table no:5), which is similar to Fernandiz et al finding of 81% tuberculin test positivity [18]. The tuberculin most widely used is purified protein derivative (PPD), which is derived from cultures of *M. tuberculosis*. In our study pulmonary TB was found in 38.24% cases (table no 6) and extrapulmonary manifestations were found in 62.76% cases.

Amongst extra pulmonary, lymph node tuberculosis was most common. This correlates with the study of Saumya Swaminathan et al (32-43%) [4]. Extrapulmonary TB

was 46% in the study of Sanjay Jain et al (46%) [19]. More cases of meningeal and disseminated TB in our study may be due to the fact that most of the children were without BCG scar and BCG protects against pulmonary and disseminated TB.

In our study, BCG scar was found in 20.59% cases. According to Kabra et al, more prevalence of TB was there in non immunized patients [20].

## Conclusion

As smear examination is negative in most of the patients, culture of *Mycobacterium tuberculosis* is important. This age group present with non specific signs and symptoms and hence tuberculosis should always be considered as one of the differential diagnosis.

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