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Research Article

CHARACTERISTICS AND PROGRAM-DEFINED TREATMENT OUTCOMES AMONG PEDIATRIC TUBERCULOSIS (TB) PATIENTS REGISTERED UNDER RNTCP IN A CITY OF GUJARAT

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ABSTRACT

Background: Childhood TB is a marker for on-going transmission of infection within a community and infected children represent the pool from which a large proportion of future cases of adult TB will arise.
Objective: Our aim was to describe the patients' characteristics, clinic-epidemiological profile, and treatment outcome of childhood tuberculosis (TB).
Methods: A retrospective, descriptive study of 331children aged 0 to 15 years registered under RNTCP from January 2013 to December 2013 in a city of Gujarat was undertaken.
Results: Out of total registered pediatric TB patients 60.4% were girls & 39.6 % were boys. More than 50% of girls were diagnosed after the age of 10 years compared to the boys among whom more than 50% were diagnosed before the age of 10 years. There was more number of girls having past history of incomplete TB treatment in comparison to boys. Out of total registered pediatric TB patients, 59.7% were registered as sputum smear positive pulmonary cases & maximum cases of it registered in the age group of 11 to 15 years and least in 0 to 5 years of age group.
Conclusions: 21.5 % children were declared cured, 74.3 % children declared treatment completed, 2.1 % children declared default while 1 child (0.3%) was declared failure during the treatment. Lymph node was the major site of involvement in extra pulmonary TB. More numbers of Girls, having past history of TB treatment compared to boys.

INTRODUCTION

Tuberculosis is still a global health problem, particularly in high-burden areas, namely Africa, South East Asia, Eastern Mediterranean regions and Western Pacific, with respective incidences of 280, 183, 121, and 87 cases per 100,000 population per year (Gulec, Telhan, Koçkaya, & Erdem, 2012; World Health Organization, 2014). The youngest children carry the biggest burden for three main reasons: Firstly, they are more prone to develop severe extra pulmonary TB disease (such as meningitis and miliary TB); Secondly, they tend to develop severe pulmonary disease with bronchial obstruction; and thirdly, young children are more likely to develop disease after being infected. The risk of developing disease after infection with *Mycobacterium tuberculosis* has been estimated to be 5 - 10% in adults, 15% in adolescents, 24% in children 1 - 5 years old and 43% in infants < 1 year old (Baghaie, Khalilzade, Boloursaz, Khodayari, & Velayati, 2009; Rie *et al*., 1999).

Though the Stop TB Strategy launched by WHO in 2006 which includes case-finding in high-risk groups such as children and prevention of TB in children who is contact of other TB cases, pediatric TB was included first time in global TB report of WHO after almost six years of launching the Stop Strategy. It's necessary to develop robust data on childhood TB to help in addressing the burden of TB (defined as those aged <15 years) & for monitoring process (World Health Organization, 2006, 2012).

The contribution of children to the total tuberculosis(TB) case load is poorly documented, especially in countries with a high burden of disease and it is mostly reported from low-burden countries (B. Marais & Schaaf, 2006; Moyo *et al*., 2010). In India, yearly report of Revised National Tuberculosis Control Program (RNTCP) provides information about the percentage of children (0 - 14 years) among all new TB cases and gender of only sputum smear positive cases. It does not provide

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information of childhood TB in different age groups (like 0-4, 5-9 and 10-14 years), sex and type of cases (Thakur, 2013).

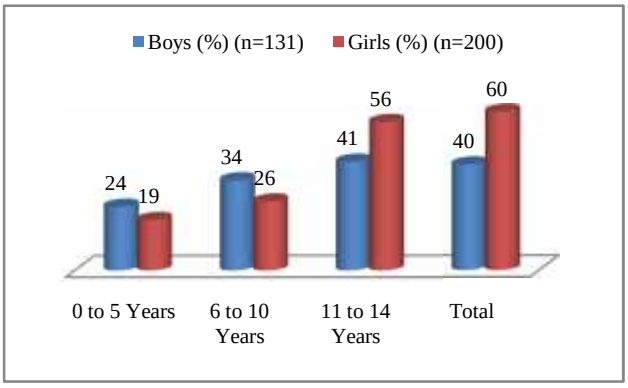
MATERIAL AND METHODOLOGY

This is the record based observational study. A Predesigned and pretested proforma was used for taking information from records. The Proforma comprised of following information: Primary information regarding the treatment outcomes of patients were collected as well other information regarding the TU number, age, sex, religion, place of residence, weight, details of diagnosis, treatment category, missed doses & type of patient were also collected. Information of the patient was taken directly from the TB treatment card with due care, so not to miss any information while collecting information. We took necessary care while collecting the records from all the TUs so not a single record missed from us.

The data of all pediatric TB patients registered under RNTCP in year 2013 was collected from their respective TUs. The information was entered in Microsoft excel sheet & analysed. Owing to ethical consideration, permission was obtained from the Institutional Ethical Committee of the Government Medical College, Surat before commencing the study. We collected total 331 records of pediatric Tuberculosis patients from all the TU's registered under RNTCP from January 2013 to December 2013. After collecting records, we made an electronic data base and gave unique numbers to this data which was used to analyse the outcome of participants.

Observation

Present study found that the mean age of registered pediatric TB patients was 9.43 ± 4.04 years (median age = 11 years) with the range from 11 months to 14 years. It also observed that out of total registered pediatric TB patients 60.4% were girls & 39.6 % were boys. The study noted that there were 39% pulmonary type TB cases, 60.4% as extra-pulmonary TB while remaining 0.6% were both type pulmonary & extra pulmonary.



Graph 1 Relationship between gender & age groups

Chi square= 10.58, df=2, P=0.005

In above table one can see that the more than 50% of girls were diagnosed after the age of 10 years compared to the boys among whom more than 50% were diagnosed before the age of 10 years. We also found this difference between the age group and gender statistically significant. (Graph: 1)

Table 1 Distribution of pediatric Tuberculosis patients according to various types & category (n=331)

Variables	Number of family	Percentage (%)
Type of registration		
New	295	89.1%
Treatment after defaulter	2	0.6%
Retreatment	1	0.3%
Relapse	5	1.5%
Other	28	8.5%
Treatment category		
Category I	296	89.4%
Category II	34	10.3%
MDR	1	0.3%
Total	**331**	**100%**

Above table shows that out of total 331 registered cases 89.1% of cases registered as new followed by 8.5%, 1.5%, 0.6% & 0.3% registered as others, relapse, treatment after defaulter & retreatment cases. (Table:1)

Table 2 Association between age of child& type of TB (n=329)*

Age group	Pulmonary (%)	Extra pulmonary (%)	Total (%)
0 to 5 years	29 (42%)	40 (58%)	69 (21%)
6 to 10 years	20 (21.1%)	75 (78.9%)	95 (29.9%)
11 to 15 years	80 (48.5%)	85 (51.5%)	165 (50.1%)
Total	129 (39.2%)	200 (60.8%)	329
Mean age (years) ± SD	9.98 ± 4.04	9.07 ± 4.03	
	t value = 1.997 , P <0.05		

*Two patients were excluded as they were having mix type of TB

The mean age of pulmonary cases were 9.98 ± 4.04 while the mean age of extra pulmonary cases were 9.07 ± 4.03, t-test was statistically significant between the mean age of pulmonary and mean age of extra pulmonary cases. (Table: 2) Above table shows that in extra-pulmonary type of tuberculosis, Lymph nodes (41.6%) were the major site of involvement. We found that around 55.9% of girls were having extra-pulmonary type of TB while 44.1% of boys had suffered from extra pulmonary TB.

Above table shows that maximum number 85 (42.5%) of extra-pulmonary cases registered in the age group of 11 to 15 years followed by 75 (37.5%) cases registered in 6 to 10 years of age group and least number of extra-pulmonary cases registered under 0 to 5 years of age group out of total registered extra pulmonary TB cases. In above table, 12.4% of participants confessed that their children took anti-TB treatment in past from private or Government setup. Out of these 12.4% of children who had past history of TB majority of them were girls'.

Above table shows that around 59.7% of pediatric TB patients were registered as sputum smear positive cases out of total registered pulmonary cases (excluding extra-pulmonary cases). We found maximum numbers of pulmonary cases (62%) were registered in the age group of 11 to 15 years, followed by 22.5% & 15.5% in 0 to 5 years & 6 to 10 years of age group respectively.

Table 3 Age wise distribution of extra-pulmonary cases (n=200)

Site of involvement	Age group									Total (%)
	0 to 5 years			6 to 10 years			11 to 15 years			
	M	F	T (%)	M	F	T (%)	M	F	T (%)	
Lymph nodes	5	9	14 (16.7)	14	16	30 (30.7)	12	28	40 (47.6)	84(41.6)
Abdomen	2	2	4 (14.8)	7	7	14(51.9)	3	6	9(33.3)	27(14.4)
Pleura	2	2	4 (14.3)	9	3	12 (42.9)	7	5	12 (42.3)	28(13.9)
Meninges	4	3	7 (43.8)	2	4	6 (37.8)	2	1	3 (18.8)	16(7.9)
Bones	0	1	1 (5.9)	2	2	4 (23.5)	5	7	12 (70.6)	17(8.4)
Other	1	0	1 (11.1)	2	3	5 (55.6)	2	1	3 (33.3)	9(4.5)
Not written	4	5	9 (47.4)	1	3	4 (21.1)	2	6	6 (31.6)	19(9.4)
Total	40 (20%)			75 (37.5%)			85 (42.5%)			200

Table 4 Association between past history of TB and gender

Past history of TB	Boys (%)	Girls (%)	Total
Yes	11 (26.8%)	30 (73.2%)	41 (12.4%)
No	120 (41.4%)	170 (58.6%)	290 (87.6%)
Total	131 (39.6%)	200 (60.4%)	331

Chi square=3.18, df=1, P=0.03728

Table 5 Age wise distribution of pulmonary cases (According to sputum microscopy)

Pulmonary TB	Age group									Total (%)
	0 to 5 years			6 to 10 years			11 to 15 years			
	M	F	T (%)	M	F	T (%)	M	F	T (%)	
Positive	2	3	5 (6.5)	4	6	10(13)	17	45	62(80.5)	77(59.7)
Negative	14	10	24(46.2)	3	7	10 (19.2)	4	14	18(34.6)	52(40.3)
Total	29 (22.5)			20 (15.5)			80 (62)			129

Table 6 Distribution of study participants according to treatment outcome

Treatment Outcome	No. of Participants	Percentage (%)
Treatment Completed	247	74.6%
Cure	71	21.5%
Default	7	2.1%
Failure	1	0.3%
Transferred out	5	1.5%
Total	331	100%

Above table shows that 74.6% children completed their treatment & 21.5% declared as cured followed by 2.1% defaulter, 1.5% patients transferred out & were 0.3% failure.

DISCUSSION

The Study findings shows that mean age of patients were 9.43 ± 4.04 years (median 11 years, range 11 months -14 years), age wise distribution of childhood tuberculosis cases as 21% cases in 0-4 years of age group (< 5 years) while 29 % and 50% in 5-9 years and 10-14 years of age groups respectively with increase in age there was increase in number of cases. More number reported in above 10 year age group that shows increase in infection in older children as they have more chances to come in contact with active case of TB present in community. In early age diagnostic difficulty was also one of the reason because of which cases were not able to be diagnosed. Similar kind of results have been reported by other author (B. J. Marais *et al*., 2004; Panigatti, Ratageri, Shivanand, Madhu, & Shepur, 2014; Puwar, Patel, & Puwar, 2012; Satyanarayana *et al*., 2010; Sharma *et al*., 2008; Thakur, 2013).

In India, from an average of 2 per cent in the "under 5 age group", the infection index has climbed to about 20 per cent at age 15 years (Park, 2015) (Park K, 2015).

In present study mean age of extra-pulmonary and pulmonary tuberculosis cases were 9.07 years and 9.98 years respectively and this mean difference found between age of extra-pulmonary TB and pulmonary TB cases was statistically significant (*t* value=1.998, P=0.046). This could be due to more exposure of school going children to adults with tubercular disease living in the community (Table 2). Ruchi *et al* (2010) had reported similar kind of results (Thakur, 2013). In present study, 39.58 % childhood tuberculosis cases were found in male children and 60.4% in female children with statistically significant difference (Graph1). Indian textbooks report tuberculosis more prevalent in males than in females (Park, 2013) (Park K, 2015). Although that is true for adult TB but not completely as in childhood TB scenario is different that is reported by this study as well other study done by Ruchi *et al* (2010), Sharma *et al* (2007) & Satyanarayana *et al* (2010) (Satyanarayana *et al*., 2010; Sharma *et al*., 2008; Thakur, 2013).

In the present study, 44 % extra-pulmonary cases were found in males and 67.4 % pulmonary cases were found in females. We found this difference statistically significant between gender and type of childhood tuberculosis (P<0.05). It shows that the girls were having more number in pulmonary as well extra pulmonary cases & that exemplify that girls were coming only after their symptoms become prominent or severe in the form of pulmonary TB or extra pulmonary TB. In present study among extra-pulmonary tuberculosis, lymph nodes were the major site of involvement (41.6%), followed by abdomen (14.4%), pleura (13.9%), bone (8.4%), meninges (7.9%) & other (4.5%). Other study done by Puwar *et al*, Satyanarayan *et al* (2010), Jose Manuel Ramos *et al* (2010) & Maltezou *et al* also found similar kind of findings (Maltezou, Spyridis, & Kafetzis, 2000; Puwar *et al*., 2012; Ramos, Reyes, & Tesfamariam, 2010; Satyanarayana *et al*., 2010).

Present study also revealed meninges' involvement more common in 0 to 5 years of age group, abdominal TB more common in 6 to 10 years of age group & in 11 to 15 years of age group, bone TB was more common in registered pediatric TB patients under RNTCP. In this study, out of total registered pulmonary cases, sputum smear positive cases (80.5%) were more common in the age group of 11 to less than 15 years while sputum smear negative cases were maximum (46.2%) in 0 to 5 years of age group. This is because the younger children were not able to cough out & other diagnostic difficulty forms a bar. Present study found that around 12% of the participants having past history of TB and among this more than 70% of girls having the past history of TB and this difference between past history of TB and gender is statistically significant (Table 4). That clearly illustrates that girls' parents were more

reluctant to complete the treatment in comparison to boys' parents. In present study 21.5 % children were declared as cured, 74.3 % children as treatment completed, 2.1 % children as default while 1 child (0.3%) was declared as failure during the treatment (Table 6). These results are comparable with the results got by Puwar *et al*, Ruchi *et al* (2015) & Satyanarayana *et al* (2010) in their study (Puwar *et al*., 2012; Satyanarayana *et al*., 2010; Thakur, 2013). Present study revealed that the treatment completion rate among new cases was 96 % (284/296) and in retreatment cases it was 97.1 % (34/35). Sharma *et al*, in their study, found that the cure rate was 92.4% for new and 92% for retreatment cases, that study also noted rates for default, failure & death as 3%, 1.9% &1% respectively (Sharma *et al*., 2008).

CONCLUSION

Out of total registered pediatric TB patient in RNTCP, 95.8% were either declared cured or treatment completed. That shows RNTCP doing well and achieving the national targets. In the present study, it was noted that maximum numbers of cases were recorded, in 11 to 14 years of age group. We also found more number of girls registered in 11 to 14 years of age group while proportions of boys were more in 0 to 10 years of age group. More number of girls having past history TB treatment as compare to boys. More number of pulmonary cases presents in older children as compare to younger children. In the present study lymph node was found to be the major site of involvement in extra pulmonary TB.

Recommendation

Awareness creation about the cause and possible signs & symptoms' of pediatric TB and how the patient can get it cured from it if he/she takes regular treatment and complete the course of treatment. This is the way we can prevent defaulter. There is need to give more motivation to the parents of girl child for continuation of treatment. As more girl child having past history of TB Government can give special incentive to register as well on completing the treatment of girl child.

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References

Baghaie, N., Khalilzade, S., Boloursaz, M. R., Khodayari, A. A., & Velayati, A. A. (2009). Extra Pulmonary Tuberculosis in Children : Two Years Study. *Acta Medica Iranica*, *48*(7), 239-243.

Gulec, S. G., Telhan, L., Koçkaya, T., & Erdem, E. (2012). Description of Pediatric Tuberculosis Evaluated in a Referral Center in Istanbul Turkey. *Yonsei Med J*, *53*(6), 1176-1182.

Maltezou, H. C., Spyridis, P., & Kafetzis, D. A. (2000). Extra-pulmonary tuberculosis in children. *Arch Dis Child*, *83*, 342-346.

Marais, B. J., Gie, R. P., Schaaf, H. S., Hesseling, a. C., Obihara, C. C., Starke, J. J., … Beyers, N. (2004). The natural history of childhood intra-thoracic tuberculosis: A critical review of literature from the pre-chemotherapy era. *International Journal of Tuberculosis and Lung Disease*, *8*(4), 392-402.

Marais, B., & Schaaf, H. S. (2006). The burden of childhood tuberculosis and the accuracy of community-based surveillance data of community-based surveillance data, (MARCH).

Moyo, S., Verver, S., Mahomed, H., Hawkridge, A., Kibel, M., Hatherill, M., … Hussey, G. (2010). Age-related tuberculosis incidence and severity in children under 5 years of age in Cape Town, South Africa. *Int J Tuberc Lung Dis*, *14*(September 2009), 149-154.

Panigatti, P., Ratageri, V. H., Shivanand, I., Madhu, P. K., & Shepur, T. a. (2014). Profile and outcome of childhood tuberculosis treated with DOTS--an observational study. *Indian Journal of Pediatrics*, *81*(1), 9-14. doi:10.1007 /s 12098-013-1175-8

Park K. (2015). *Preventive & Social Medicine* (23rd ed.). jabalpur: M/s Bhanarsidas Bhanot.

Puwar, B., Patel, V., & Puwar, T. (2012). A Record Based Study on Paediatric Tuberculosis In Ahmedabad City , India. *National Journal of Community Medicine*, *3*(1), 3-6.

Ramos, J. M., Reyes, F., & Tesfamariam, A. (2010). Childhood and adult tuberculosis in a rural hospital in Southeast Ethiopia : a ten-year retrospective study. *BMC Public Health*, 4-11.

Rie, A. Van, Beyers, N., Gie, R. P., Kunneke, M., Zietsman, L., & Donald, P. R. (1999). Childhood tuberculosis in an urban population in South Africa : burden and risk factor. *Arch Dis Child*, *80*, 433-37.

Satyanarayana, S., Shivashankar, R., Vashist, R. P., Chauhan, L. S., Chadha, S. S., Dewan, P. K., … Harries, A. D. (2010). Characteristics and programme-defined treatment outcomes among childhood tuberculosis (TB) patients under the national TB programme in Delhi. *PloS One*, *5*(10), e13338. doi:10.1371/ journal. pone. 0013338

Sharma, S., Sarin, R., Khalid, U. K., Singla, N., Sharma, P. P., & Behera, D. (2008). The DOTS strategy for treatment of Paediatric Pulmonary TB in south Delhi , India . 2007 The DOTS strategy for treatment of paediatric. *Int J Tuberc Lung Dis*, (October 2015).

Thakur, H. P. (2013). Characteristics of Childhood Tuberculosis Patients Registered under RNTCP in Varanasi , Uttar Pradesh. *Indian Journal of Public Health*, *57*(1), 2-5. doi:10.4103/0019-557X.111367

World Health Organization. (2006). *The Stop TB Strategy*. Geneva. doi:10.2165/00128413-200615310-00002

World Health Organization. (2012). *Global tuberculosis report*. Geneva. doi:978 92 4 156450 2

World Health Organization. (2014). *Global Tuberculosis Report*. Geneva. Retrieved from http://apps.who.int/iris/bitstream/10665/137094/1/9789241564809_eng.pdf

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