

Assessment of Clinical Profile of Children with Pulmonary Tuberculosis: An Observational Study

Manju M Tripathi¹, Pankaj Tripathi^{2*}

¹Associate Professor, Department of Paediatrics, Saraswati Medical College, Unnao, Uttar Pradesh, India.

^{2*}Professor, Department of Pathology, Saraswati Medical College, Unnao, Uttar Pradesh, India.

ABSTRACT

Background: Many clinicians regard tuberculosis as an adult pulmonary disease, but tuberculosis (TB) is a major cause of disease, both pulmonary and extrapulmonary, and death in young children from TB-endemic countries, especially in areas affected by poverty, social disruption, and human immunodeficiency virus (HIV) infection.

Materials and Methods: This retrospective study included 70 children less than 17 years of age. All the demographic details of the patients were recorded from the hospital records. A thorough clinical record of patient and contact history and physical examination, TST, CXR, sputum smear microscopy and culture were noted. Cases with positive bacteriology (smear, culture or both) were considered TB. The patient sample was divided into 3 groups based on age: less than 8 years, 8-12 years, 13-17 years. Entire data was recorded in the Microsoft excel sheets. SPSS software was used for statistical analysis.

Results: 38.57% of patients were less than 8 years of age. 41.42% of patients belonged to age group of 8-12 years whereas 20% of the patients were above 13 years and less than 17 years. Out of 70 patients 41 were females (58.57%)

and the rest 29 were males (41.42%). It was observed in this study that cough was the most common presenting symptom amongst the patients (75.71%). Fever, fatigue and weight loss was present in 70%, 62.85% and 55.71% cases respectively.

Conclusion: Children are highly vulnerable to tuberculosis, and there are particularities specific to pediatric patients. Cough, fever, fatigue and weight loss are the most presenting signs of pulmonary tuberculosis in children.


Keywords: Pediatrics, Tuberculosis, Sputum, Pulmonary.

*Correspondence to:

Dr. Pankaj Tripathi,
Professor, Department of Pathology,
Saraswati Medical College, Unnao, Uttar Pradesh, India.

Article History:

Received: 04-12-2019, Revised: 22-12-2019, Accepted: 18-01-2020

Access this article online	
Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2020.6.1.052	

INTRODUCTION

Tuberculosis (TB) in children is a neglected aspect of the TB epidemic despite it constituting 20% or more of all TB cases in many countries with high TB incidence. Childhood TB is a direct consequence of adult TB but remains overshadowed by adult TB because it is usually smear-negative. Infants and young children are more likely to develop life-threatening forms of TB than older children and adults due to their immature immune systems.¹ Diagnosis of pulmonary tuberculosis in children can be challenging due to nonspecific symptoms, signs, and radiological changes and the difficulty of making a definitive microbiologic diagnosis.² Microbiologic confirmation of disease is limited by the paucibacillary nature of TB in children; in general, TB cultures and newer rapid molecular tests are positive in the minority of children, generally <25–40% of children with TB disease.^{3,4}

Age and immune status are important risk factors for progression to TB disease among children. Young children aged <2 years are at a higher risk of disease progression and disseminated disease, primarily due to immature innate and adaptive immune

responses.⁵⁻⁷ There are severe limitations in any symptom-based approach to TB diagnosis among very young or human immunodeficiency virus (HIV) infected children.⁶ Hence this study was undertaken to assess the clinical profile of children with pulmonary tuberculosis.

MATERIALS AND METHODS

This study was undertaken to assess the clinical profile of children with pulmonary tuberculosis. A total of 70 patients were included in this study.

This retrospective study included children less than 17 years of age who were admitted in the pulmonary ward of the medical hospital and had a discharge diagnosis of pulmonary tuberculosis (TB). All the demographic details of the patients were recorded from the hospital records. A thorough clinical record of patient and contact history and physical examination, TST, CXR, sputum smear microscopy and culture were noted. Cases with positive bacteriology (smear, culture or both) were considered TB.

The patient sample was divided into 3 groups based on age:

- Less than 8 years
- 8 to 12 years
- 13 to 17 years

Entire data was recorded in the Microsoft excel sheets. SPSS software was used for statistical analysis. Chi square test and student T test were used to compare the variables. P-value of less than 0.05 was considered significant.

Table 1: Demographic details

Parameter		Number of patients	Percentage
Age group (years)	Less than 8	27	38.57%
	8 to 12	29	41.42%
	13 to 17	14	20%
Gender	Males	29	41.42
	Females	41	58.57

Table 2: Profile of clinical signs and symptoms of patients

Clinical profile	Number of patients	Percentage
Edema	5	7.1%
Diarrheal	6	8.5%
Headache	12	17.14%
Nausea/vomiting	20	28.57%
Dyspnea	28	40%
Chest pain	7	10%
Hemoptysis	13	18.57%
Night sweats	18	25.71%
Cough	53	75.71%
Pallor	27	38.57%
Weight loss	41	58.57%
Anorexia	39	55.71%
Fatigue	44	62.85%
Fever	49	70%

Table 3: Correlation between clinical signs and age groups

Clinical profile	Age group (years)			p- value
	Less than 8	8 to 12	13 to 17	
Edema	2	2	1	.084
Diarrheal	3	1	2	
Headache	5	4	3	
Nausea/vomiting	9	6	5	
Dyspnea	14	8	6	
Chest pain	1	2	4	
hemoptysis	3	4	6	
Night sweats	6	4	8	
cough	22	12	19	
Pallor	9	11	7	
Weight loss	16	10	15	
Anorexia	12	14	13	
Fatigue	13	16	15	
Fever	19	13	17	

Table 4: Correlation between clinical signs and gender

Clinical profile	Gender		p- value
	Males	Females	
Edema	2	3	.62
Diarrheal	3	3	
Headache	5	7	
Nausea/vomiting	9	11	
Dyspnea	15	13	
Chest pain	1	1	
Hemoptysis	6	7	
Night sweats	7	11	
Cough	24	29	
Pallor	13	14	
Weight loss	19	22	
Anorexia	21	18	
Fatigue	23	21	
Fever	23	26	

RESULTS

In the current study, 38.57% of patients were less than 8 years of age. 41.42% of patients belonged to age group of 8-12 years whereas 20% of the patients were above 13 years and less than 17 years. Out of 70 patients 41 were females (58.57%) and the rest 29 were males (41.42%).

It was observed in this study that cough was the most common presenting symptom amongst the patients (75.71%). Fever, fatigue and weight loss was present in 70%, 62.85% and 55.71% cases respectively. The frequency of occurrence of other signs and symptoms was elaborated in table 2.

Age wise variation of signs and symptoms was illustrated in table 3. No significant variation between the clinical profile was seen in the different age groups with P-value of .084 (table 3). Similarly, no significant difference was observed in the presentation of the clinical signs and symptoms in relation to the gender of the patient with a P-value of 0.62 (table 4).

DISCUSSION

Tuberculosis (TB) is an important public health problem in both developing and developed countries. Childhood TB is also an important epidemiological indicator in terms of forming the future TB pool. The diagnosis of TB is difficult in children due to the lack of a standard clinical and radiological description.⁸ Globally, tuberculosis (TB) continues to exact an unacceptably high toll of disease and death among children, particularly in the wake of the HIV epidemic.⁵

Despite achieving great public health strides to control tuberculosis (TB), it remains an enormous public health issue worldwide. Accurate statistics on pediatric TB cases are difficult to obtain for a multitude of reasons, including under-recognition, challenges in confirming the diagnosis, and under-reporting to national TB programs. The clinical and radiographic manifestations are less specific in children compared to adults, and are often confused with bacterial pneumonia.⁹

In the current study, 38.57% of patients were less than 8 years of age. 41.42% of patients belonged to age group of 8-12 years whereas 20% of the patients were above 13 years and less than

17 years. Out of 70 patients 41 were females (58.57%) and the rest 29 were males (41.42%). H Del Castillo-Barrientos et al described clinical presentation across age groups in 2855 children with pulmonary tuberculosis (TB) attending the Children's Hospital, Lima, Peru, to improve the diagnosis, treatment and care of childhood TB. Of the 2855 enrollees, 47% were malnourished and 56% had a household contact. Older children presented with classic TB symptoms, while weight loss and anorexia were rare in children aged <5 years. Microbiological or pathologic confirmation was obtained in 71% of children aged 10-14 years compared with 34% of children aged <2 years; however, severe extra-pulmonary TB was most common among children aged <2 years (41%). Classic TB symptoms should be considered when making a diagnosis; however, systematic symptoms among young children are also important. In high-burden settings, clinicians should have a low threshold to diagnose and treat children for TB across all ages, even in the context of a negative tuberculin skin test result and lack of micro-pathological confirmation.¹⁰

In the present study, no significant variation between the clinical profile was seen in the different age groups with P-value of .084 (table 3). Heather J. Zar et al performed a retrospective analysis of consecutive children hospitalized with suspected pulmonary tuberculosis in Cape Town, South Africa. Children were categorized as definite tuberculosis (culture positive), probable tuberculosis (chest radiograph consistent), possible tuberculosis (chest radiograph inconsistent), or not tuberculosis (improved without tuberculosis treatment). Four hundred sixty-four children (median age, 25.1 months [interquartile range, 13.5–61.5 months]) were included; 96 (20.7%) were HIV infected. Of these, 165 (35.6%) were definite tuberculosis, and 299 (64.4%) were not tuberculosis. If strict NIH symptom criteria were applied, 100 (21.6%) were unclassifiable including 21 (21.0%) with definite pulmonary tuberculosis, as they did not meet the NIH criteria due to short duration of symptoms; 71 (71%) had cough <14 days, 48 (48%) had recent weight loss, and 39 (39%) had fever <7 days. Of 364 classifiable children, there was moderate agreement ($\kappa = 0.48$) with 100% agreement for definite tuberculosis and moderate agreement for not tuberculosis (220 [60.4%] vs 89 [24.5%]).¹¹

In the present study, no significant difference was observed in the presentation of the clinical signs and symptoms in relation to the gender of the patient with a P-value of .62 (table 4). J G Vallejo et al described the epidemiology, clinical, and radiographic manifestations, and response to therapy in infants < 1 year of age with tuberculous disease. Of the 47 infants identified, 51% were female. The median age at diagnosis was 8 months (range 3.5 to 12 months). Diagnosis resulted from the examination of an ill infant in 79% of cases, a case contact investigation of an adult suspected of having tuberculosis in 19%, and routine tuberculin skin testing in 2%. An adult with infectious tuberculosis who had contact with the infant was identified in 68% of cases. Intrathoracic disease alone was present in 70% of cases. Fourteen (30%) infants had extrapulmonary tuberculosis (11 central nervous system disease, 2 disseminated disease, and 1 cervical adenitis). Gastric aspirate cultures yielded *Mycobacterium tuberculosis* from 75% of the infants with isolated intrathoracic disease. Most infants with tuberculosis are symptomatic at the time of diagnosis, and bacteriologic confirmation was obtained in 70% of cases. A contact investigation of the household should be initiated immediately when an infant is suspected of having tuberculosis because valuable information needed to establish the diagnosis and guide therapy in the infant may be obtained.¹²

CONCLUSION

From the above study the author concluded that Children are highly vulnerable to tuberculosis, and there are particularities specific to pediatric patients. It was inferred that cough, fever, fatigue and weight loss are the most presenting signs of pulmonary tuberculosis in children. Further studies are recommended.

REFERENCES

1. Esposito S, Tagliabue C, Bosis S. Tuberculosis in children. *Mediterr J Hematol Infect Dis*. 2013;5(1):e2013064. Published 2013 Nov 4. doi:10.4084/MJHID.2013.064
2. Zar HJ, Connell TG, Nicol M. Diagnosis of pulmonary tuberculosis in children: new advances. *Expert Rev Anti Infect Ther* 2010; 8:277–88.
3. Starke JR. Pediatric tuberculosis: time for a new approach. *Tuberculosis (Edinb)* 2003;83(1– 3):208–12.
4. World Health Organization. Automated real-time nucleic acid amplification technology for rapid and simultaneous detection of tuberculosis and rifampicin resistance: Xpert MTB/RIF assay for the diagnosis of pulmonary and extrapulmonary TB in adults and children. Policy update. Geneva: WHO; 2013.

5. Newton SM, Brent AJ, Anderson S, Whittaker E, Kampmann B. Paediatric tuberculosis. *Lancet Infect Dis*. 2008;8(8):498-510. doi:10.1016/S1473-3099(08)70182-8
6. Marais B J, Gie R P, Hesselning A C, et al. A refined symptom based approach to diagnose pulmonary tuberculosis in children. *Pediatrics* 2006; 118: e1350–1359.
7. Lewinsohn D A, Gennaro ML, Scholvinck L, Lewinsohn DM. Tuberculosis immunology in children: diagnostic and therapeutic challenges and opportunities. *Int J Tuberc Lung Dis* 2004; 8: 658–74.
8. Aygun D, Akcakaya N, Cokugras H, Camcioglu Y. Evaluation of Clinical and Laboratory Characteristics of Children with Pulmonary and Extrapulmonary Tuberculosis. *Medicina (Kaunas)*. 2019;55(8):428. doi:10.3390/medicina55080428
9. Thomas TA. Tuberculosis in Children. *Pediatr Clin North Am*. 2017;64(4):893-909. doi:10.1016/j.pcl.2017.03.010
10. Del Castillo-Barrientos H, Centeno-Luque G, Untiveros-Tello A, et al. Clinical presentation of children with pulmonary tuberculosis: 25 years of experience in Lima, Peru. *Int J Tuberc Lung Dis*. 2014;18(9):1066-1073. doi:10.5588/ijtld.13.0458
11. Zar HJ, Workman LJ, Little F, Nicol MP. Diagnosis of Pulmonary Tuberculosis in Children: Assessment of the 2012 National Institutes of Health Expert Consensus Criteria. *Clin Infect Dis*. 2015;61Suppl 3(Suppl 3):S173-S178. doi:10.1093/cid/civ622
12. Vallejo JG, Ong LT, Starke JR. Clinical features, diagnosis, and treatment of tuberculosis in infants. *Pediatrics*. 1994; 94 (1): 1-7.

Source of Support: Nil.

Conflict of Interest: None Declared.

Copyright: © the author(s) and publisher. IJMRP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882.

This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Manju M Tripathi, Pankaj Tripathi. Assessment of Clinical Profile of Children with Pulmonary Tuberculosis: An Observational Study. *Int J Med Res Prof*. 2020 Jan; 6(1): 217-20. DOI:10.21276/ijmrp.2020.6.1.052