

# Profile of Pediatric Tuberculosis Patients in Jharkhand: A Descriptive Study

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**Abstract:** ***Introduction:** Tuberculosis is one of the important causes of childhood morbidity and mortality. It is estimated that around 10% of the 10.4 million global incident TB cases and 250, 000 of the 1.7 million TB deaths in 2016 was found among children (<15 years). **Objectives:** To assess the profile of different categories of Pediatric TB patients in Jharkhand for the year 2019 who are registered in the NIKSHAY web-based online portal. **Methodology:** Data was obtained from the NIKSHAY portal of State TB Cell, Jharkhand and analysed to enumerate all the relevant variables. **Results:** A total of 3225 pediatric TB patients were notified. Most of patients were boys (54.5%), most belonged to Drug sensitive category (99.4%) and Pulmonary TB (68.2%) being most common. Treatment success rate was 79.4%. **Discussion:** In our study, 22% patients were bacteriologically confirmed. The results were similar to study by Nicol et al. Extra pulmonary TB was present in 30 % cases, results were similar to study done by Wang et al. **Conclusion:** Special focus should be done to create awareness in community specially sensitization of teachers and students in schools regarding symptoms of TB, early diagnosis and benefits/schemes provided in the programme.*

**Keywords:** Pediatric TB, Nikshay, NTEP, EPTB

## 1. Introduction

Tuberculosis is one of the important causes of childhood morbidity and mortality. It is estimated that around 10% of the 10.4 million global incident TB cases and 250, 000 of the 1.7 million TB deaths in 2016 was found among children (<15 years). Globally, children accounted for only 6.9% of the new cases that were notified in 2016<sup>1</sup>. Under and delayed diagnoses of TB in children are few obstacles to effective management of childhood TB due to which cases often remain underreported<sup>2-3</sup>. In high TB burden settings, it is estimated that childhood TB culminates to 15–20% of all TB cases and is one of the leading causes of childhood mortality<sup>4</sup>. India, which is among the highest TB and DR-TB burden countries globally, notified 76, 745 childhood TB cases in 2016, accounting for only a meagre 5% of the total notified TB cases in the country<sup>5</sup>.

TB, one of the greatest infectious killer, is a major public health crisis across the world. India has more than one-fourth of new TB cases and around one-third of TB deaths globally<sup>6</sup>. Though, roughly a million children (aged <15 years) TB cases estimated globally each year (11% of global TB cases), but the risk of death is much higher in children (14% of global TB deaths)<sup>6</sup>. Early detection and quick treatment initiation as well as prevention of transmission from TB positive adult family members, since household source being most commonly implicated for young children, are crucial<sup>7-9</sup>.

The National TB Control Programme of India, Revised National TB Control Programme launched a web-based case-based TB notification portal-NIKSHAY in May 2012 to improve TB surveillance from an Epi-Info based aggregated quarterly reporting to a real time web based case

based notification system<sup>10</sup>. This system has given an opportunity to look into patient wise details for better understanding and analysing the profile of TB patients.

## 2. Literature Survey

The study was done with retrospective analysis of the profile of TB patients of pediatric age group in Jharkhand state. The data thus obtained was analysed and interpreted to portray the present scenario of TB profile of said age group.

## 3. Aim and Objectives

The aim of this study was to assess the profile of the different categories of Pediatric TB patients in Jharkhand for the year 2019 who are registered in the NIKSHAY web-based online portal. A comparison to outline the various statistical values for their analysis and evaluation so as to interpret the newer trends in TB care were the objectives of this study.

## 4. Methodology

Present study was a descriptive retrospective study. Data was obtained from the NIKSHAY portal of State TB Cell, Jharkhand. The secondary data of the Nikshay portal under NTEP was analysed to enumerate all the variables in the web-based portal. Data from the state of Jharkhand for the year 2019 i. e from January 1, 2019 to December 31, 2019 was obtained. The data of all the four quarters was obtained, evaluated and summed up to represent the annual statistics.

Notification for TB has been defined as reporting about information on diagnosis and/or treatment of TB cases to the nodal Public Health Authority (for this purpose) or officials

designated by them for this purpose. Every health-care provider and clinical establishments run or managed by the government (including local authorities), private, or NGO sectors and/or individual practitioners have to notify the cases of TB encountered<sup>11</sup>. This study was done after taking permission from State TB Training and Demonstration Centre (STDC) Director. The study was a review of reports obtained from the "Nikshay" database and did not involve patient interaction; therefore, individual patient consent was deemed unnecessary. Data was retrieved electronically in Microsoft-Excel and the analysis was done using SPSS Software. The data was expressed in frequency and proportions.

The data which is used, is from the year 2019 Nikshay web portal, is selected as this represents the pre-COVID data. Thus, the results and data were not affected by the COVID pandemic, which has resulted in lack of reporting the cases and difficulty in management of the disease.

## 5. Results

- 1) **Age:** A total of 3225 (5.6%) out of total 57504 patients were registered in the web-based Nikshay portal in the state of Jharkhand in 2019 as paediatric patients (Age less than 15 years).

**Table 1:** No. of Pediatric Vs Adult TB patients

	Frequency	Percent
Child (<15 years)	3225	5.6%
Adult (>15 years)	54279	94.4%
	57504	

- 2) **Pediatric:** TB patient distribution according to age group. Majority of Pediatric patients 46.9% belonged to 10-14 years age group, and rest belonging to 0-4 years (27.8%) and 5-9 years (25.1%) respectively.

**Table 2:** Pediatric patient distribution according to age

Age group	Frequency	Percent
0-4 years	898	27.8%
5-9 years	812	25.1%
10-14 years	1515	46.9%

- 3) **Gender:** Table 3 represents the gender distribution of the TB cases in Jharkhand:

Most of the pediatric TB patients were male (54.48%), followed by females (45.36%) and about 0.16% were transgenders.

**Table 3:** Gender based distribution of the TB patients in Jharkhand

Gender	Frequency	Percentage
Female	1463	45.36%
Male	1757	54.48%
Transgender	5	0.16%
Total	3225	

The ratio of male to female cases is 1.2

- 4) **Type of case according to Drug Sensitivity Pattern:** Table 2 represents the type of cases in TB in the state of Jharkhand, outlining the DSTB (Drug Sensitive TB) which is further categorized to new and retreatment

cases and DRTB (Drug Resistant cases) also known as PMDT (Programmatic management of drug resistant TB) cases. 99.41% cases were Drug sensitive and remaining 0.59% were Drug resistant.

In DSTB, the maximum cases seen were new cases (98.1%). Under the retreatment category, 0.43 % had recurrent TB, 0.09 % belonged to treatment after failure group and 0.06% fell in treatment after lost to follow up.

**Table 4:** Type of TB cases in Jharkhand state:

Type of case	Total	Subcategory	Cases	Percentage
DSTB	99.41% (3206)	New	3147	98.1%
		Retreatment: Treatment after lost to follow up	2	0.06%
		Retreatment: Treatment after failure	3	0.09%
		Retreatment: Recurrent	14	0.43%
		Retreatment: Others	40	1.24%
DRTB	0.59%	PMDT	19	
	100%	Total	3225	

- 5) **Microbiological diagnosis:** Table 3 represents the microbiological diagnosis in TB patients in Jharkhand. Only 21.95% of the patients were diagnosed microbiologically i. e by Sputum microscopy, rapid diagnostics tests like CBNAAT or culture.

**Table 5:** Microbiological diagnosis

Microbiological diagnosis	Percentage
No	2517 78.05%
Yes	708 21.95%
Total	3225

- 6) **Anatomical Site:** Table 6 represents the anatomical site of TB in the cases:

Table 6a) Most of the patients were found to have pulmonary disease (68.22%). Extra pulmonary disease was seen in 30.20% of the cases.

**Table 6 (a):** Anatomical Site of Disease

Site of disease	Frequency	Percentage	Microbiologically Confirmed (Percent)
Extra Pulmonary	974	30.20%	49 (5%)
Pulmonary	2200	68.22%	620 (28.2%)
(blank)	51	1.58%	39 (76.4%)
Total	3225		

Table 6b) shows Pulmonary and Extra pulmonary TB in Child Vs Adult. In children less than 15 years, 30.2 percent had extra pulmonary TB. In the same cohort of TB patients, in adults extra pulmonary TB was seen in only 10.7%.

**Table 6 (b):** Pulmonary and Extra pulmonary TB in Child Vs Adult

	Pulmonary	Extrapulmonary	Blank	Total
Child	2200 (68.2%)	974 (30.2%)	51 (1.6%)	3225
Adult	47476 (87.5%)	585 (10.7%)	998 (1.8%)	54279
Total	49676	6779	1049	57504

Table 6c) reveals Association of Extra pulmonary with age

In extrapulmonary TB, the odds of being a child under 15 years is 3.6 (95% CI 3.34-3.91) times higher than others. P value of this association was found to be highly significant. (p value 0.000)

**Table 6 (c): Association of Extra pulmonary with age**

	Extrapulmonary	Others (Pulmonary+Blank)
Child	974	2251
Adult	5805	48474
Odds Ratio	3.61	
P value	0.000	

**7. Distribution of Pulmonary and Extra Pulmonary Pediatric TB in various age groups.** In 5-9 years age group, the proportion on extrapulmonary out total TB was highest (37.19%) followed by 0-4 age group (33.51%) and 10-14 age group (24.48%)

**Table 7: Distribution of Pulmonary and Extra Pulmonary Pediatric TB in various age groups**

Age group	Pulmonary	Extrapulmonary	Blank	Total
0-4years	582 (64.81%)	301 (33.51%)	15	898
5-9 years	502 (61.82%)	302 (37.19%)	8	812
10-14 years	1116 (73.66%)	371 (24.48%)	28	1515
Total	2200	974	51	

**8. Site of extrapulmonary TB:** Table 8 represents the different sites that were seen in extrapulmonary disease in TB patients:

Most of the patients had abdominal Koch's (33.46%), followed by pleural disease and lymph node disease. Sites other than mentioned in the table, accounted for 19.68% cases.

**Table 8: Site of Extrapulmonary TB**

Extrapulmonary TB	Frequency	Percent	Bacteriologically confirmed (Percent)
Abdominal	339	34.80%	17 (5%)
Bone (Excluding Spine)	26	2.67%	2 (7.6%)
Genitourinary	8	0.82%	0 (0%)
Lymph Node	197	20.23%	17 (8.6%)
Miliary	10	1.03%	0 (0%)
Other	280	28.75%	10 (3.8%)
Pericardial	4	0.41%	0 (0%)
Pleural	64	6.26%	1 (1.5%)
Spinal	16	1.64%	0 (0%)
TBM	33	3.39%	2 (0.6%)
Total	974	100.00%	

**9. UDST (Universal Drug Susceptibility Testing):** Table 9a) represents UDST in TB patients in Jharkhand. Only 25.71% cases had UDST done

**Table 9 a): UDST**

UDST done	Frequency	Percentage
No	2396	74.29%
Yes	829	25.71%
Total	3225	100%

Table 9 b) represents UDST done in Bacteriologically positive Pulmonary and extrapulmonary Pediatric TB patients. UDST was done only in 215 out of total 1580 (i.e. 13.6%) Bacteriologically positive pulmonary TB patients.

only in 105 out of total 925 (i.e. 11.4%) Bacteriologically positive extra pulmonary TB patients.

Pulmonary TB			
	UDST not done	UDST done	Grand Total
Bacteriologically positive Pulmonary TB	1365	215	1580
Bacteriologically positive Extra Pulmonary TB	820	105	925

**10. Treatment outcome:** Table 7 represents treatment outcome. Around 68.12% of notified patients completed their treatment and 11.32% were assigned cure status at the end of treatment making Treatment Success Rate (= {Cured + treatment completed}/total cases notified)<sup>10</sup> as 79.44%. Around 14.6% of patients were not evaluated and 0.96% died.

**Table 10: Treatment Outcome**

Treatment outcome	Frequency	Percentage
Cured	365	11.32%
Died	31	0.96%
Duplicate Record	5	0.16%
Lost To Follow Up	121	3.75%
Not Evaluated	471	14.60%
Treatment Complete	2197	68.12%
Treatment Failure	10	0.31%
Treatment Regimen Changed	10	0.31%
Untraceable Incorrect Address	8	0.25%
Wrongly Diagnosed	1	0.03%
(blank)	6	0.19%
	3225	

## 6. Discussion

In our study Pediatric TB patients were 5.6% out of total TB patients registered on Nikshay Portal in 2019. Similar proportion was mentioned in a research on Childhood Tuberculosis by WHO<sup>12</sup>.

Our study reported majority of patients lying in 10-14 years age group. Similar findings were reported by Mazta et al<sup>13</sup>.

Number of males was higher than females in Pediatric TB patients, male to female ratio being 1.2. Similar findings were seen in study by Yagnavalkya et al<sup>14</sup>.

Only 0.59% patients had Drug resistant TB which is lower than studies done by Shah et al<sup>15</sup>. The lower percentage can be due to the lower UDST uptake.

In our study, 22% patients were bacteriologically confirmed. The results were similar to study by Nicol et al<sup>16</sup>. Extra pulmonary TB was present in 30% cases, results were similar to study done by Wang et al<sup>17</sup>. In children less than 15 years, 30.2 percent had extra pulmonary TB. In the same cohort of TB patients, in adults extra pulmonary TB was seen in only 10.7%. The findings were taken from a previous study of Narain et al<sup>18</sup>.

UDST uptake in Pediatric TB patients was only 25% which is very low as compared to the target. Causes could be

difficulty in obtaining the sample and deficient skilled workforce/facilities for testing.

In our study Treatment success rate in Pediatric TB patients was 79.4 percent which needs to be 100 percent. Similar findings were seen in study by Belay et al <sup>19</sup>.

## 7. Conclusion

Low notification rate of girl child as compared to boy counterpart, points to poor health seeking behaviour and gender-based neglect to girl child. Special focus should be done to create awareness in community specially schools regarding symptoms of TB, early diagnosis, facilities provided in the programme and the complications which can happen due to neglecting one's symptoms. Sensitization of school teacher and students may do wonders in creating awareness regarding Pediatric TB. Low UDST uptake which in turn may have resulted in low drug resistant TB detection is extremely detrimental to health of pediatric age group resulting in increased mortality and morbidity. Interventions like training of staff to take pediatric samples (gastric lavage), improving diagnostic facilities, contact tracing and proper TB preventive therapy to eligible household pediatric contacts of TB patients are some steps to address the current problem. A lot of data was not filled in Nikshay resulting in an inaccurate picture. We need to train our data entry operators and see to it that all are HR positions are filled. This should be in turn monitored by district and state level officers.

## 8. Future Scope

Some data variables were not filled (interpreted as blanks) by Data entry operator in Nikshay Portal which hampers the accuracy of findings. Fully filled and precise data will improve the accuracy of study. More studies may need to be conducted to understand the current scenario for better understanding.

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## Author Profile



**Dr. Smiti Narain** did her graduation (MBBS) from BPKIHS, Dharan, Nepal in 2008. Thereafter she passed all steps of USMLE and got ECFMG certified in 2010. She did her postgraduation (MD) in Community Medicine from Rohilkhand Medical College Hospital, Bareilly, Uttar Pradesh in 2016. She worked as a Senior Medical Officer in a US based Telemedicine firm, First Opinion from 2016 to 2018. She has also done Post Graduate Diploma in Maternal and Child Health (PGDMCH) from IGNOU and Fellowship in Aesthetic Medicine from ILAMED. She has been working as Medical Officer in State TB Cell, Jharkhand since 2020.