

# Childhood tuberculosis at Laayoune, Morocco: Report of 16 cases

Rkia EDDABRA

Higher Institute of Nurses Professions and Health Techniques of Laayoune, Ministry of Health, Avenue Colonel  
Major Habbouha Oued Laâbid, Madinat Al Wahda I - Laayoune, Morocco  
eddabra@gmail.com

**Abstract—** The aim of this work was to describe the epidemiology of TB among children under 15 years, at Laayoune, from January 2017 to May 2018. Retrospective analysis of risk factors and clinical presentation for disease among children was conducted. 16 children had tuberculosis. They were 9 girls and 7 boys. The main age was 8.4 years (4 months-15 years). 4 patients had definite familial history of TBC contact. Pulmonary tuberculosis occurred in 8, and 8 patients had extra-pulmonary tuberculosis. The most common sites of extrapulmonary involvement were the lymph nodes. Our study highlighted the gap in knowledge surrounding childhood tuberculosis in Morocco, thus, further studies are needed to clarify the epidemiology, etiology, antimicrobial susceptibility patterns.

**Keywords—**tuberculosis; children; Morocco; epidemiological profile; pulmonary; extra-pulmonary

## I. INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis* (MTB) bacteria, which is spread through the air in droplets when a person with active TB disease in their lungs coughs or sneeze [1]. TB usually affects the lungs (pulmonary TB), but can also affect other parts of the body such as the brain, the kidneys, or the spine sites (extrapulmonary TB) [2].

Children are considered a vulnerable population, the attention being given to the challenges of tuberculosis (TB) in this young population has increasingly recognized within the global public health [3]. Tuberculosis is a leading cause of morbidity and mortality worldwide, especially in developing countries, in 2018, 1.1 million children fell ill with TB globally, and there were 205 000 child deaths due to TB (including among children with HIV) [4]. In Morocco, there were an estimated 30 977 TB cases (Number of new and relapse TB patients), of which 7% were children aged 0-14 years [5].

This study was performed at Diagnosis of Tuberculosis and Respiratory Diseases Reference

Center of Laayoune from January 2017 to May 2018, to describe epidemiological profile among tuberculosis children.

## II. METHODS

### A. Study setting and data collection

This retrospective study based on medical records of patients  $\leq 15$  year registered at Diagnosis of Tuberculosis and Respiratory Diseases Reference Center from January 2017 to May 2018. For each patient, demographic information and clinical characteristics were recorded. Clinical characteristics included were, co-morbid conditions (diabetes mellitus....etc), past history of treatment for TB, history of known contact with a case of TB.

### B. Statistical Analyses

Data was entered and analyzed using the statistical software (IBM, SPSS Statistics for Windows, version 25.0. Armonk, NY: IBM Corp.). Data was presented as rates and proportions. Statistical significance of difference in proportions was tested using Chi Square Test and a  $p$ -value less than 0.05 was considered as significant.

## III. RESULTS

A total of 238 tuberculosis patients was registered at Diagnosis of Tuberculosis and Respiratory Diseases Reference Center (DTRDRC) during the study period. 16 were included in the analysis (patients  $\leq 15$  years).

The overall male to female ratio of TB cases was 0.77. The mean age of the patients was 8.4 years, and the age range was 4 months to 15 years.

Pulmonary tuberculosis (PTB) constitutes 50% of all cases of tuberculosis. There was no difference in clinical characteristics of tuberculosis. Extrapulmonary tuberculosis (EPTB) was more common in females (62.5%) than in males (table 1). The most common sites of extrapulmonary involvement were the lymph nodes (intrathoracic (4 case), Cervical (2cases) and extrathoracic (1case)), followed by the pleura (1case).

25% patients had a household TB contact who are aged <5 years, and their mother is under TB treatment. 1 patient is under immunosuppressive therapy. HIV status was known for only 2 patients. Most of the cases (93.75%) were newly diagnosed; and 5 children (3 females and two males) have been hospitalized.

#### IV. DISCUSSION

Childhood tuberculosis accounts for about 10% of estimated TB cases in the world. Despite advances in diagnostics, childhood TB remains a challenge, due to the difficulty in obtaining appropriate clinical specimens especially in children younger than 8 years and the scarcity of bacilli in specimens [6]. In low burden countries the “gold standard” for diagnosis of childhood tuberculosis is usually based on: known contact with an infectious source case; a positive tuberculin skin test (TST) and characteristic radiographic abnormalities [7].

In this study, among the 238 total cases of TB reported at DTRDRC, children were 16 (6.72%), it is to be mentioned that globally, the WHO estimated the prevalence of childhood TB is around 10% of total cases [4]. Our finding is lower than the reported global burden of TB in children. The majority of participants in the present study were females (56.25%) but the difference was not significant. The highest cases of TB in current study were observed among the children aged between 11-15 years (50%), and this is in agreement with a previous studies [8], followed by the children aged between 1-5 years (37.5%).

There are many factors that increase the risk of TB infection in children. Among these factors: contacts with an adult with tuberculosis (TB). It has been demonstrated by Marquez et al., 2020 [9] that children whose mothers had a positive TST had a higher odds of TB infection, highlighting the importance of family-based TB screening and integration of TB prevention and screening into maternal and child health services, which is line with our findings, that 24% of children in household contacts of adult TB patients also had TB. 1 patient is under immunosuppressive therapy, and it has been reported that an increased risk of TB infection was associated with biological therapies, including TNF- $\alpha$  [10].

In our study, we identified PTB in 50% of the cases and 50% were EPTB. This percentage is less than that reported in Turkey, 62% for pulmonary and 39% for both extrapulmonary and pulmonary TB [11], these variations may be attributed to disease prevalence as well as the availability of methods of early diagnosis and early notification [12].

Small sample size is one limitation of this study; however, this was the total number of cases notified at the Diagnosis of Tuberculosis and Respiratory Diseases Reference Center during study period, thus we recommend further studies and investigation with bigger sample size to explore the whole picture (risk

factors, clinical presentation, outcomes of treatment...) in childhood tuberculosis in Morocco.

TABLE I. : CHARACTERISTICS OF REGISTERED TB CHILDREN ACCORDING TO TB TYPE

	PTB n(%)	EPTB n(%)	P-value
Age group			
1-5	3 (37.5)	3(37.5)	0.287
6-10	0 (0)	2 (25)	
11-15	5 (62.5)	3 (37.5)	
Gender			
Male	4 (50)	3 (37.5)	0.614
Female	4 (50)	5(62.5)	
HIV sero-status			
Negative	2 (25)	0(0)	0.131
Unknown	6 (75)	8 (100)	
History of exposure to an individual with TB			
Yes	3 (37.5)	1 (12.5)	0.248
No	5 (62.5)	7 (87.5)	
Previous TB infection			
New patient	7 (87.5)	1(12.5)	0.302
Re-treatment	8 (100)	0(0)	
Patient Type			
Outpatients	5 (62.5)	6 (75)	0.590
Inpatients	3(37.5)	2 (25)	
Anti-TNF	1 (100)	0 (0)	

#### ACKNOWLEDGMENT

The authors acknowledge the assistance of the undergraduate student: Nkhili Ayman, during the data collection, as well as the unconditional help of staff members at Diagnosis of Tuberculosis and Respiratory Diseases Reference Center Laayoune, who gave their inputs and contributed in the making and completion of this work

#### REFERENCES

[1] E.A. Nardell, Transmission and Institutional Infection Control of Tuberculosis. Cold Spring Harb Perspect Med, 2015. 6(2): p. a018192

[2] R. Eddabra and H. Ait Benhassou, Rapid molecular assays for detection of tuberculosis. Pneumonia (Nathan), 2018. 10: p. 4.

[3] J.R. Starke and P.R. Donald, Handbook of child and adolescent tuberculosis. Oxford University Press, 2016: p. 449

[4] WHO, <Global Tuberculosis Report>. 2019: p. 297.

[5] WHO, WHO\_HQ\_Reports-G2-PROD-EXT-TB Country Profile. 2018.

[6] Elhassan, M.M., et al., Challenges in diagnosing tuberculosis in children: a comparative study from Sudan. *Int J Infect Dis*, 2016. 43: p. 25-29.

[7] Graham, S.M., et al., Evaluation of tuberculosis diagnostics in children: 1. Proposed clinical case definitions for classification of intrathoracic tuberculosis disease. Consensus from an expert panel. *J Infect Dis*, 2012. 205 Suppl 2: p. S199-208.

[8] Gebremichael, B., et al., Predictors of pediatric tuberculosis in public health facilities of Bale zone, Oromia region, Ethiopia: a case control study. *BMC Infect Dis*, 2018. 18(1): p. 252.

[9] Carina Marquez , et al., The age-specific burden and household and school-based predictors of child and adolescent tuberculosis infection in rural Uganda. *PLOS ONE*, 2020. 15(1): e0228102.

[10] Xie, X., et al., Risk of tuberculosis infection in anti-TNF-alpha biological therapy: from bench to bedside. *J Microbiol Immunol Infect*, 2014. 47(4): p. 268-74.

[11] Turel, O., et al., Paediatric Tuberculosis at a Referral Hospital in Istanbul: Analysis of 250 Cases. *Biomed Res Int*, 2016. 2016: p. 6896279

[12] Elmadhooun, W.M., et al., Prevalence of tuberculosis among children in North Sudan: Are we only seeing the tip of the iceberg? *J Nat Sci Biol Med*, 2017. 8(1): p. 114-118