

**Profile of paediatric tuberculosis patients in Bangalore Mahanagar Palike area.**

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**Abstract**

Tuberculosis (TB) continues to be one of the most devastating and widespread infections in the world. 11% of the cases occur in children causing morbidity and mortality worldwide.

**Methodology:** An observational study was conducted among paediatric patients registered under Revised National Tuberculosis Control Programme (RNTCP) in Bangalore to know their sociodemographic and disease profile from January 2009-December 2009.

**Observation:** The study revealed that the mean age of the subjects studied was 7.5 years, the most number were in the 1-6 year age group with a male to female ratio of 0.6:1, thus there were more cases of tuberculosis in female children. Majority of the subjects were undernourished and belonged to low socioeconomic status (95.2 %). Twenty three percent gave a history of contact with tuberculosis patients, 76.5 % of the subjects had BCG scar and 43.5% of them had extra pulmonary TB.

**Key words:** Paediatric, tuberculosis, RNTCP.

**Introduction**

Tuberculosis (TB) continues to be one of the most devastating and widespread infections in the world. It is estimated that one third of the world's population is infected with *Mycobacterium tuberculosis* (the bacterium that causes tuberculosis), and that each year, about 9 million people develop tuberculosis, of which about 2 million die. Of the 9 million annual tuberculosis cases, about 1 million (11%) occur in children (under 15 years of age). In countries worldwide, the reported percentage of all tuberculosis cases occurring in children varies from 3% to more than 25%.<sup>1</sup> Tuberculosis is an important cause of morbidity and mortality in children worldwide, especially in resource poor countries. Children are most likely to develop disease after infection and are significantly more likely to develop extra pulmonary and severe disseminated disease than adults. Infected children represent the pool from which a large proportion of future cases of adult tuberculosis will arise. In addition, childhood tuberculosis is a sentinel event indicating on-going transmission of tuberculosis within communities.<sup>2</sup> Though an estimated 1 million new cases of tuberculosis occur in children worldwide each year, paediatric TB has not been given the same priority as its adult

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counterpart. Childhood tuberculosis is a neglected aspect of the tuberculosis epidemic. This "orphan disease" exists in the shadow of adult TB and is a significant child health problem, but is neglected because it is usually smear-negative and is thus considered to make a relatively minor contribution to the spread of TB.<sup>3</sup> Does this justify ignoring childhood tuberculosis?

However, children are particularly vulnerable to severe disease and death following infection, and those with latent infection become the reservoir for future transmission following disease reactivation in adulthood, fuelling future epidemics. Tuberculosis has always been given priority in India, but the interest in childhood tuberculosis has been kindled only recently.

Hence the present study was undertaken in order to know the socio demographic and disease profile of paediatric tuberculosis patients put on Paediatric DOTS at Revised National Tuberculosis Control Programme (RNTCP) centres in the city of Bangalore.

### **Methodology**

A study was conducted in nine Tuberculosis units of Bangalore city from January 2009 to December 2009. All paediatric patients in the age group of 0 to 14 years diagnosed as TB and registered under RNTCP were included in the study. Five Tuberculosis units from the nine tuberculosis units were selected by simple random sampling, all the paediatric patients in these Tuberculosis units were enrolled (a total of 209 paediatric TB patients). Data collection was started after obtaining clearance from respective authorities from Bangalore Mahanagar Palike and health centre. Informed consent was obtained from the parents/or guardians. The data was collected by a pre tested questionnaire during their visit to the hospital /health centre.

### **Observations**

Most of the patients coming to the RNTCP centres belonged to the under-privileged group. Out of 209 registered patients studied, 3 (1.43 %), were less than one year. Most of the patients were in the age group of 1-6 years, which were 79 (37.7 %) (Table 1). There were more females (62.68 %) than males (37.32 %), male to female ratio was observed to be 0.6:1.

The mean age of the patients in our study was 7.5 years and median age was 8 years. Majority of the patients were Hindus (58.4%) followed by Muslims (36.4%). Majority of the study population lived in nuclear families (Table 2). Majority (96 %) of the study population belonged to low socioeconomic status as per Kuppuswamy classification (Table 3). About 89.5% of the study population gave a history of dwelling in overcrowded houses and nearly 85% of them gave a history of being exposed to indoor air pollution. More than half of the patients (120) had wasting /under-nutrition. Majority of the mothers of the paediatric patients were illiterate (54.08 %) (Table 4).

Out of 209 patients, history of contact with tuberculosis patients was present in 49 patients (23%), BCG scar was present in 159 patients (76%). In this study, 56.5% had pulmonary TB and 43.5% had extra-pulmonary TB. Our study showed that tubercular lymphadenopathy was the most common manifestation of extra-pulmonary TB followed by tubercular meningitis and among the tubercular lymphadenopathy, the cervical lymph nodes were the most commonly involved. There was one case of tuberculosis involvement of the eye and one of dermatological Tuberculosis (Table 5).

## Discussion

Our study revealed that 1.4% of the study population was less than one year and 37.7% were in the age group of 1-6 years. Therefore the maximum number of patients was in the age group of 1 to 6 years, followed by the age group of 11 to 15 years. Similar findings were reported in a hospital based study done by Sushamabai S et al<sup>4</sup> in 1998 in Kottayam district of Kerala where they also observed that the maximum number of cases were in the 1 to 6 years age group which was 49.5%. In the study done by Arora VK et al<sup>5</sup>, the maximum number of patients were in the age group of 11-15 years which was 51.1% and this observation was similar to the study by Sharma S et al<sup>6</sup> where the maximum number of patients were also in the age group of 11 to 15 years (55.1%). These differences may be due to factors, like the differences in study population, whether it was a hospital based study and in the case of Sharma et al<sup>6</sup>, where only pulmonary tuberculosis cases were studied. The mean age of the population studied was 7.5 years. CK Indumathi et al<sup>7</sup> also observed a similar mean age of 7.6 years in their study. Our study revealed that there were more females (62.68%) which is similar to the observation of Sharma S et al<sup>6</sup> in a retrospective analysis of paediatric patients which reported more females (61.7%) than males (38.3%). Our study revealed a male to female ratio of 0.6:1 while a study done by CK Indumathi et al<sup>7</sup> revealed a male to female ratio of 0.8:1. (Tables 1 and 2).

In our study population, majority of the cases were Hindus (58.4%) which is lower than the census data which reported that 80.5% of the population were Hindus<sup>8</sup>, so it does not imply that cases were more in Hindus but because the proportion of Hindus were more in the general population, more cases were reported. Majority (73.2%) of the population lived in nuclear families as most of the families in urban area are nuclear. In our study 95.2% belonged to low socioeconomic status and 4.8% belonged to middle class. While in a study by Sushmabhai S et al<sup>4</sup> in Kottayam district of Kerala slightly more than half (55.8%) belonged to low, 38.9% to middle and 5.3% to high socio-economic groups, as the study comprised of a more aware group as it was done in BCG vaccinated children.

As the maternal literacy status is known to be an important factor in child rearing and caring, the information of maternal literacy status was included. Majority of the mothers of the paediatric patients were illiterate (54.08 %) (Table 3). This rate falls far lower than the female literacy rate in Bangalore Urban (78.98%)<sup>9</sup> which can be explained by the fact that most of them were unskilled labourers which further substantiates the importance of female literacy in improving health and living conditions.

In our study, 23 % of the patients had a history of contact with tuberculosis patients, similar to the findings observed by Madhi F et al<sup>10</sup> in a Paris suburb, where 22% had history of contact with tuberculosis patients. However in a hospital based study at Kyriakou Children's Hospital at Athens by H C Maltezou et al<sup>11</sup>, 47 % of the patients gave history of contact. In a study by [Uysal G](#) et al<sup>12</sup> in children with extra-pulmonary tuberculosis in Ankara Social Security Children's Hospital Turkey between June 1995 and May 2003, a positive family history of active TB was reported in 39% of the cases. The higher percentages of contact elicited in the above two studies may be due to the fact that these patients were better educated and could give proper contact history. Among the children studied in our study 76.5% had a BCG scar which is similar to the findings of a retrospective study by Shivanandan S et al<sup>13</sup> which revealed that 76% had received BCG vaccination and Gupta R et al<sup>14</sup> in their study also observed that 77% cases were vaccinated with BCG.

In our study 120 patients (57.4%) studied were undernourished, Sushmabhai S et al <sup>4</sup> observed in their study that 42% had under nutrition. Thus there is an association between under nutrition and tuberculosis. Our study revealed that 43.5% of the study population had extra pulmonary tuberculosis, similar to the observation by Arora V K et al <sup>5</sup> who also observed that extra pulmonary tuberculosis was seen in 47% of children. Among the extra pulmonary TB, tubercular lymphadenopathy was the most common manifestation followed by tubercular meningitis (23.2%), pleural effusion (11 %), abdominal tuberculosis (6.5 %), spinal tuberculosis (2.1%), skin and eye tuberculosis (1.1%). A hospital based study in paediatrics patients with extra-pulmonary tuberculosis by HC Maltezou et al <sup>11</sup> also showed that lymphadenitis (47%) was the most common manifestation of extra-pulmonary tuberculosis, followed by pleural effusion (26%), meningitis (16%), skeletal tuberculosis (5 %), miliary tuberculosis (3%), abdominal tuberculosis (2%), and pericarditis (1%). The difference in rates of types of extra pulmonary tuberculosis reported by HC Maltezou's study may be due to the fact that it was a hospital based study and our study was done at RNTCP centres. In our study there were no cases of miliary tuberculosis, as these are patients in a serious condition and would be hospitalised and wouldn't come to the RNTCP centres.

## Conclusion

It was therefore seen that most of the patients who received treatment at the RNTCP centres at Bangalore belonged to the under-privileged sections of society, the people belonging to the higher socio-economic class may be going to the private clinics/ hospitals for treatment. Paediatric tuberculosis still continues to be a major problem in 1-6 years of age who are undernourished and belong to low socioeconomic status. The high prevalence of cases in females in our study could be explained, by the fact that most of our study population belonged to labour/ unskilled class, where the female child's nutrition and health may be neglected.

Thus further research into the epidemiology, immune mechanisms, diagnosis, treatment and prevention of childhood tuberculosis is urgently needed. Advances in our understanding of tuberculosis in children would provide insights and opportunities to enhance efforts to control this disease.

**Table 1: Distribution of study population according to Age and sex**

Age group in years	Male	Female	Total (%)
<1	2	1	3 (1.4%)
1-<6	32	47	79 (37.7%)
6-<10	21	41	62 (29.6%)
10-<15	23	42	65 (31.1%)
Total	78 (37.32 %)	131 (62.68 %)	209 (100%)

**Table 2: Demographic profile of the patients**

<b>Character</b>	<b>Number (%)</b>
Mean age	7.5
Median age	8
<b>Religion</b>	
Hindus	122 (58.4)
Muslims	76 (36.4 )
Christians	11 (5.3)
<b>Type of family</b>	
Nuclear	153 (73.2)
Joint	45 (21.5)
Three generation	10 (4.8)
Others	1 (0.5)

**Table 3: Distribution of patients according to socioeconomic status (Kuppuswamy's classification)**

<b>Character</b>	<b>Frequency (%)</b>
Upper middle	9 (4.8)
Lower middle	61 (29.9)
Upper lower	138 (65.6)
Lower	1 (0.5)
Total	209 (100)

**Table 4: Distribution of study population according Education of mother**

<b>Character</b>	<b>Frequency (%)</b>
Illiterate	113 (54.1)
Primary school certificate	54 (26)
Middle school certificate	23 (11.1)
High school certificate	14 (6.7)
Intermediate or post high school diploma	4 (1.9)
Total	208 (100)

**Table 5: showing the distribution of study population with extrapulmonary tuberculosis**

Type of extra-pulmonary tuberculosis	Male	Female	Total (%)
Tubercular Meningitis	8	13	21 (23.2%)
Cervical lymphadenitis	12	34	46 (50.7%)
Axillary lymphadenitis	0	1	1 (1.1%)
Generalised lymphadenopathy	1	1	2 (2.1%)
Inguinal lymphadenitis	1	0	1 (1.1%)
Pleural effusion	5	5	10 (11 %)
Abdominal tuberculosis	2	4	6 (6.5 %)
Spinal tuberculosis	1	1	2 (2.1%)
Skin tuberculosis	1	0	1 (1.1 %)
Eye tuberculosis	0	1	1 (1.1 %)
Total	31	60	91 (100%)

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