A Study of Clinico-demographic Profile of Children with Presumptive Pulmonary Tuberculosis at Tertiary Health Care Institute

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Abstract
Background: Tuberculosis (TB) is an air borne disease caused by *Mycobacterium tuberculosis*. Though lung is the most common organ affected by TB, it can involve any organ system. TB is one of the leading causes of morbidity and mortality worldwide from an infectious disease. India has the highest TB burden in the world, with a considerable amount of cases falling in the age group 0-14 years. Hence childhood tuberculosis is a major concern in our country. **Aims and Objectives:** To study the clinico-demographic profile of children with presumptive pulmonary tuberculosis at a tertiary health care centre. **Materials and Methods:** A prospective study carried out in 120 clinically suspected cases of pulmonary TB in children in the age group 0 to 10 years. Data collected with pretested questionnaire. Data included demographic data, clinical features and risk factors. Patients were analysed for clinical profile and risk factors. **Results:** Male to female ratio was 1.2:1. Maximum number of cases (30%) was in the age group 8-10 years. The most frequent symptoms in these children were cough ≥3wks and fever (99.2%). Significantly higher percentage of cases (54.2%) had history of TB contact. ESR was elevated in 84.2% of cases, whereas Mantoux test was positive in 59.2% cases and 37.5% had abnormal Chest X-ray findings suggestive of pulmonary TB. There was retroperitoneal lymphadenopathy in 66.7% of the cases and cervical lymphadenopathy was noted in 3.3% cases. **Conclusion:** In children, TB is often missed or overlooked due to non-specific symptoms and difficulty in diagnosis. A majority of these cases are diagnosed on the basis of clinical suspicion supported by various investigation results. Presence of history of TB contact increases the risk of contracting childhood TB considerably.
Key Words: Tuberculosis, children, clinico-demographic profile.

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Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 22 September 2020

INTRODUCTION
Tuberculosis, caused by *Mycobacterium tuberculosis*, still continues to be one of the world's deadliest communicable diseases. It typically affects the lungs (pulmonary TB), but other sites can also be affected (extra-pulmonary TB) such as pleura, lymph nodes, meninges, abdomen, genitourinary system, spine, bones and joints, etc. As per WHO Global Report 2018, an estimated 10.0 million people developed TB and 1.6 million died from the disease in the year 2017. Among those who developed TB disease in 2017, 5.8 million were men, 3.2 million were women and 1.0 million were children. India has the highest TB burden in the world accounting for 27% of the global cases with an estimated incidence of 2.74 million of which 2,24,000 were in the age group 0-14 years.[1] Conventional pulmonary TB diagnosis is based mainly upon sputum microscopy,

isolation of the causative organism on culture (solid or liquid medium), radiological or histopathological findings and clinical suspicion.[2] In children, TB is often missed or overlooked due to non-specific symptoms and difficulty in diagnosis. Also, TB in children shows many clinical similarities with other common childhood diseases. In children, diagnosis of TB usually is dependent on discovery of a case in adults, tuberculin skin testing, chest radiograph and clinical signs and symptoms. But, none of these methods are fully reliable for diagnosing a case of childhood pulmonary TB.[3,4]

Tuberculosis has a major impact on the overall health of a child. This study was conducted to determine the clinico-demographic profile of children with presumptive pulmonary tuberculosis at a tertiary health care institute.

MATERIALS AND METHODS

Present study was a prospective study carried out in Department of Microbiology at a tertiary care hospital. Total 120 paediatric cases of Presumptive Pulmonary Tuberculosis were studied during 1st January, 2017 to 31st December, 2017.

Inclusion Criteria:
1. Children in the age group 0 to 10 years
2. Patients with clinical symptoms suggestive of pulmonary TB along with atleast any one factor like History of TB contact, Raised Erythrocyte Sedimentation Rate (ESR), Positive Mantoux Test [Positive Result- ≥10 mm], Abnormal Radiological Findings suggestive of Pulmonary TB
3. Human Immunodeficiency Virus (HIV) negative patients.

Exclusion Criteria:
1. Age > 10 years
2. Patients on Anti-tuberculosis treatment (ATT)
3. Human Immunodeficiency Virus (HIV) positive patients.
4. Parent/ guardian not giving consent for the study.

Study was approved by ethical committee of the institute. A valid written consent was taken from parent/ guardian of the patient after explaining the study to them.

Data was collected with pretested questionnaire. It included the demographic profile, presenting complaints, past history, investigations done for each patient and it was duly recorded in the case record form.

Statistical Analysis

Statistical analysis was performed with the software package: SPSS statistic 20 for Windows. The significance of difference of proportion of categorical variables among groups was examined by the chi-square test for large samples and Fischer's exact test for small samples. A value of P of ≤ 0.05 was considered significant for all statistical analysis and was marked with an asterisk.

RESULTS

Out of the 120 cases included in this study, males comprised of 55% of the cases whereas females comprised of 45% (male to female ratio=1.2:1) (table 1). Out of the 120 cases included in this study, maximum number of cases (30%) were in the age group 8-10 years whereas minimum number of cases (15.8%) were in the age group 0-2 years. Mean age was 6.1yr (± 3.1yr) and median age was 7yr, (range 0.1yr to 10yr) (table2). Out of the 120 cases included in this study, 47.5% of the cases were inpatients whereas 52.5% were outpatients (table 3). Table 4 shows distribution of cases according to presenting symptoms. Cough ≥3wks and fever (99.2%) were the most frequent symptoms followed by fatigue (70.8%). Other symptoms seen were loss of appetite (55%), weight loss (31.7%), chest pain or pain during coughing/ breathing (20.8%), chills (10.8%), night sweats (5%). Haemoptysis was not seen in any patient. Significantly higher percentage of cases (54.2%) had history of TB contact. There was no past history of TB in these children (table 5). Table 6 shows distribution of cases based on ESR, Mantoux and Chest X-ray findings. ESR was elevated in 84.2% of cases, whereas Mantoux test was positive in 59.2% cases and 37.5% had abnormal Chest X-ray findings suggestive of pulmonary TB. This difference was statistically significant (Chi Square Value- 54.7, P Value- <0.001*). There was Retroperitoneal Lymphadenopathy in 66.7% of the cases. This difference was statistically significant (Chi Square Value- 13.33, P Value- <0.001*). Amongst the cases with Retroperitoneal Lymphadenopathy, 20% were necrotic and 80% were non-necrotic. This difference was statistically significant (Chi Square Value- 28.8, P Value- <0.001*) (Table 7). Cervical Lymphadenopathy was noted in 3.3% cases. This difference was statistically significant (Chi Square Value- 104.53, P Value- <0.001*). Amongst the cases with Cervical Lymphadenopathy, 25% were necrotic and 75% were non-necrotic (Table 8).

Table 1: Distribution of patients according to gender

Sr no	Gender	Number of cases	Percentage (%)
1	Female	54	45
2	Male	66	55
	Total	120	100

Table 2: Distribution of patients according to age group

Sr no	Age-groups	Number of cases	Percentage (%)
1	0-2yrs	19	15.8
2	2-4yrs	20	16.7
3	4-6yrs	20	16.7
4	6-8yrs	25	20.8
5	8-10yrs	36	30.0
	Total	**120**	**100.0**

Table 3: Inpatient/outpatient distribution of cases

Sr no	Inpatient/Outpatient	Number of cases	Percentage (%)
1	Inpatient	57	47.5
2	Outpatient	63	52.5
	Total	**120**	**100.0**

TABLE 4: Distribution of cases according to presenting symptoms (n=120)

PRESENTING SYMPTOMS		Number	Percentage (%)
Cough ≥3wks	Yes	119	**99.2**
	No	1	0.8
Haemoptysis	Yes	0	**0.0**
	No	120	100
Chest pain/pain with breathing or coughing	Yes	25	**20.8**
	No	95	79.2
Weight loss	Yes	38	**31.7**
	No	82	68.3
Fatigue	Yes	85	**70.8**
	No	35	29.2
Fever	Yes	119	**99.2**
	No	1	0.8
Night sweats	Yes	6	**5.0**
	No	114	95
Chills	Yes	13	**10.8**
	No	107	89.2
Loss of appetite	Yes	66	**55**
	No	54	45

Table 5: Distribution of cases based on past history of TB and history of TB contact (n=120)

		Number	Percentage
Past history of TB	Yes	0	0
	No	120	100
History of TB Contact	Yes	65	54.2
	No	55	45.8
Chi Square Value- 89.1			P Value- <0.001*

Table 6: Distribution of cases based on ESR, Mantoux and Chest X-ray findings (n=120)

TEST		Number	%
ESR (Normal range=0-13 mm/hr)	Within normal limits	19	15.8
	Raised	101	84.2
Mantoux test (Positive result= ≥10mm)	Within normal limits	49	40.8
	Raised	71	59.2
Chest X-ray	Normal	75	62.5
	Abnormal	45	37.5
Chi Square Value- 54.7			P Value- <0.001*

Table 7: Distribution of cases based on retroperitoneal lymphadenopathy on Ultrasonography (USG)

USG- Retroperitoneal lymph nodes		No. of cases	Percentage (%)
Lymphadenopathy	Necrotic	16	13.3
	Non necrotic	64	53.4
Nothing Abnormal Detected		40	33.3
Total		120	100.0

Table 8: Distribution of cases based on cervical lymphadenopathy on USG Neck

USG Neck		No. of cases	Percentage (%)
Cervical Lymphadenopathy	Necrotic	1	0.8
	Non necrotic	3	2.5
Nothing abnormal detected		116	96.7
Total		120	100.0

DISCUSSION

In the present study, out of the 120 cases, males comprised of 55% of the cases whereas females comprised of 45% with male to female ratio of 1.2:1. In a study by Moussa HS *et al.*[3] in 2016, maximum number of cases were males, that is, 60.9% while females accounted for only 39.1% of the total cases with male to female ratio of 1.6:1. In a study by Hasan Z *et al.*.[5] in 2017, males comprised of 56% of the cases whereas females comprised of 44% with male to female ratio of 1.2:1. These findings were concordant with the present study. In a study by Memon SS *et al.*[6] in 2018, males comprised 41% of the cases while females comprised 59% of the cases with a male to female ratio of 0.7:1. In a study by Walters E *et al.*[7] in 2012, males comprised 46.4% of the cases whereas female comprised of 53.6% with male to female ratio of 0.9:1. These findings were discordant with the present study. In the present study, out of the 120 cases, maximum number of cases (30%) was in the age group 8-10 years whereas minimum number of cases (15.8%) was in the age group 0-2 years. Mean age was 6.1yr (± 3.1yr) and median age was 7yr, (range 0.1yr to 10yr). In a study by Memon SS *et al.*[6] in 2018, maximum number of cases (58%) was in the age group 10-15 years whereas minimum number of cases (16%) was in the age group 0-5 years. Mean age was 9.98yr (± 3.67yr) and median age was 11yr. In a study by Hasan Z *et al.*[5] in 2017, which included subjects in the ages ranging from 7 months to 15 years, the median age was 6.8 years. These findings were similar to the present study. In a study by Walters E *et al.*[7] in 2012, in which children less than 14 years of age were enrolled, the median age was 17.2 months. In a study by Nicol MP *et al.*[8] in 2013, in which children less than 15 years of age were enrolled, the median age was 31 months. These findings were discordant with the present study. In the present study, out of the 120 cases, 47.5% of the cases were inpatients whereas 52.5% were outpatients. In a study by Nicol MP *et al.*[8] in 2013, 58.3% were inpatients. This finding was discordant with the present study. In the present study, out of the 120 cases, cough ≥3wks and fever (99.2%) were the most frequent symptoms

followed by fatigue (70.8%), loss of appetite (55%), weight loss (31.7%), chest pain/pain with breathing or coughing (20.8%) and chills (10.8%); none of the patients presented with haemoptysis. In a study by Moussa HS et al.[3] in 2016, persisting cough (86.1%) was the most common symptom followed by night sweat (77.4%), fever ≥ 1week (66.1%) and weight loss (30.1%). In a study by Chipinduro M et al.[9] in 2017, weight loss was the most common symptom with which the patients presented followed by fever and night sweats. Both the studies show that paediatric TB presents with non-specific symptoms and shows many clinical similarities with other common childhood diseases. Childhood TB is acquired usually from an infectious adult contact.[10] Mycobacterium tuberculosis (MTB) infection usually occurs by inhalation of tubercle bacilli in aerosolised respiratory droplets derived from an infectious case of pulmonary TB. Therefore, risk of infection is dependent on the probability, duration and proximity of exposure to an infectious case, and on the infectiousness of the source. In case of childhood TB, this is usually an adult with cavitatory pulmonary disease, although older children may also contribute to transmission.[11] In the present study, out of the 120 cases, significantly higher percentage of cases (54.2%) had history of TB contact. There was no past history of TB in these children. In a study by Hasan Z et al.[5] in 2017, 56% of child TB cases had contact with an adult TB patient. This finding was concordant with the present study. In a study by Moussa HS et al.[3] in 2016, 38.2% cases had history of TB contact. In a study by Chipinduro M et al.[9] in 2017, 23.4% cases had history of TB contact and 7.8% cases had history of TB in the past. These findings were discordant with the present study. In the present study, out of the 120 cases, ESR was elevated in 84.2% of cases, whereas Mantoux test was positive in 59.2% cases and 37.5% had abnormal Chest X-ray findings suggestive of pulmonary TB. In a study by Moussa HS et al.[3] in 2016, 11.3% case had positive Mantoux test and 83.5% cases had Chest X-ray findings consistent with TB. These findings were discordant with the present study. According to a study by Scheepers S et al.[12] in 2011, diagnosis of PTB using abdominal lymphadenopathy as a surrogate for mediastinal lymphadenopathy may present a simple and accurate additional diagnostic technique that is of value in developing countries. In the present study, out of the 120 cases, there was Retroperitoneal Lymphadenopathy in 66.7% of the cases. Amongst the cases with Retroperitoneal Lymphadenopathy, 20% were necrotic and 80% were non-necrotic. In the present study, cervical lymphadenopathy was noted in 3.3% cases. Amongst the cases with Cervical Lymphadenopathy, 25% were necrotic and 75% were non-necrotic.

CONCLUSION

In children, TB is often missed or overlooked due to non-specific symptoms and difficulty in diagnosis. A majority of these cases are diagnosed on the basis of clinical suspicion supported by various investigation results. Presence of history of TB contact increases the risk of contracting childhood TB considerably.

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Source of Support: None Declared
Conflict of Interest: None Declared