

# Study of the Epidemiological factors of Tubercular meningitis among children attending R.T.H.C Kanti and Pediatrics Department of S.K.M.C.H., Muzaffarpur

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## Abstract

**Background:** Childhood tuberculosis is a major public health problem in developing countries with tubercular meningitis being a serious complication with high mortality and morbidity. India has one of the highest burdens of tuberculosis (TB) globally, accounting for around 20% of all new TB cases annually.

**Aims and Objectives:** To investigate the epidemiological and clinical characteristics of tubercular meningitis in children aged 0–14 years at R.T.H.C Kanti and Pediatrics Department of S.K.M.C.H, Muzaffarpur, Bihar.

**Methodology:** This was a case control study in the Pediatric patients with Meningitis and diagnosed as the TB meningitis by CSF examination at R.T.H.C Kanti and Pediatrics Department of S.K.M.C.H, Muzaffarpur, Bihar during the one year period i.e., from June 2019 to June 2020. There were total 80 patients were included into the study.

**Results:** The majority of the Patients were in the age group of 0-2 i.e., 28.75%, 2-5 were 33.75 %, 5-8 were 18.75 %, 8-12 were 11.25%, and 12-14 were 7.5 % respectively. Majority of the patients were Male i.e. 58.75% and 41.25% were Female. The most common associated risk factors were Low SES in 85.5%, Malnutrition in 60.5%, Un-immunized patients were 35.5%, H/o Corticosteroid use were in 25.5%, Diabetes in 20.5%, Rural /Slum dwelling in 15.5% and H/o Migration were 13% respectively.

**Conclusion:** It can be concluded from our present analysis that the majority of the Patients were in the age group of 2-5 i.e., 33.75%. The most common associated factors were Low SES, Malnutrition, Un-immunized patients, H/o Corticosteroid use, Diabetes, Rural /Slum dwelling and H/o Migration.

**Key Words:** Tubercular meningitis in Children, Corticosteroid, Diabetes

## Introduction

Tuberculosis remains the major public health problem in India. The overall prevalence of infection (Based on Tuberculin Positivity) is 22.8 to 30.4 %

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in the age group of 0-14 years. The prevalence of bacteriological confirmed cases is 4 per 1000 population. A conservative estimate shows that currently the rate of infection in India is 1% to 2% and annual risk of infection among unvaccinated children 0-9 year's age group range from 0.6% to 2.3%<sup>[1]</sup>. In India 40% children by the age of 6 years, and 80% children by the age of 16 years are labeled as highly infected group. Out of estimated globally prevalence of 15 to 20 million cases, Indian alone accounts for 4.5 to 6 million cases. According to Government of India (2000) the death rates have been

declined from 400 per 100000 populations in 1920-21 to 53 in 1993.

Tuberculosis is caused by Mycobacteria that belong to the family Mycobacteriaceae and the order Actinomycetales. Most frequent and important cause of human disease is Mycobacterium tuberculosis [2]. Closely related organisms that also infect human include Mycobacterium bovis (the bovine tubercle bacilli, once an important cause of tuberculosis of a small percentage of cases in developing countries) and Mycobacterium africanum (isolated in small proportion of cases in West and central Africa.

Mycobacterium tuberculosis is a straight or a slightly curved rod, non-spore forming, acid fast, thin aerobic bacterium measuring 1-4 micron 0.2 to 0.8 micron, occur singly, in pairs, or in clump. Most of the cases of Tubercular meningitis are caused by mycobacterium bacilli. M.bovis infection has become rare now a days, comprising less than 5% of cases of tubercular meningitis due to wide spread use of pasteurized milk .

India has one of the highest burdens of tuberculosis (TB) globally, accounting for around 20% of the all new TB cases annually [3]. It is estimated that childhood TB constitutes 10–20% of all TB cases in high burden countries[4], accounting for 8–20% of TB-related deaths [5]. Approximately, 25% of pediatric TB cases are extra pulmonary, with tuberculous meningitis (TBM) being the most severe form. Worldwide, TBM accounts for majority of the deaths due to TB.

According to WHO, TB is a worldwide pandemic. Among the 15 countries with the highest estimated TB

incidence rates, 13 are in Africa, while half of all new cases are in six Asian countries, viz., Bangladesh, China, India, Indonesia, Pakistan and Philippines. A WHO fact sheet dated March 2010 on tuberculosis stated that overall one third of the world's population (over 2 billion) is currently infected with the TB bacillus [6].

The reasons are likely to be multifactorial: inherent not just to the individual person, but to their given population and environment. In populations with high TB prevalence TBM differs from pulmonary and other extra pulmonary tuberculosis, in that the peak age is from 0–4 years [7]. In populations with lower TB prevalence, most cases of TBM are in adults. Risk factors identified for these people are alcoholism, diabetes mellitus, malignancy, and recent corticosteroid use [8].

## Materials & Methods

This was a case control study in the Pediatric patients with Meningitis and diagnosed as the TB meningitis by CSF examination at R.T.H.C Kanti and Pediatrics Department of S.K.M.C.H, Muzaffarpur, Bihar during the one year period i.e. from June 2019 to June 2020. There were total 80 patients were included into the study. The detailed history like age, sex, Nutritional status was calculated by WHO's Growth chart and various associated factors like Socio Economic Status was assessed by BG Prasad's Classification, immunization status was checked by immunization card and BCG vaccination was assessed by Scar mark on Left hand and immunization record, H/o Corticosteroid use, H/o Diabetes, Rural /Slum dwellingetc.

## Results

**Table 1: Age wise Distribution of the Patients**

Agegroup	No. of Patients	Percentage (%)
0-2	23	28.75
2-5	27	33.75
5-8	15	18.75
8-12	9	11.25
12-14	6	7.5
Total	80	100

The majority of the patients were in the age group of 0-2 i.e., 28.75%, 2-5 were 33.75%, 5-8 were 18.75%, 8-12 were 11.25% and 12-14 were 7.5% respectively.

**Table 2: Distribution as per theSex**

Sex	No. of Patients	Percentage
Male	47	58.75
Female	33	41.25
Total	80	100

Majority of the patients were Male i.e. 58.75% and 41.25% wereFemale.

**Table 3: As per the associated riskfactors\***

Associatedfactors	No.	Percentage (%)
Low SES	35	85.5
Malnutrition	25	60.5
Un-immunized	15	35.5
H/o Corticosteroid use	11	25.5
Diabetes	9	20.5
Rural /Slum dwelling	7	15.5
H/o Migration	6	13

(\*Total may be more than 80 as more than one risk factors were associated with the patients)

The most common associated risk factors were Low SES in 85.5%, Malnutrition in 60.5%, Un-immunized patients were 35.5%, H/o Corticosteroid use were in 25.5%, Diabetes in 20.5%, Rural /Slum dwelling in 15.5%, and H/o Migration were 13% respectively.

### Discussion

Human migration plays a large role in the epidemiology of TB. The risk factors are Poor SES, Malnutrition; Un- immunized specially BCG immunization, Corticosteroid use and Diabetes Rural/ Slum dwelling<sup>[9]</sup>. PEM(Malnutrition) is having decreased

cell mediated immunity may predispose to Meningitis, BCG vaccination seems to protect from TB specially TB meningitis; also unnecessary use of corticosteroid in pediatric and diabetes are associated with decreased immunity may cause TB Meningitis. The rural or slum area dwellers are exposed to overcrowding and exposure to communicable diseases specially ARI and TB and also there is full of Indoor air pollution causing Pneumonia and its complications like TB Meningitis<sup>[10]</sup>.

In our study we have found that the majority of the Patients were in the age group of 2-5 i.e., 33.75% followed by 0-2 were 28.75%, 5-8 were 18.75%,

8-12 were 11.25%, 12-14 were 7.5% respectively. These findings are found in populations with high TB prevalence TBM divers from pulmonary, and other extra pulmonary tuberculosis, in that the peak age is from 0–4 years [11]. Majority of the patients were male i.e. 58.75% and 41.25% were female. Confirmation with *G Thwaites* females were more than Males. The most common associated risk factors were Low SES in 85.5%, Malnutrition in 60.5%, Un-immunized patients were 35.5%, H/o Corticosteroid use were in 25.5%, Diabetes in 20.5%, Rural /Slum dwelling in 15.5% and H/o Migration were 13%, these findings similar to *Tarakad S Ramachandran* and *G Thwaites*.

### Conclusion

It can be concluded from our present analysis that the majority of the patients were in the age group of 2-5 i.e., 33.75%. The most common associated factors were Low SES, Malnutrition, Un-immunized patients, H/o Corticosteroid use, Diabetes, Rural /Slum dwelling and H/o Migration.

**Ethical Clearance:** Taken from Institutional Ethics Committee, Sri Krishna Medical College, Muzaffarpur, Bihar

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