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Original Article

Comparison between Childhood and Adult Tuberculosis in Kollam District Tuberculosis Centre: A Retrospective Study

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Abstract

Introduction: Prevalence of childhood TB has been reported to be between 3% and 25 % in different countries. It remains under reported in developing countries like India due to diagnostic difficulties, poor reporting and recording system. *Objectives:* (1) To compare the differences between adult and pediatric TB in terms of disease type, category and outcome of treatment. (2) To determine whether childhood TB was an important predictor of adverse outcome following treatment under the Revised National TB Control Programme (RNTCP). *Methods:* Study design: Retrospective record based study. *Study Area:* This record based study was done at District Tuberculosis center in Kollam. *Sample Size:* All the TB cases from 2012 January to December 2012 of all age groups, which were registered in the district TB Centre, were selected. There were total 605 patients registered. *Results:* Out of total 605 tuberculosis patients, 549(90.7%) were adults and 56(9.3 %) were pediatric. In adult age group 394 (71.8 %) were males and 155 (28.2%) females. Among the pediatric age group, 35(62.5%) were males and 21(37.5%) were females. Pediatric age group had 53 (94.65%) cases under pulmonary disease type and 3 (5.4%) were extra pulmonary. Similarly in adults 476 (86.7%) were pulmonary and 77 (14.1%) extra pulmonary tuberculosis. This difference was statistically significant (P 0.043). All pediatric age groups were treated under category 1, while among the adults 476 (86.7%) were treated under category 1. *Conclusion:* There were differences in the clinical presentation of TB among children and adults. In case of treatment outcomes, pediatrics age group had better outcome than adults.

Keywords: Childhood; Pulmonary; Tuberculosis.

Introduction

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis and remains a leading public health problem worldwide. The global incidence of TB is rising. Majority of TB is contributed by developing countries like India. Disseminated disease in children and pulmonary disease in adult constitute two major epidemiological and clinical forms of TB.

In India, every day, more than 5,000 people develop tuberculosis and nearly 1,000 people die, resulting in 2 deaths every 3 minutes from TB, but these can be prevented with proper care and treatment. TB patients can be cured and the battle against TB can be won [1].

Prevalence of childhood TB has been reported to be between 3% and 25 % in different countries. It remains under reported in developing countries like India due to diagnostic difficulties and poor reporting and recording system. Most cases of tuberculosis in children are sputum smear negative and they are considered to be minor contributors to the transmission of disease [1].

In the absence of clear-cut guidelines the diagnosis of childhood TB during the initial years of RNTCP in India was difficult. Management was physician specific and un-standardized. Pediatric medicine, where either proprietary or doses had to be reconstituted from adult medicines supplied under program [2].

The present study was done to compare the differences in clinical presentation, treatment outcome of new smear positive cases between childhood and adult TB and to determine if childhood TB was an important predictor of adverse outcome following ATT treatment under RNTCP.

Methodology

Study Design: The present study is a retrospective record based study.

Study Area: This record based study was done at District Tuberculosis center in Kollam.

Sample Size: All the TB cases from 2012 January to December 2012 of all age groups, which were registered in the district TB Centre, were selected. There were total 605 patients registered.

Selection Criteria

We selected all the TB cases from 2012 January to December 2012 with all age groups which were registered. There were total of 605 patients registered.

The diagnosis of pulmonary TB in children and adults was done according to the RNTCP guidelines. Categorization and treatment were in accordance with the RNTCP guidelines and under direct observation of the field level workers of the government healthcare system.

In this present study, a child was defined as being 14 years or less in age as specified by the RNTCP definition. Cure, treatment completed, default, death, failure, and transferred out were alsodefined in accordance to the RNTCP guidelines [3].

Data on age, sex, diseases type, disease classification, category of treatment, human immunodeficiency virus (HIV) status, as recorded in the TB register of the Tuberculosis centre between January 2012 and December 2012, were collected for analysis.

Further data was entered in excel sheet and analyzed using SPSS software.

Results

On analyzing the research outcome, we found that among the total 605 tuberculosis patients 549 (90.7%) were adults and 56 (9.3 %) were pediatric. In the adult age group 394 (71.8 %) were males and 155 (28.2 %) were females. Among the pediatric age group, 35 (62.5%) were males and 21 (37.5%) were females (Table 1).

Regarding the disease type, pediatric age group had 53 (94.65%) cases under pulmonary disease type and 3 (5.4%) were extra pulmonary. Similarly in adult age group 476 (86.7%) were under pulmonary and 77 (14.1%) had extra pulmonary tuberculosis. This difference was statistically significant as p value is 0.043 (Table 1).

The study of relationship between age and category of treatment revealed that 100% of pediatric age group were treated under category 1, while among the adult age group 476(86.7%) were treated under category 1 and 73 (13.3%) were treated under category II. More adults were categorized under category II than children and the difference was found to be statistically significant as the p value is 0.001 (Table 1).

The results between the age group and treatment outcome, found that all 56 (100.0%) of the pediatric age group had overall favorable outcome (cured and treatment completed) that is 1(1.8%) were cured and 55 (98.2%) were treatment completed. None of them were default, failure or death, while among the adult age group, out of 471 (85.8%) favorable outcome, 276 (50.4%) were cured and 195 (35.6%) were treatment completed. Overall adverse outcome when taken together was seen in 78 (14.2%) out of this 27 (4.9%) were default, 22 (4.0%) failure, 27 (4.9%) were dead and 2 (0.2)% were transferred out.

The relationship between age and disease classification showed that among adults, 342 (62.3%) were sputum smear positive and 207 (37.7%) were sputum smear negative Tuberculosis. Similarly in pediatric age group, 2 (3.5%) were sputum smear positive and 54 (96.5%) were sputum smear negative. Among the 549 adult cases, 7(1.3%) were HIV positive and 542 (98.7%) were HIV negative & among the 56 (100.0%) pediatric cases, all were HIV negative (Table1).

The association between disease type in pediatric and adult TB was statistically significant (p=0.043). The association between disease type and outcome shown that 471(87.8%) of the pulmonary type had favorable outcome while 64 (12.5%) had adverse outcome. And among the extra pulmonary, 66 (82.5%) had favorable outcome and 14 (17.5%) had adverse outcome. This difference statistically, significant with p value 0.128 (Table 2, Graph 1).

Discussion

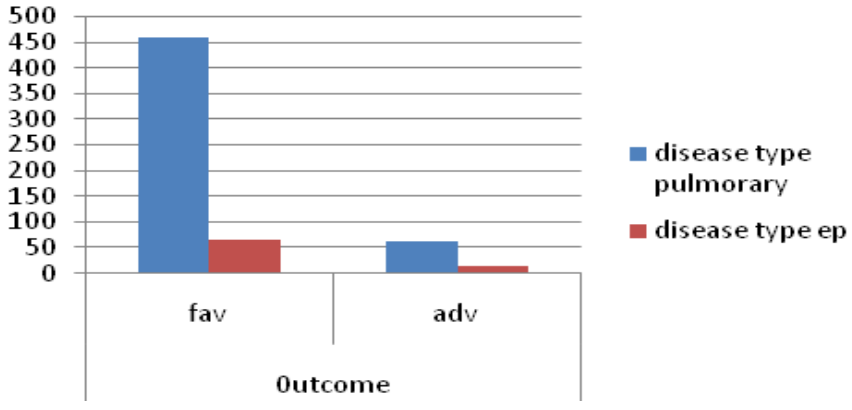
The proportion of childhood cases in the present study was 9.3% of the total registered cases of TB; while the national average was 7% for 2011 [4]. It was higher than that found in other studies from India [5] and other countries in the region [6], the total number of childhood TB cases registered under

Table 1: Comparison between adults and pediatric Tuberculosis

	Pediatric		Adult		total	%
Age	**No**	**%**	**No**	**%**		
Male	35	62.5	394	71.8	429	70.9
Female	21	37.5	155	28.2	177	29.1
Disease type						
Pulmonary	53	94.6	472	85.9	525	86.8
Extra pulmonary	3	5.4	77	14.1	80	13.2
Category						
I	56	100	476	86.7	532	87.9
II	0	0	73	13.3	73	12.1
Disease classification						
Smear positive	2	3.5	342	62.3	344	56.8
Smear negative	54	96.5	207	37.7	261	43.1
HIV status						
Positive	0	0	7	1.3	7	1.2
Negative	56	100	542	98.7	598	98.8
Favorable outcome	56	100	471	85.8	527	87.1
Cured	1	1.8	276	50.4	277	45.8
Treatment completed	55	98.2	195	35.6	250	41.3
Adverse outcome	0	0	78	14.2	78	12.9
Default	0	0	27	4.9	27	4.5
Failure	0	0	22	4.0	22	3.6
Died	0	0	27	4.9	27	4.5
Transferred out	0	0	2	0.2	2	0.3
Total	56	9.3	549	90.7	605	100

Table 2: Relationship between disease type and outcome of treatment

Disease type	Outcome		Total	P value
	Favorable	Adverse		
Pulmonary	461 (87.8%)	64 (12.2%)	525	0.128
Extrapulmonary	66 (82.5%)	14 (17.5%)	80	
Total	527	78	605	



Graph 1: Relationship between disease type and outcome of treatment

the RNTCP is a reflection of the program related low notification of cases.

The guidelines for diagnosis of childhood TB established by the RNTCP in conjunction with the IAP are more useful for the diagnosis of TB in children capable of providing sputum for microscopy. But younger children can rarely expectorate sputum, making diagnosis difficult [7]. In addition, many children are diagnosed and treated outside the government health care settings and are not registered under the RNTCP.

Differences in childhood and adult tuberculosis- The higher notification of males in both the groups reflects either a differential access to healthcare or biological reasons [8] causing a reduced incidence of TB in females. Gender based differences in the notification pattern under the RNTCP have been seen in other studies. The proportion of male patients among childhood TB cases in the present study, were much higher than reported in other studies on childhood TB from India [9].

In the present study, 89.1 % TB cases were 'new', that is, never treated or treated for less than 1 month with anti-tubercular drugs before registration. In their study on childhood TB cases from Delhi, found that 93.1% of childhood TB cases were new, with the remainder being retreatment TB cases. Ninety percent of childhood TB cases from a record based study in Ahmadabad [10] were new cases. They reported a significantly higher number of relapses in adult TB cases compared to cases from the childhood patients from a rural hospital in Ethiopia [11].

TB and HIV-The prevalence of HIV co-infection among patients with TB in the present study (1.1%) is much lower than that found in studies on outpatient and inpatients TB cases at the All India Institute of Medical Sciences (AIIMS) or those reported form sub-Saharan Africa [12, 13]. This low prevalence of HIV confection in patients with TB probably reflects the low level (0.31%) of HIV prevalence in the state of Kerala.

Outcome on treatment under the RNTCP, success rates of TB treatment have been seen to be similar among childhood and adult cases of TB [14]. The finding of the present study reveal that childhood TB was significantly related to favorable treatment outcome.

The present study is one of the very few studies that report data on the community-wide profile and treatment outcome of TB patients aged less than 15 years registered and treated under routine program conditions in India. The program defined treatment completion rate was >95%, which is reassuringly similar to treatment outcomes reported by other hospital-based studies [15 - 17]. This suggests that the treatment strategy adopted by RNTCP in treating children with TB disease has been effective. In this respect, the study findings however identify certain priority areas that need to be addressed by the National and State health authorities.

The program defined treatment completion rates were similar among those treated with doses that were less than or in accordance the WHO recommendations. The anti-TB drug dosages and the regimens were formulated by RNTCP in consultation with the Indian Academy of Pediatricians, based on the treatment guidelines recommended by WHO in 2003 [9, 2]. However, WHO subsequently increased the dosages per kilogram recommended for children in its later revision of the treatment guidelines [18].

The total no of pediatric cases as such is very less compared to the number of adult cases. This may be because TB in children is difficult to diagnose due to the lack of specialized pediatric departments and the non-availability of chest X-ray, aspiration cytology and culture facilities for diagnosis. Children attending these centers remain undiagnosed. Younger children can rarely expectorate sputum making the diagnosis difficult. In addition many children are diagnosed and treated outside the government healthcare settings and are not registered under RNTCP. Also antituberculous drugs, based on weight bands, supplied under the RNTCP, do not have provisions for children with bodyweight less than 6 kg. These children are prescribed proprietary medicines even after being diagnosed by the physician at the government health facilities.

Conclusions

As measured by program defined treatment outcomes, childhood TB patients in Kollam District Tuberculosis Centre, across all groups notified under the RNTCP, which follows WHO TB, treatment guideline definitions, have high treatment completion rates. The demographic and clinical profile of registered childhood TB patients shows that they are mostly aged 1-5 years and with program defined non-serious forms of TB. The registration of childhood TB under the RNTCP was low. There were differences in the clinical presentation of TB among children and adults. In case of treatment outcomes, pediatric age group had better outcome, signifying the effectiveness of the RNTCP regimens in the treatment of childhood TB. Childhood TB was not a significant predictor of adverse treatment outcome either independently or after adjusting for other factors.

Recommendations

Further studies are needed:

i. To assess the reasons for the low proportion of childhood TB case notifications, identify and implement strategies to reach out to the cases missed by the program.

ii. To assess the accuracy of diagnosis and treatment clinical response in various demographic and clinical subgroups.

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References

1. Timesofindia.indiatimes.com › City- Dec 3, 2009.
2. Lung India, Comparison between adult and pediatric Tuberculosis in a rural unit of West Bengal: A retrospective study, 2014; 31(2).
3. *www.tbcindia.nic.in/rntcp.html.*
4. Central TB Division. Tuberculosis India 2012. Annual Report of the Revised National Tuberculosis Control Programme, Directorate of General Health Services, Ministry of Health and Family Welfare, Government of India; 2012.
5. Arora VK, Agarwal SP. Paediatric tuberculosis: An experience from LRS institute of tuberculosis and respiratory diseases. Available from: http://tbcindia.nic.in/pdfs/Tubercu-losis%20Control%20in%20India12.pdf [Last accessed on 2015 Jan 11].
6. Dendup T, Dorji T, Edginton ME, Kumar AM, Wangchuk D, Dophu U, *et al.* Childhood tuberculosis in Bhutan: Profile and treatment outcomes. Public Health Action, 2013; 3: 11-14.
7. Kant L. Childhood tuberculosis: Increasing but neglected. Ind J Tub, 2001; 48: 1-3.
8. Mukherjee A, Saha I, Sarkar A, Chowdhury R. Gender differences in notification rates, clinical forms and treatment outcome of tuberculosis patients under the RNTCP. Lung India, 2012; 29: 120-2.
9. Kakrani VA, Pratinidhi AK. A study of childhood tuberculosis. Ind J Tub, 1992; 39: 177.
10. Puwar B, Patel V, Puwar T. A record based study on pediatric tuberculosis in Ahmedabad city, India. Nat J Com Med, 2012; 3: 153-6.
11. Ramos JM, Reyes F, Tesfamariam A. Childhood and adult tuberculosis in a rural hospital in Southeast Ethiopia: A ten-year retrospective study. BMC Public Health, 2010; 10: 215.
12. Kassu A, Mengistu G, Ayele B, Diro E, Mekonnen F, Ketema D, *et al.* HIV and intestinal parasites in adult TB patients in a teaching hospital in Northwest Ethiopia. Trop Doct. 2007; 37: 222-4.
13. Piramanayagam P, Tahir M, Sharma SK, Smith-rohrberg D, Biswas A, Vajpayee M. Persistently high HIV seroprevalence among adult tuberculosis patients at a tertiary care centre in Delhi. Indian J Med Res. 2007; 125: 163-7.
14. Sharma S, Sarin R, Khalid UK, Singla N, Sharma PP, Behera D. Clinical profile and treatment outcome of tuberculous lymphadenitis in children using DOTS strategy. Indian J Tuberc. 2010; 57: 4.
15. Sharma S, Sarin R, Khalid UK, Singla N, Sharma PP, et al. The DOTS strategy for treatment of paediatric pulmonary tuberculosis in South Delhi, India. Int J Tuberc Lung Dis. 2008; 12: 74-80.
16. Indumathi CK, Prasanna KK, Dinakar C, Shet A, Lewin S. Intermittent short course therapy for pediatric tuberculosis. Indian Pediatr.2010; 47: 93-96. pii: S097475590900078-2.
17. Kabra SK, Lodha R, Seth V. Category based treatment of tuberculosis in children. Indian Pediatr. 2004; 41: 927-937.
18. World Health Organization. Guidance for National Tuberculosis Programs on the Management of Tuberculosis in Children. Geneva: WHO; 2006.