

## Prevalence and Clinico- Laboratory Profile of Tuberculosis In Children in Nobel Medical College, Biratnagar

Sah VK<sup>1</sup>, Giri A<sup>2</sup>, Niraula N<sup>3</sup>

### ABSTRACT

**Introduction:** Tuberculosis infection is very common, and it continues to be the major public health problem in Nepal. Published data about the epidemiology of TB in children is scarce in Nepal, though it is considered one of the most common causes of childhood morbidity in the country. **Aims and objectives:** To calculate the prevalence of tuberculosis in children aged 0-15 years and to study their clinico-laboratory profile. **Methodology:** This is a hospital based study conducted in Nobel Medical College Teaching Hospital, Biratnagar over a period of one year. We analyzed 289 children aged 0-15 years suspected of having tuberculosis on clinical grounds and subjected to further screening tests. **Results:** Majority of the children were males and most of the children were 5-15 years of age. 15 of the cases were diagnosed as tuberculosis out of which one case was bacteriologically confirmed pulmonary tuberculosis and be 5.2%. Fever and cough were the most common clinical presentations and mantoux test and chest X-ray were most suggestive in majority of the cases. **Conclusions:** This study supports the use of history and thorough clinical examination and high index of clinical suspicion for diagnosis of childhood tuberculosis.

*Keywords: Children, Chest X-ray, Mantoux, Tuberculosis*

### INTRODUCTION

World Health Organization defines tuberculosis (TB) as an infectious bacterial disease caused by Mycobacterium tuberculosis (M. tuberculosis). Patients with lung tuberculosis from whose sputum M. tuberculosis bacilli are isolated are the main source of the infection. M. tuberculosis, which was discovered in 1882 by Robert Koch, is anaerobic, facultative intracellular slow-growing acidophilic bacillus, naturally pathogenic only in humans. In children, TB usually develops as a result of close family contact with smear-positive TB patient.[1] Global incidence of tuberculosis (TB) is approximately 9.6 million cases. Of these, more than one third are in Asian countries: India, Indonesia, Myanmar, Thailand, Bangladesh, Pakistan, Sri Lanka, and Korea. Extra-pulmonary TB (EPTB) accounts for approximately 17% of all TB cases.[2] Childhood and adolescent tuberculosis (TB) continues to be a growing concern and problem in countries with a medium or high prevalence of TB. Worldwide in 2017, the incidence of

childhood TB was approximately 1 million with 230,000 deaths. To achieve the World Health Organization (WHO) End TB Strategy, systematic screening of contacts including children will be important.[3]

Therefore, more epidemiological evidence is needed on the risk of infection and disease especially among populations at high risk, such as children, in order to guide future policy development for screening and preventive therapy.

### METHODOLOGY:

This is a hospital based study conducted in Nobel Medical College Teaching Hospital and Research Centre located in Khanchanbari, Biratnagar, Nepal from 1st May 2017 to 30th April 2018. After ethical clearance from the institutional review committee, data was collected from 289 children admitted to the department of pediatrics by means of interview with the parents, clinical examination and laboratory report tracing and entered into a Performa.

A total of 289 children aged 0-15 years suspected of having tuberculosis were subjected to tuberculosis screening tests i.e. mantoux test, chest x-ray, sputum/gastric aspirate for AFB and Xpert MTB/RIF. Suspicion of tuberculosis was made solely on clinical grounds. Patient presenting with the following features were suspected of having tuberculosis and were included in the study:-

- ☞ Cough persisting for more than 2 weeks
- ☞ Unexplained weight loss (>1.5 kg in 1 month)
- ☞ All cases with severe or moderate acute malnutrition

- 
1. Dr. Vijay Kumar Sah
  2. Dr. Arun Giri
  3. Dr. Niraj Niraula

### Address for correspondence:

Dr. Vijay Kumar Sah  
Assistant professor, Department of Pediatrics  
Nobel Medical College Teaching Hospital  
Biratnagar, Nepal  
Mob.9842465218  
E-mail ID: drvks18@gmail.com

A detailed relevant history of patient was recorded and thorough physical examination was done. Informed consent (verbal as well as written) was taken from the patients or parents.

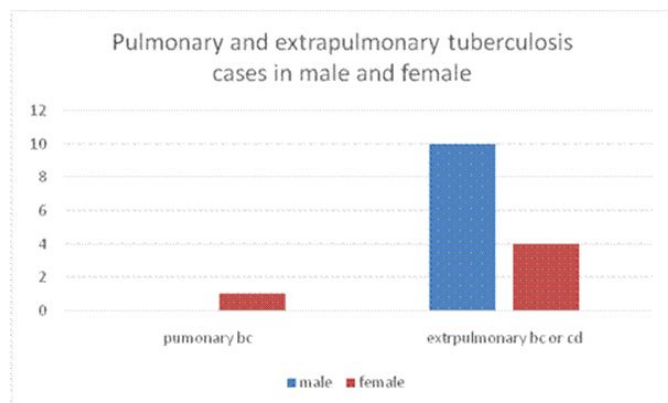
**RESULTS**

A total of 289 patients of age between 0-15 years arriving in the outpatient or emergency department of NMCTH and suspected as a case of tuberculosis during a period of one year were included in the study. The age of the patients ranged from 0- 15years with a mean of  $9.62 \pm 1.72$  years. Most of the patients belonged to 5-15 years of age (58.85%). Majority of the patients were male (58.12%). Among the total suspected cases, 15 cases were diagnosed as tuberculosis either clinically or following bacteriological confirmation.

Age Group (months)	SEX				Total	Percent (%)
	Male	Percent (%)	Female	Percent (%)		
0-4	62	21.45%	57	19.7%	119	41.15%
5-15	106	36.67%	64	22.14%	170	58.85%
<b>Total</b>	<b>168</b>	<b>58.12%</b>	<b>121</b>	<b>41.84%</b>	<b>289</b>	<b>100%</b>

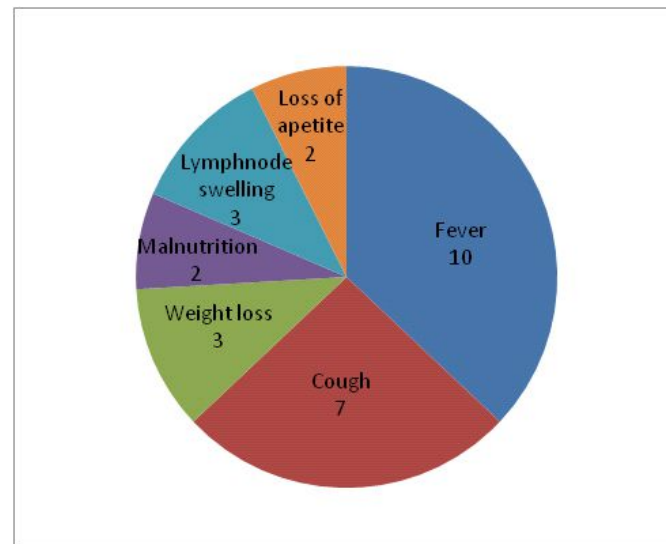
**Table I:** Age and sex distribution of suspected tuberculosis cases

Of the total 15 diagnosed cases of tuberculosis which were diagnosed either clinically based on risk history and radiography or bacteriologically by sputum microscopy or gene X-pert; there was one female case with bacteriologically confirmed (bc) pulmonary tuberculosis whereas there was no male case with bacteriologically confirmed pulmonary tuberculosis. Similarly there were 4 female extrapulmonary tuberculosis and 10 male extrapulmonary tuberculosis cases which were clinically diagnosed (cd).



**Figure 1:** Sex distribution of diagnosed cases of tuberculosis

Total tuberculosis prevalence =  $15/289 * 100 = 5.2\%$   
 Total tuberculosis prevalence in male =  $10/168 * 100 = 5.95\%$   
 Total tuberculosis prevalence in female =  $5/121 * 100 = 4.1\%$



\* Each patient may have more than one symptom

**Figure 2:** Common clinical presentations among diagnosed cases of tuberculosis

Fever and cough were the most common symptoms present in clinically diagnosed or bacteriologically confirmed cases of tuberculosis, fever being present in 66% (n=10) cases and cough was present in 46.6% (n=7) cases. Weight loss and lymph node swelling were present in 20% (n=3) cases, followed by malnutrition and loss of appetite in 13.3% (n=2) cases.

S.N.	Investigations	Number of positive cases
1.	Mantoux test	10 (66.66%)
2.	Chest X-ray	12 (80%)
3.	Gastric lavage or sputum for AFB	1 (6.6%)

\* Each patient may have more than one positive investigation

**Table II:** Laboratory findings among diagnosed cases of tuberculosis

Upon the review of investigations done, pulmonary radiographic changes were noted in 80% of clinically diagnosed or bacteriologically confirmed cases of tuberculosis and mantoux test was positive among 66.66% of cases whereas sputum microscopy was positive in only 6.6% of clinically diagnosed cases of tuberculosis.

**DISCUSSION**

About a quarter of the global population, including nearly 70

million children and adolescents <15 years of age, is infected with *Mycobacterium tuberculosis*. Many infected individuals are able to contain *M. tuberculosis* without the organism ever causing pathology.[4]

In a study done by Gyawali N et al, prevalence of tuberculosis among household contacts was found to be 1.6% and Shrestha S et al found prevalence of tuberculosis to be 1.5% which was lower than our study.[5, 6] In contrast to these studies, extrapulmonary tuberculosis was found to be more common than pulmonary tuberculosis in our study.

Regarding the clinical presentation, Sreeramareddy CT et al and Shrestha S et al found fever (43.2%), cough (25.9%) and lymph node swelling (15.1%) to be the common presentations of a patient with tuberculosis which was similar to our findings.[6, 7]

In our study, commonest laboratory finding was radiological changes in chest radiographs (80%), followed by tuberculin skin test positivity (66.66%) but sputum microscopy was positive only in 6.6% of the cases which is similar to the study findings of Sreeramareddy et al.[7]

## CONCLUSION

The prevalence of tuberculosis was higher in older children and adolescents with male predominance. Fever, cough and weight loss were the commonest clinical manifestations in children presenting with tuberculosis. Sputum microscopy was positive only in very few (6.6%) cases hence; this study supports the use of history and thorough clinical examination and high index of clinical suspicion for diagnosis of childhood tuberculosis.

## REFERENCES

1. Boskovska K, Naceva-Fustic S, Simonovska L, Dilberovska M, Dacevski D, Popova G, et al. Comparison of IFN- $\gamma$  Levels in Children with Tuberculosis Disease (TB) and Latent Tuberculosis Infection (LTBI). Open Access Macedonian Journal of Medical Sciences. 2018;6(11):2091-6;doi: 10.3889/oamjms.2018.467
2. Agarwal A, Singh S, Agarwal S, Gupta S. Needle Aspiration and Cytology for Suspected Osteoarticular Tuberculosis in Children. Malaysian Orthopaedic Journal. 2018;12(3):31-7; doi: 10.5704/moj.1811.007
3. Pan D, Lin M, Lan R, Graviss EA, Lin D, Liang D, et al. Tuberculosis Transmission in Households and Classrooms of Adolescent Cases Compared to the Community in China. International journal of environmental research and public health. 2018;15(12);doi: 10.3390/ijerph15122803
4. Seddon JA, Chiang SS, Esmail H, Coussens AK. The Wonder Years: What Can Primary School Children Teach Us About Immunity to Mycobacterium tuberculosis? Frontiers in immunology. 2018;9:2946; doi: 10.3389/fimmu.2018.02946
5. Gyawali N, Gurung R, Poudyal N, Amatya R, Niraula SR, Jha P, et al. Prevalence of tuberculosis in household contacts of sputum smears positive cases and associated demographic risk factors. Nepal Medical College journal : NMCJ. 2012;14(4):303-7.
6. Shrestha S, Bichha RP, Sharma A, Upadhyay S, Rijal P. Clinical profile of tuberculosis in children. Nepal Medical College journal : NMCJ. 2011;13(2):119-22.
7. Sreeramareddy CT, Ramakrishnareddy N, Shah RK, Baniya R, Swain PK. Clinico-epidemiological profile and diagnostic procedures of pediatric tuberculosis in a tertiary care hospital of western Nepal-a case-series analysis. BMC pediatrics. 2010;10:57;doi: 10.1186/1471-2431-10-57