Original Research Article

Clinical Profile of Childhood Tuberculosis in a Tertiary Care Rural Hospital

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Abstract

Introduction: Tuberculosis (TB) remains a major public health problem, despite noteworthy socio-economic development and advances in medical science. It is a curable disease but still millions of people suffer every year and a number of them die from this infectious disease, resulting in devastating social and economic impact. TB treatment requires several months of swallowing a combination of 3 to 4 drugs every day. Patients often forget to take their medicines or stop taking them when they start to feel better. The Revised National TB Control Programme (RNTCP), based on the internationally recommended Directly Observed Treatment Short-course (DOTS) strategy was launched. Studies of paediatric TB are scantily available both in global and national context. Reliable data on the treatment of paediatric TB and its follow up are not available. Hence, a study of paediatric TB is designed to evaluate the clinical profile of childhood tuberculosis and following up the treatment outcome upto 6 months

Materials and methods: The study was carried out in the Department of Pediatrics at Dhiraj Hospital, Piparia. Recruitment took place from February 2014 to February 2015. The clinical profile of 71 patients was studied.

Results: There was preponderance of males (60.56%, n=43) in study population as compared to females (39.44%, n=28). Most of the patients were belonging to age group of <6 years (32.4%, n=23) and >10 years (38.0%, n=27). Among 6 to 10 years, 21 (29.6%) patients were included in study. Most common form of TB was extra-pulmonary TB (60.56%, n=43) followed by pulmonary TB (39.43%, n=28). Non-specific symptoms like fever (82.5%, n=66) was the commonest presenting symptoms. Other symptoms included cough (33.8%, n=24), altered sensorium (19.71%, n=14), swelling (15.5%,

n=11). From all, the patient with follow up (n=50), 44 (88.0%) were cured, 3 (6.0%) patients expired during the course of treatment, 3(6.0%) patient showed no improvement.
Conclusion: Diagnosis of paediatric tuberculosis still continues to be a challenge. In the study TB was more common in extra-pulmonary than pulmonary forms in our setting. Diagnosis was based on a combination of epidemiological and clinical suspicion supported by results of various investigations. Presence of paediatric TB is an indication of prevalence of TB in that community. As the source of transmission of TB to children is usually an adult, control of tuberculosis in adult is necessary to decrease the prevalence of TB in children. DOTS is an effective strategy for treatment of TB.

Key words

Tuberculosis, Clinical Profile, DOTS, TST, Sputum/gastric lavage AFB, Outcome.

Introduction

Tuberculosis (TB) remains a major public health problem, despite noteworthy socio-economic development and advances in medical science. It is a curable disease but still millions of people suffer every year and a number of them die from this infectious disease, resulting in devastating social and economic impact.

Mycobacterium tuberculosis, the bacteria that causes tuberculosis, has been around for centuries. Fragments of the spinal columns from Egyptian mummies from 2400 B.C.E. were found to have definite signs of the ravages of this terrible disease [1].

The actual burden of paediatric TB is not known due to diagnostic difficulties but has been assumed that 10% of total TB load is found in children. Globally, about 1 million cases of paediatric TB are estimated to occur every year accounting for 10-15% of all TB; with more than 100,000 estimated deaths every year, It is one of the top 10 causes of childhood mortality. Though Multi Drug Resistance-Tuberculosis (MDR-TB) and Extensive Drug Resistance-Tuberculosis (XDR-TB) is documented among paediatric age group, there are no estimates of overall burden, chiefly because of diagnostic difficulties and exclusion of children in most of the drug resistance surveys [2].

The proportion of pediatric TB cases registered under RNTCP has been constant in the past five years and for 2013, 63919 new TB cases were notified accounting for 5% of all cases. This is in the range of the expected incidence by WHO report. However considering difficulties in diagnosis of pediatric TB under field condition, the notification rates can be further strengthened [3].

However, the proportion of paediatric TB case detection has variation among the states, which significantly varies from 5-14% in larger states and in Gujarat it is about 6-8% [2].

Despite this huge disease burden, studies of paediatric TB are scantily available both in global and national contexts.However, research on childhood tuberculosis as it relates to better diagnostics is often neglected because of technical difficulties, such as the slow growth in culture, the difficulty of obtaining specimens, and the diverse and relatively nonspecific clinical presentation of tuberculosis in this age group. Researchers often use individually designed criteria for enrollment, diagnostic classifications, and reference standards, thereby hindering the interpretation and comparability of their findings.Reliable data on the clinical profile of all forms of TB amongst children in India are not available. Most surveys conducted have focused on pulmonary TB and no significant studies on extra pulmonary TB esp. on childhood tuberculosis are available.

By keeping all the above facts in mind this study aimed to identify the potential types of tuberculosis presentation and its immediate

outcome in rural tertiary level centre.

Aim and objectives

- To assess the Clinical Profile of various type of Tuberculosis presenting to our hospital.
- To follow the patients minimum up to 6 months after enrollment in the study.
- To analyze the Mantoux test positivity in suspected cases of tuberculosis.
- To find the association of presence of BCG scar in diagnosed tuberculosis patients.

Materials and methods

Study Design

It was a prospective, questionnaire-based study.

Setting

The study was carried out in the Department of Paediatrics at Dhiraj Hospital, Piparia, Waghodia.

Inclusion Criteria

- All children (male and female) with tuberculosis.
- Diagnosed at our hospital
- Children below 18 yrs.

Exclusion Criteria

- Participants whose parents are not willing to give consent for the study.
- Patient with MDR-TB and XDR-TB
- Congenital tuberculosis

Sample size

Total 71 diagnosed cases of tuberculosis included in study attending Dhiraj General Hospital between Feburary 2014 to Feburary 2015.

Study period

February 2014 to February 2015

Study Procedure

Tuberculosis patients of aged up to 18 year, satisfying the inclusion and exclusion criteria were approached for enrolment in the study. They were informed about the purpose and nature of study, risks and benefits associated with participation in the study.

All consecutive children attending the out-patient department of Dhiraj Hospital with clinical symptoms and signs suggestive of tuberculosis or failure to thrive were investigated for TB disease. After obtaining written informed consent, demographic data, a detailed clinical history, family history of contact with TB disease, and physical examination for each child was recorded in a standardized format.

Complete blood count, Mantoux test, and chest X-ray were done for all the cases. Interpretation of Mantoux test (1TU) and complete blood count were done using the standardized methods. Fine needle aspiration cytology (FNAC), ultrasound abdomen, abdominal paracentesis, x-ray chest and spine, lumbar puncture, computed tomography (CT) (of relevant systems), MRI and other relevant investigations were done as and when required with consultation with senior paediatrician for the diagnosis of tuberculosis. Sputum examination was done on all the suspected patients in case considering age. In the cases where sputum collection was not feasible then gastric lavage was performed for acid fast bacilli staining (AFB).

Patient attending Dhiraj Hospital on OPD basis and/or got admitted were evaluated and enrolled for the study but only 32 patient were came for follow up for regular 6 months. All diagnosed patient of TB were put on Anti tuberculosis treatment. Follow up was done every month, if they do not turn up telephonic reminder was given.

Results

This prospective study was performed in Department of Paediatrics at Dhiraj Hospital, Piparia, Waghodia at Vadodara. Recruitment took place from January 2014 to January 2015. All the patients (n=71) diagnosed with TB at

Dhiraj Hospital during study period satisfying inclusion and exclusion criteria were included in study. The clinical profile of 71 patients was studied. Out of 71 patients, 34 patients (47.88%) were treated with daily private AKT and 37 patients (52.11%) received AKT under DOTS. We could follow up 50 patients (70.42%) and rest all (29.58%, n=21) were lost to follow up.

Average duration of the hospital stay was 7.85 with SD ± 5.54. Minimum 3 days and maximum was 28 days.

There was preponderance of males (60.56%, n=43) in study population as compared to females (39.44%, n=28) as shown in **Table - 1**. The male to female ratio was 1.53:1.The male predominance in the study may be due to their ambulatory nature which make them more expose to the TB infected cases or could be because of more attention given to male child in developing country like India which may lead to early diagnosis (**Table – 1**).

Table - 1: Distribution of children according to sex.

Sex	**Frequency**	**%**
Male	43	60.6
Female	28	39.4
Total	71	100.0

Maximum patients were from age group of <6 years (32.4%, n=23) and >10 years (38.0%, n=27). Among 6 to 10 years, 21(29.6%) patients were included in study. The youngest patient was 6 months old and the eldest patient was 17 years old. There was almost equitable distribution of males (16.9%, n=12) and females (15.40%, n=11) in <6 years age group. In other two age groups of 6 to 10 years and >10 years, there was male predominance with 21.1% (n=15) and 22.5% (n=16) respectively (**Table – 2**).

While calculating the spectrum of tuberculosis, Pulmonary koch's was observed to be the most common form of tuberculosis as per organ-wise involvement, however on broad classification extra-pulmonary TB (60.56%, n=43) was more common than pulmonary TB (39.43%, n=28). One patient (1.40%) was diagnosed as disseminated TB. One child (1.40%) had miliary TB. Distribution of types of TB according to age groups is shown in **Table - 4**. The sites of extra-pulmonary TB are shown in figure 14**.** Out of 49 patients who were diagnosed as extra-pulmonary TB, most common sites were meninges (23.9%, n=17), abdominal (15.49%, n=11) and lymph node (14.0%, n=10).Less common sites of extra-pulmonary TB were Skin (2.8%, n=2) and psoas abscess (1.4%, n=1) as per **Table - 3**.

Table - 2: Distribution of children according to age.

		Age group			**Total**
		<6 yrs	**6-10 yrs**	**>10 yrs**	
Sex	Male	12	15	16	43
		16.9%	21.1%	22.5%	60.6%
	Female	11	6	11	28
		15.5%	8.5%	15.5%	39.4%
Total		23	21	27	71
		32.4%	29.6%	38.0%	100.0%

Out of all the cases of pulmonary TB 42.9% (n=12) were >10 years, 35.71% (n=10) were <6 years and 21.4% (n=6) between 6-10 years. Among extra-pulmonary TB 30.23% (n=13) were <6 years, 34.88% (n=15) were >10 years and same were between 6-10 years (**Table – 4**).

Table - 5 shows the prevalence of various symptoms and signs at the time of diagnosis of tuberculosis. Symptoms like fever (54.9%, n=39) Cough (33.8%, n=24), Altered sensorium (19.71%, n=14) and malnutrition were the commonest among others in all forms of

tuberculosis. In Pulmonary tuberculosis cough (82.1%, n=23) and fever (60.7%, n=17) were common complaints while altered sensorium (82.3%, n=14) was the commonest clinical feature in case of CNS tuberculosis. Patients of TB lymphadenitis were presented with complaints of swelling (100%, n=10) and vomiting was the most common complaint among the patients of abdominal tuberculosis (54.5%, n=6).

Table - 3: Spectrum of type of tuberculosis.

Final Diagnosis	Frequency	%
Pulmonary Koch's	28	39.4
CNS Tuberculosis	17	23.9
Abdominal Koch's	11	15.5
TB Lymphadenitis	10	14.1
Skin Tuberculosis	2	2.8
Disseminated Koch's	1	1.4
Miliary TB	1	1.4
Psoas Abscess of Tubercular Origin	1	1.4
Total	71	100.0

Tuberculin skin test was done in all the patients. Tuberculin test was positive in 69.0% (n=49) and negative in 31.0% (n=22) of all the patients. Patients with pulmonary TB, 75.0% (n=21) had positive TST while 25.0% (n=7) had negative TST. In extra pulmonary TB, 28 (65.11%) patients had positive TST while 15 (34.88%) patients had negative TST. This analysis showed more patients of extra-pulmonary TB had negative TST in comparison to pulmonary TB (**Table – 6**). Among the tuberculosis patients ESR was sent for all the patients admitted at Dhiraj General Hospital, 78.87 % had High ESR(>20 mm at 1st hour), which shows that ESR is a sensitive marker for tuberculosis.

All the patients of pulmonary TB (39.43%, n=28) and military TB (1.40%, n=1) had positive chest X-ray (**Table - 7**). Among the patients of pulmonary tuberculosis 54% (n=15) presented with chest X-Ray finding of hilar lymphadenopathy, 18% presented with patchy infiltrates and 18% presented with both hilar lymphadenopathy and infiltrates, while 10% presented with cavitatory lesions on Chest X-Ray.

Table - 4: Spectrum of type of tuberculosis and age wise distribution.

Final Diagnosis	Age group			Total
	<6 yrs	6-10 yrs	>10 yrs	
Pulmonary Koch's	10	6	12	28
	35.7%	21.4%	42.9%	100.0%
CNS Tuberculosis	6	6	5	17
	35.3%	35.3%	29.4%	100.0%
Abdominal Koch's	1	5	5	11
	9.1%	45.5%	45.5%	100.0%
TB Lymphadenitis	4	2	4	10
	40.0%	20.0%	40.0%	100.0%
Skin Tuberculosis	1	0	1	2
	50.0%	.0%	50.0%	100.0%
Disseminated Koch's	1	0	0	1
	100.0%	.0%	.0%	100.0%
Miliary TB	0	1	0	1
	.0%	100.0%	.0%	100.0%
Psoas Abscess of Tubercular Origin	0	1	0	1
	.0%	100.0%	.0%	100.0%
Total	23	21	27	71

Table - 5: Presenting symptoms of the children diagnosed with tuberculosis.

Final Diagnosis	Fever	Cough	Altered sensorium	Swelling	Vomiting	Convulsion	Abdominal pain	Cold	Breath less ness	Lesions
Pulmonary Koch's	17 (60.7)	23 (82.1)	0(0)	0(0)	0(0)	0(0)	0(0)	3 (10.7)	2 (7.1)	0 (0)
CNS Tuberculosis	14 (82.4)	0 (0)	14 (82.35)	0(0)	3 (17.6)	9 (52.9)	1 (5.9)	0 (0)	0 (0)	0 (0)
Abdominal Koch's	5 (45.5)	0 (0)	0 (0)	1 (9.1)	6 (54.5)	0 (0)	7 (63.6)	0 (0)	0(0)	0 (0)
Disseminated Koch's	1 (100)	0 (0)	0 (0)	0(0)	0(0)	0 (0)	0(0)	0(0)	0(0)	0 (0)
Miliary TB	1 (100)	1 (100)	0(0)	0(0)	0(0)	0 (0)	0(0)	1(100)	0(0)	0 (0)
Psoas Abscess of Tubercular Origin	1 (100)	0(0)	0(0)	0(0)	0(0)	0 (0)	0(0)	0 (0)	0 (0)	0 (0)
Skin Tuberculosis	0 (0)	0 (0)	0(0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (100)
TB Lymphadenitis	0 (0)	0 (0)	0 (0)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	39 (54.9)	24 (33.8)	14 (19.71)	11 (15.5)	9 (12.7)	9 (12.7)	8 (11.3)	4 (5.6)	2(2.8)	2 (2.8)

Table - 6: Distribution of TB cases according to the results of tuberculin skin test.

Final Diagnosis	**MT (TST)**		**Total**
	Positive	**Negative**	
Pulmonary Koch's	21	7	28
	75.0%	25.0%	100.0%
CNS Tuberculosis	9	8	17
	52.9%	47.1%	100.0%
Abdominal Koch's	8	3	11
	72.7%	27.3%	100.0%
Tb Lymphadenitis	8	2	10
	80.0%	20.0%	100.0%
Skin Tuberculosis	2	0	2
	100.0%	.0%	100.0%
Disseminated Koch's	0	1	1
	.0%	100.0%	100.0%
Miliary TB	0	1	1
	.0%	100.0%	100.0%
Psoas Abscess of Tubercular Origin	1	0	1
	100.0%	.0%	100.0%
Total	49	22	71
	69.0%	31.0%	100.0%

Only 2 (11.8%) patient of TBME and 2 (18.2%) patients of abdominal tuberculosis had positive chest X-ray. All patients with TB lymphadenopathy had normal chest X-ray. This shows chest x-ray examination is not sensitive investigation for diagnosis of extra-pulmonary

TB. Sputum/Gastric lavage for AFB was done in all patients. AFB was detected from sputum/gastric lavage sample of 3(4.2%) patients. While in 68 (95.7%) patients AFB examination did not yield positive results (**Table – 8**). In case of psoas abscess of tubercular origin, we were able to identify the acid fast bacilli in pus examination.

Contact history was positive in 15 (21.1%) patients while remaining 56 (78.9%) patients did not have any known contact history of tuberculosis. Patient diagnosed with pulmonary TB 8 (11.26%), TBME 4 (5.63%) were having positive contact history (**Table – 9**).

Association of BCG with type of tuberculosis was compared among patients that were enrolled in the study (**Table - 10**). From patient that were included in the study 43 (60.6%) patients were having history of BCG taken while 28 (39.4%) had not taken BCG.

Table - 7: Association of type of tuberculosis against chest X-ray findings.

Final Diagnosis	**X-Ray**		**Total**
	Positive	**Normal**	
Pulmonary Koch's	28	0	28
	100%	0.0%	100.0%
CNS Tuberculosis	2	15	17
	11.8%	88.2%	100.0%
Abdominal Koch's	2	9	11
	18.2%	81.8%	100.0%
TB Lymphadenitis	0	10	10
	.0%	100.0%	100.0%
Skin Tuberculosis	1	1	2
	50.0%	50.0%	100.0%
Disseminated Koch's	0	1	1
	.0%	100.0%	100.0%
Miliary TB	1	0	1
	100.0%	.0%	100.0%
Psoas Abscess of Tubercular Origin	0	1	1
	.0%	100.0%	100.0%
Total	34	37	71
	47.88%	52.11%	100.0%

All form of TB was seen in patients who had received BCG in our study. Confirmations of BCG status of patients were done by history and examination of scar. Majority of patients diagnosed with pulmonary TB 22 (30.9%), TB lymphadenopathy 8 (11.20%), TBME 5 (7.04%) and abdominal koch's 6 (8.45%) had received BCG.

We co-related TST results with nutritional status of patients as shown in **Table - 11**. Nutritional status of all the patients enrolled in the study was assessed as per Weight for age classification after plotting their weight on WHO (for children below 5 years) and IAP growth chart (for children 5-18 years of age). Children with their weight less than -2 SD were taken as malnourished.

Our study showed 65.4% (n=34) patient were TST positive among 52 malnourished patient while 78.9% (n=15) were TST positive among 19 normal nutritional status patient which is suggestive of that mantoux test is still a test of value even in malnourished children. Patients in the study were started on anti-tuberculosis

treatment after classifying them as per RNTCP category. All the patients were started on category I AKT. Thirty four (48%) patients were started on Daily AKT and thirty seven (52%) were started on alternate day therapy under RNTCP (**Table – 12**).

Table - 8: Association of type of tuberculosis against sputum/gastric lavage AFB examination.

Final Diagnosis	**AFB EXAMINATION**		**Total**
	Positive	**Negative**	
Pulmonary Koch's	3	25	28
	10.7%	89.3%	100.0%
CNS Tuberculosis	0	17	17
	.0%	100.0%	100.0%
Abdominal Koch's	0	11	11
	.0%	100.0%	100.0%
Tb Lymphadenitis	0	10	10
	.0%	100.0%	100.0%
Skin Tuberculosis	0	2	2
	.0%	100.0%	100.0%
Disseminated Koch's	0	1	1
	.0%	100.0%	100.0%
Miliary TB	0	1	1
	.0%	100.0%	100.0%
Psoas Abscess Of Tubercular Origin	1	0	1
	100.0%	.0%	100.0%
Total	4	67	71

Table - 9: Association of type of tuberculosis with contact history.

Final Diagnosis	**Contact History**		**Total**
	Present	**Absent**	
Pulmonary Koch's	8	20	28
	28.6%	71.4%	100.0%
CNS Tuberculosis	4	13	17
	23.5%	76.5%	100.0%
Abdominal Koch's	1	10	11
	9.1%	90.9%	100.0%
TB Lymphadenitis	1	9	10
	10.0%	90.0%	100.0%
Skin Tuberculosis	0	2	2
	.0%	100.0%	100.0%
Disseminated Koch's	1	0	1
	100.0%	.0%	100.0%
Miliary TB	0	1	1
	.0%	100.0%	100.0%
Psoas Abscess of Tubercular Origin	0	1	1
	.0%	100.0%	100.0%
Total	15	56	71

Table - 10: BCG vaccination status in TB patients.

Final Diagnosis	BCG		Total
	Absent	Present	
Pulmonary Koch's	6	22	28
	21.4%	78.6%	100.0%
CNS Tuberculosis	12	5	17
	70.6%	29.4%	100.0%
Abdominal Koch's	5	6	11
	45.5%	54.5%	100.0%
Tb Lymphadenitis	2	8	10
	20.0%	80.0%	100.0%
Skin Tuberculosis	1	1	2
	50.0%	50.0%	100.0%
Disseminated Koch's	1	0	1
	100.0%	.0%	100.0%
Miliary TB	1	0	1
	100.0%	.0%	100.0%
Psoas Abscess of Tubercular Origin	0	1	1
	.0%	100.0%	100.0%
Total	28	43	71
	39.4%	60.6%	100.0%

Table - 11: Association of TST outcome with nutritional status.

	MT(TST)		Total
	Positive	Negative	
Malnourished	34	18	52
	65.4%	34.6%	100.0%
Normal	15	4	19
	78.9%	21.1%	100.0%
Total	49	22	71
	69.0%	31.0%	100.0%

Table - 12: Distribution of patients on basis of type of treatment.

Treatment category	Daily Therapy n (%)	DOTS (intermittent) n (%)
No. of Patients	34 (47.88%)	37 (52.12%)

While choosing the type of treatment of tuberculosis each patient's parents were counselled about the both the treatment options and their relative benefits and harms, As per the patients parents decision they were started on different modalities of treatment (Daily or Intermittent Therapy)

Among pulmonary tuberculosis 39.3% (n=11) were started on daily therapy while 60.7% (n=17) were on intermittent therapy, in case of CNS tuberculosis 76.5% (n=13) patients were started on daily therapy out of total 17 CNS tuberculosis. Among abdominal tuberculosis patient 63.6% (n=7) were started on intermittent based therapy out of total 11 patients.50% (n=5) tubercular lymphadenitis patients were started on daily therapy while 50% on alternate day therapy (**Table – 13**).

Table - 13: Distribution of different type of tuberculosis and their treatment.

Final Diagnosis	Treatment		Total
	Daily	Intermittent	
Pulmonary Koch's	11	17	28
	39.3%	60.7%	100.0%
CNS Tuberculosis	13	4	17
	76.5%	23.5%	100.0%
Abdominal Koch's	4	7	11
	36.4%	63.6%	100.0%
TB Lymphadenitis	5	5	10
	50.0%	50.0%	100.0%
Skin Tuberculosis	0	2	2
	.0%	100.0%	100.0%
Disseminated Koch's	1	0	1
	100.0%	.0%	100.0%
Miliary TB	0	1	1
	.0%	100.0%	100.0%
Psoas Abscess of Tubercular Origin	0	1	1
	.0%	100.0%	100.0%
Total	34	37	71
	47.9%	52.1%	100.0%

Table - 14: Association of treatment outcome with type of treatment.

	Outcome						Total
Treatment	DAMA	EXPIRED	Abscond	Cured	Failure	Loss to Follow up	
Daily	3	2	2	22	0	5	34
	8.8%	5.9%	5.9%	64.7%	.0%	14.7%	100.0%
Intermittent	1	1	0	22	3	10	37
	2.7%	2.7%	.0%	60%	8.1%	27.0%	100.0%
Total	4	3	2	44	3	15	71
	5.6%	4.2%	2.8%	61.9%	4.2%	21.1%	100.0%

Out of total 34 patients who were receiving daily therapy 50% (n=17) patients were cured, 29.4% (n=10) patients who did not turned up for follow up, telephonic follow up was able to be obtained for 14.7% (n=5) patients and as per the information they have completed the treatment for 6 months and got cured and other 14.7% (n=5) patients couldn't be contacted, 8.8%(n=3) patients left against medical advice,5.9% (n=2) patient expired and 5.9% (n=2) abscond from hospital.

Among other 37 patients receiving intermittent based therapy under RNTCP 27.01% (n=10) patient lost to follow up, 60.0% (n=22) were cured, 2.7% (n=1) left against medical advice and 8.1% (n=3) patient didn't respond to treatment and considered as failure and referred to district TB centre for evaluation of resistance and further management (**Table – 14**).

Out of pulmonary tuberculosis Patients shows 75.0% (n=21) cured, 7.1% (n=2) failure to respond, 14.2% (n=4) lost to follow up and 3.6% (n=1) patient was abscond. Among the patients of CNS tuberculosis 41.1% (n=7) patients were cured, 5.8% (n=1) failure to respond, 17.66% (n=3) were expired , 11.8% (n=2) patient left

against medical advice while 23.5 % (n=4) patient were lost to follow up.

Among abdominal tuberculosis patient 45.4% (n=5) patient were cured and 36.4% (n=4) patient were lost to follow up while 18.2% (n=2) left against medical advice. 70% (n=7) patients of tubercular lymphadenitis were cured while 20% (n=2) lost to follow up and 10% (n=1) patient abscond from hospital (**Table – 15**).

Table - 15: Association of treatment outcome with type of tuberculosis.

	Outcome						Total
Final Diagnosis	**DAMA**	**EXPIRED**	**Abscond**	**Cured**	**Failure**	**Loss to Follow up**	
Pulmonary Koch's	0	0	1	21	2	4	28
	.0%	.0%	3.6%	75.0%	7.1%	14.2%	100.0%
CNS Tuberculosis	2	3	0	7	1	4	17
	11.8%	17.6%	.0%	41.1%	5.8%	23.5%	100.0%
Abdominal Koch's	2	0	0	5	0	4	11
	18.2%	.0%	.0%	45.4%	.0%	36.4%	100.0%
TB Lymphadenitis	0	0	1	7	0	2	10
	.0%	.0%	10.0%	70.0%	.0%	20.0%	100.0%
Skin Tuberculosis	0	0	0	2	0	0	2
	.0%	.0%	.0%	100.0%	.0%	.0%	100.0%
Disseminated Koch's	0	0	0	0	0	1	1
	.0%	.0%	.0%	.0%	.0%	100.0%	100.0%
Miliary TB	0	0	0	1	0	0	1
	.0%	.0%	.0%	100.0%	.0%	.0%	100.0%
Psoas Abscess of Tubercular Origin	0	0	0	1	0	0	1
	.0%	.0%	.0%	100.0%	.0%	.0%	100.0%
Total	4	3	2	44	3	15	71
	5.6%	4.2%	2.8%	61.9%	4.2%	21.1%	100.0%

Discussion

In our prospective study conducted at Dhiraj Hospital 71 patients were enrolled for the study. Out of which there was preponderance of males (60.56%, n=43) in study population as compared to females (39.44%, n=28) as shown in table 8. The male to female ratio was 1.53:1.This distribution was similar to study done in Bhutan which had 57% males and 43% females [4]. Also, one study in Nepal had similar distribution with 58.5% males and 41.5% were females [5]. The male predominance in the study may be due to their ambulatory nature which make them more expose to the TB infected cases or could be because of more attention given to male child in developing country like India.

Maximum patients were from age group of <6 years (32.4%, n=23) and >10 years (38.0%, n=27). Among 6 to 10 years, 21(29.6%) patients was there in our study. The youngest patient was 6 months old and the eldest patient was 17 years old. There was almost equitable distribution of males (16.9%, n=12) and females (15.40%, n=11) in <6 years age group. In other two age groups of 6 to 10 years and >10 years, there was male predominance with 21.1% (n=15) and 22.5% (n=16) respectively. In children below 6 year of age, probably there is less developed immunity and similarly adolescent and pre pubertal age group has more exposure to infection. Although the difference between patients from various age groups are not

statistically significant in our study perhaps it would have been significant if the sample size was large.

Shrestha S, et al. also had maximum patients in age group of 10-15 years (63.4%) followed by age group of <5 years (29.3%) [6]. The age of the child at acquisition of TB infection has a great effect on the occurrence of tuberculosis disease. Approximately 40% of infected children less than 1 year of age if left untreated develop radiological significant lymphadenopathy or segmental lesions compared with 24% of children between 1-10 year and 16% of children between 11-15 year of age [7]. Our study supports this concept as we got more patients in younger and adolescent age. Probably young child has less developed immunity and more prone to infection, similarly post pubertal or adolescent were more because of more exposure to infection.

While calculating the spectrum of tuberculosis, Pulmonary koch's was observed to be the most common form of tuberculosis as per organ-wise involvement, however on broad classification extra-pulmonary TB (60.56%, n=43) was more common than pulmonary TB (39.43%, n=28). One patient (1.40%) was diagnosed as disseminated TB. One child (1.40%) had miliary TB. Out of 49 patients who were diagnosed as extra-pulmonary TB, most common sites were meninges (23.9%, n=17), abdominal (15.49%, n=11) and lymph node (14.0%, n=10).Less common sites of extra-pulmonary TB were Skin (2.8%, n=2) and psoas abscess (1.4%, n=1). Out of all the cases of pulmonary TB 42.9% (n=12) were >10 years, 35.71% (n=10) were <6 years and 21.4% (n=6) between 6-10 years. Among extra-pulmonary TB 30.23% (n=13) were <6 years, 34.88% (n=15) were >10 years and same were between 6-10 years.

Thus, extra-pulmonary TB had equal distribution among different age group as compared to pulmonary TB which was more common in older age group.

A study from Bhutan had 51% patients with extra-pulmonary TB and 49% patients with pulmonary TB and TB lymphadenitis (54%) was most common form of extra-pulmonary TB [8]. A study conducted in Delhi, extra-pulmonary TB was diagnosed in 63.3% and pulmonary TB in 36.7% [9]. Distribution of extra-pulmonary TB according to organ involved in Hatwal D, et al. was TB lymphadenitis (41.3%), TBME (22.4%), pleural effusion (13.7%), musculoskeletal (12%) and abdominal TB (5.2%) [10]. Findings of these studies match with our findings.

Symptoms like fever (54.9%, n=39) Cough (33.8%, n=24), altered sensorium (19.71%, n=14) were the commonest among others in all forms of tuberculosis. In pulmonary tuberculosis cough (82.1%, n=23) and fever (60.7%, n=17) were common complaints while altered sensorium (82.3%, n=14) was the commonest clinical feature in case of CNS tuberculosis. Patients of TB lymphadenitis were presented with complaints of swelling (100%, n=10) and vomiting was the most common complaint among the patients of Abdominal tuberculosis (54.5%, n=6).

Shrestha, et al. had nonspecific symptoms like fever (75.6%), cough (63.4%) and weight loss (41.5%) as most common presenting symptoms [6]. Study from north India had maximum numbers of children presenting with non-specific symptoms of anorexia (95%) followed by fever (84%), weight loss (63%) and cough (44%) [11]. Another study from Chennai, India had predominant symptoms as fever and cough (47%), loss of weight (41%) and a visible glandular swelling (49%) [12]. Also, in a study done at Philippines, most frequent symptoms were fever (86.6%), cough (76.1%), malnutrition (52.3%), weight loss (50.7%), anorexia (44.8%), and breathing difficulty (28.4%) [5]. This shows nonspecific symptoms are most common presenting features of TB in children, which makes early diagnosis difficult and which requests high degree of suspicion for proper work up.

Tuberculin skin test was done in all the patients. Tuberculin test was positive in 69.0% (n=49) and negative in 31.0% (n=22) of all the patients.

Patients with pulmonary TB, 75.0% (n=21) had positive TST while 25.0% (n=7) had negative TST. In extra pulmonary TB, 28 (65.11%) patients had positive TST while 15 (34.88%) patients had negative TST. This analysis showed more patients of extra-pulmonary TB had negative TST in comparison to pulmonary TB.

Zombini, et al. used TST only in few patients (33.3%) for diagnosis of TB and all the patients had TST positive [13]. Study from Bangalore, India had 23% patients with positive TST [14]. However, this study was done for HIV and TB co infected patients. Of abdominal TB patients 53.1% had positive TST in Shah I, et al. [15]. It is known that negative TST does not rule out TB infection, while utility of positive MT is more in children <5years. In our study greater proportion of patients had positive TST. This favours the use of TST for the diagnosis of TB.

Among the tuberculosis patients ESR was sent for all the patients admitted at Dhiraj Hospital, 78.87% had High ESR(>20 mm at 1st hour), which shows that ESR is a sensitive marker for tuberculosis.

Shamin A, et al. conducted a study at children hospital Islamabad which showed that ESR was raised in 81% children [16]. Findings match to outcome of our study. M.R.H.A. Al-Marri, et al. conducted a study which showed 67% had elevated ESR at time of diagnosis of childhood tuberculosis [17]. This favours the sensitivity of ESR in tuberculosis.

All the patients of pulmonary TB (39.43%, n=28) and military TB (1.40%, n=1) had positive chest X-ray. Among the patients of pulmonary tuberculosis 54% (n=15) presented with chest X-Ray finding of hilar lymphadenopathy, 18% presented with infiltrates and 18% presented with both hilar lymphadenopathy and infiltrates, while 10% presented with cavitary lesions on Chest X-Ray.

Only 2 (11.8%) patient of TBME and 2 (18.2%) patients of abdominal tuberculosis had positive chest x-ray. All patients with TB lymphadenopathy had normal chest x-ray.

Chest X ray was normal in 56% patients of bacteriologically proven TB in Swaminathan, et al. [12]. All the patients of extra-pulmonary TB had normal chest X ray in a study done at Uttarakhand [10]. Majority of patients had significant chest X ray finding and 14% of patients with pulmonary disease had normal chest X ray in Pama CP, et al. [5]. In these studies consolidation, effusion, hilar lymphadenopathy were common chest X ray findings, which helps to diagnose pulmonary TB.

This shows chest x-ray examination is not sensitive investigation for diagnosis of extra-pulmonary TB.

Sputum/Gastric lavage for AFB was done in all patients. AFB was detected from sputum/gastric lavage sample of 3(4.2%) patients. While in 68 (95.7%) patients AFB examination did not yield positive results.

In case of psoas abscess of tubercular origin, we were able to identify the acid fast bacilli in pus examination.

Similarly microscopy for AFB was positive in small proportion of children (<20%) in Sreeramareddy CT, et al. [8]. In a study done at Brazil 32.5% showed positive identification of Mycobacterium [13]. Only eleven (14%) cases were confirmed (bacteriological or histological) to harbour the disease in Garg P, et al. [11].

Contact history was positive in 15 (21.1%) patients while remaining 56 (78.9%) patients did not have any known contact history of tuberculosis. Patient diagnosed with pulmonary TB 8 (11.26%), TBME 4 (5.63%) were having positive contact history.

History of contact with patients of active tuberculosis was reported in total 10 (18.18%) cases in study done at Sangli, India [18]. Only 23.45% patients had positive history of contact in study from Nepal [8]. Similarly a history of contact with tuberculosis was given by only 13.1% relatives in north Indian study [11].

Children acquire TB infection from the adults with TB as in children pauci-bacillary TB is common and poor tussive force. Contact history of TB is seldom positive; this could be due to family members not giving true history due to the social stigma attached to this disease. So although mention facts questions the role of history of contact with T.B. as tool for diagnosing tuberculosis but still we consider as important aspect especially in cases of less than 5 years old.

Association of BCG with type of tuberculosis was compared among patients that were enrolled in the study. From patient that were included in the study 43 (60.6%) patients were having history of BCG taken while 28 (39.4%) had not taken BCG. Sreeramareddy CT, et al. had 57.4% with history of receiving BCG [8]. A study done by Pama CP had most patients (56.7%) who had received BCG [5].

All form of TB was seen in patients who had received BCG in our study. Majority of patients diagnosed with pulmonary TB 22 (30.9%), TB lymphadenopathy 8 (11.20%), TBME 5 (7.04%) and abdominal koch's 6 (8.45%) had taken BCG. This indicates that there is still a significant chance of developing TB even in the presence of BCG vaccination but probably as well-known fact it may reduce dissemination of the disease.

We co-related TST results with nutritional status of patients. Nutritional status of all the patients enrolled in the study was assessed as per Weight for age classification after plotting their weight on WHO (for children below 5 years) and IAP growth chart (for children 5-18 years of age). Children with their weight less than -2 SD were taken as malnourished.

Our study showed 73.2 (n=52) children were malnourished among the total 71 patients. While comparing the TST results with nutritional status of the patients, 65.4% (n=34) patient were TST positive among 52 malnourished patient while 78.9% (n=15) were TST positive among 19 normal nutritional status patient which is suggestive of that mantoux test is still a test of value even in malnourished children.

In Shrestha, et al., 20 (48.8%) patient had malnutrition and most of children with disseminated tuberculosis had grade III malnutrition [6]. Malnutrition was present in more than half of patients (52.3%) in study from Philippine [5] and patients with extra-pulmonary TB were more malnourished. Sixty two percent patients had grade 3, 4 malnutrition in Swaminathan, et al. [12].

Patients in the study were started on anti-tuberculosis treatment after classifying them as per RNTCP category. All the patients were started on category I AKT. Thirty four (48%) patients were started on Daily AKT and thirty seven (52%) were started on alternate day therapy under RNTCP. Out of total 34 patients who were receiving daily therapy 50% (n=17) patients were cured, 29.4% (n=10) patients who did not turned up for follow up, telephonic follow up was able to be obtained for 5 patients and as per the information they have completed the treatment for 6 months and got cured and other 5 patients couldn't be contacted, 8.8%(n=3) patients left against medical advice,5.9%(n=2) patient expired and 5.9% (n=2) abscond from hospital.

Among other 37 patients receiving intermittent based therapy under RNTCP 27.01% (n=10) patient lost to follow up, 60.0% (n=22) were cured, 2.7% (n=1) left against medical advice and 8.1% (n=3) patient didn't respond to treatment and considered as failure and referred to district TB centre for evaluation of resistance and further management.

Kumar L, et al. conducted a randomized controlled trial to compare intermittent vs daily short course chemotherapy for childhood tuberculosis and concluded that overall efficacy of both regimens were almost similar and greater than 95% in patients with good compliance [19].
Out of pulmonary tuberculosis Patients shows 75.0% (n=21) cured, 7.1% (n=2) failure to respond, 14.2% (n=4) lost to follow up and 3.6% (n=1) patient was abscond. Among the patients of CNS tuberculosis 41.1% (n=7) patients were cured, 5.8% (n=1) failure to respond, 17.66% (n=3) were expired, 11.8% (n=2) patient left against medical advice while 23.5% (n=4) patient were lost to follow up.

Among abdominal tuberculosis patient 45.4% (n=5) patient were cured and 36.4% (n=4) patient were lost to follow up while 18.2% (n=2) left against medical advice. 70% (n=7) patients of tubercular lymphadenitis were cured while 20% (n=2) lost to follow up and 10% (n=1) patient abscond from hospital.

In a study by Shrestha S, 24.4% failed to follow up, 2.4% expired, and remaining 73.2% improved but one 2.4% case came with relapse pulmonary tuberculosis after 3 months of completion of treatment [6].

Satyanarayana S, et al. had 95% of the patients reported to have been successfully treated, i.e., completed or cured. Other outcomes defaulted (2.6%), death (1.1%), failure (0.6%), transferred out (0.4%)] were noted in 4.3% of the patients [20]. A study done at Bhutan had 93% overall treatment success rate (cured and treatment completion) and the death and failure rates were <1% [10]. In Sharma S, et al. the overall success rate was 95.4% and 82.6% for new and retreatment cases, respectively. The rates for default, failure and death in the study were respectively 3%, 1.9% and 1% [21].

Conclusion

There was preponderance of males (60.56%) in study population. Most common form of TB was extra-pulmonary TB (60%) followed by pulmonary TB (39%). 32.4% and 38% patients were from age group of <6 years and>10 years respectively. Among 6 to 10 years, 29.6% patients were included in study. Non-specific symptom like fever (54.9%) was the commonest presenting symptoms. Most common presenting complaint among patients of pulmonary koch's were cough (82.1%), while altered sensorium (82.3%) was the most common presenting complaint among tubercular meningitis patients. Tuberculin test was positive in 69% and negative in 31% of all the patients. All the patients of pulmonary TB and military TB had positive chest x-ray while only 12.1% patients of extra-pulmonary tuberculosis had positive chest x-ray. 48% were treated with daily private AKT and 52% received AKT under DOTS; both groups had almost similar efficacy.

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