

# Proportionate Morbidity of Various Clinical Forms of Tuberculosis in Children Under 5 Years of Age at Lahore

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Tuberculosis results in 1.3 million cases and 450,000 deaths among the children each year. A correctional study was conducted on 100 Tuberculous children under 5 years of age from August 1997 to November 1997 presenting at Mayo Hospital and Jinnah Hospital Lahore to see the proportionate morbidity of various clinical forms of tuberculosis. A New Guinea Paediatrics Tuberculosis chart was used to diagnose the cases. The children scoring seven or more on the chart were included as cases. The mean age of the cases was 35.28 (SD 14.93) months. Pulmonary Tuberculosis was 68.0%, Tuberculous Meningitis 20.0%, exclusive Tuberculous Lymphadenitis 6.0%, Abdominal Tuberculosis 3.0 % Miliary Tuberculosis 2.0% and Tuberculous Arthritis 1.0%. Malnutrition, over crowding, illiteracy and poverty was very common among the tuberculous children.

**Key words:** Proportionate morbidity, tuberculosis, children

Tuberculosis remains a leading cause of death among the medically and economically deprived persons throughout the world. It is estimated that 1.7 billion individuals are infected worldwide, with 8 to 10 million cases and 3 million deaths per year. The majority of these occur in the underdeveloped countries<sup>1,2,3</sup>. Among the children 1.3 million cases and 450,000 deaths occurs each year<sup>4</sup>. Tuberculosis like in many other developing countries is very serious in Pakistan. As per WHO estimate more than 3000,000 cases of tuberculosis develop in this country every year<sup>5</sup>. According to Pakistan's first National Tuberculosis survey of 1961-1962, 70% of population was infected in the 20-29 years old age, second National Tuberculosis prevalence of tuberculosis was carried out in 1974-1978 revealed tuberculosis infection rate was 83 in the 20-29 years old age group<sup>6</sup>. In 1994 a survey was conducted in the province NWFP. The annual risk of infection (ARI) was found to be 1.69% and the expected incidence of sputum positive cases was 93 per 100,000. In Pakistan the situation apparently was made worse by the Afgan refugees who migrated to Pakistan as result of Russian invasion of Afghanistan in 1979. From 1986 onwards case finding of AFB positive cases among the refugees 60% and 1990 and onward close to 100 %. The average success rate was about 70%<sup>7</sup>.

Tuberculosis has variety of clinical presentation. As the diagnostic techniques are improving the number of new clinical forms tuberculosis are being added and manifestation is involving almost all organs of body. The clinical pattern of tuberculosis may be influenced by number factors such as immunity, nutritional status, living conditions and socioeconomic status. Therefore study of clinical Pattern of tuberculosis in very important.

## Material and methods

A hospital based correctional study was designed and conducted to study the clinical pattern of tuberculosis in

children under 5 years of age during the period August to November 1997. A total 100 cases suffering from tuberculosis were included in the study from the Paediatrics out patient departments, follow-up and in patient departments of May Hospital and Jinnah Hospital Lahore which are 2300, and 1100 bedded hospitals respectively.

Keeping in to view the variety of presentation and difficulty in diagnosis of tuberculosis in children and objectivity New Guinea Paediatrics Tuberculosis Score Chart was used to establish the diagnosis. This chart is a clinical scoring system based on the history, clinical examination and laboratory diagnosis. The children having score seven or more were included as cases. Various socioeconomic factors were also included in the data collection Performa.

## Scoring Chart No. 1

Finding	0	1	3
Duration of illness	< 2 weeks	2-4 weeks	> 4 weeks
Malnutrition	Average Wt for age.	Wt between 60-80%	< 60%
Family member contact	None	Reported by family	Confirmed by doctor
Past or present			

(Source) Crofton S J, Horne N, Miller F. Clinical Tuberculosis. London and Basingstoke: Macmillan. 1992

If the children have some of the above presentation and score three or more, then he is subjected to detailed clinical examination and laboratory diagnosis and the further scoring is done by scoring chart No 2

The children evaluated by both the Clinical Scoring Charts having score seven or more were included as cases. Case definitions for various clinical presentation was based on the evaluation by Scoring Chart No 2. The Tuberculous lymphadenitis was defined as when the lymphadenitis was not associated with other clinical presentation.

Any of the following findings.

Chart No.2

Clinical findings	Score
Unexplained fever night sweats not responding to malaria treatment more than two weeks.	2
Clinical nervous system changes, irritability, headache, vomiting, neck stiffness and fits or coma.	3
Undiagnosed abdominal mass of ascities.	3
Large painless lymph nodes firm, soft, or sinus in the neck or axilla.	3
Radiological findings, cavity, mediastinal lymph nodes, consolidation and effusion or miliary shadow.	3
Positive tuberculin test.	3
Positive lymph node or pleural biopsy.	4
AFB. Positive from sputum, CSF and gastric, pleural or peritoneal aspirates.	4
Positive biopsy of spine.	4

(Source) Crofton S J, Horne N, Miller F. Clinical Tuberculosis. London and Basingstoke: Macmillan. 1992

## Results

### Demographic Data Of The Subject Under Study

Out of 100 cases 50 (50.0%) were taken from Jinnah Hospital and 50 (50.0%) from Mayo Hospital Lahore and 51(50.0) % of the cases were females and 49 (49.0%) were male. As given in the table number I, 5% of the cases were in age group 3-11 months, 19% in group 12-23 months, 23% in group 24-35 months, 27% in group 36-47 months and 26% were in age group 48-59 months.

Table 1 Age and Sex distribution among the cases under study

Age Groups	Female Freq(%)	Male Freq(%)	Total Freq(%)
3- 11	2(2.0)	3 (3.0)	5 (5.0)
12-23	6 (6.0)	13(13.0)	19(19.0)
24-35	13(13.0)	10(10.0)	23 (23.0)
36-47	15 (15.0)	12(12.0)	27(27.0)
48-59	15(15.0)	11(11.0)	26 (26.0)
Total	51 (51.0)	49(49.0)	100 (100.0)

Maximum numbers of cases were from age group 36-47 months. The mean age for the cases was 35.28 (SD 14.93) months.

### Socio-economic Status of Study cases

Among the 100 Tuberculous children, fathers of 53.0% children were educated and 47.0% were not educated while mothers of 21.0% children were educated and of 79.0% were not educated Father's occupation of the Tuberculous children were observed as Business man 3.0%, Govt. employees 10.0%, Private employees 7.0% Skilled workers 17.0%, Non-skilled workers 25.0%, Farmers 11.0% and Laborers 27.0%.

Table 2. Educational status of the fathers and mothers of the subjects under study

Father's Education	Not Educated Freq (%)	Not Educated Freq (%)	Total Freq (%)
Fathers	53(53.0)	47(47.0)	100 (10.0)
Mothers	21(21.0)	79(79.0)	100 (10.0)

Table 3 Family Income and Living Status

Subjects	N = No Of Observation	Mean	Standred Deviation
Family Income Per Capita per Month	100	528.55	237.17
Number of persons per living room	100	5.024	1.951

Among 100 subject under study 57.0% of the children are belonging to the families living above 4.0 persons per living room and 43.0% of children belonging to the families living of up to 4.0 persons per living room. The mean number of persons per living room was 5.024(SD =1.951) The families of 69.0% of the children had income up to Rs. 500 per capita per month and 31.0% had above Rs 500 per capita per month and mean per capita income per month was 528.52 (SD = 237.17)

Table Nutritional Status of the Cases under study

Weight % of the Expected Weight	Degree of Malnutrition	Cases Freq(%)
Wt. More than 80%	Normal Weight	13 (13.0%)
Wt. 80 to 60%	Moderate Malnutrition	63 (63.0%)
Wt. Less than 60%	Severe Malnutrition	24(24.0%)
Total		100(100%)

Among 100 cases 13.0% children were normal (having weight more than 80% of expected weight for age), 63.0% were moderately malnourished (having weight between 80 to 60% of expected weight for age) and 24.0% were severely malnourished (having weight less than 60% of expected weight for age). Out of 100 cases 74.0% had positive history of vaccination. and 64.0 % had BCG Scar while 26.0% had negative history of vaccination and 36.0% did not had BCG Scar.

Table 5 Vaccination status by history and BCG Scar

Vaccination Status	Positive Freq (%)	Negative Freq (%)	Total Freq (%)
History	74 (74.0%)	26 (26.0%)	100 (100%)
BCG Scar	64 (64.0%)	36 (36.0%)	100 (100%)

### Clinical Pattern of tuberculosis among the cases

Among the 100 cases 68.0% were suffering from pulmonary tuberculosis, 20.0% from Tuberculous Meningitis, 6.0% from Tuberculous Lymphadenitis , 3.0% from Abdominal Tuberculosis, 2.0% from miliary tuberculosis and 1.0% from tuberculosis of joint (*Table 3*)

Table 6 Clinical Pattern of tuberculosis among the cases

Clinical Variety	No. of Cases	%age
Pulmonary TB.	68	(68.0%)
Tuberculous meningitis	20	(20.0%)
TB. Lymph Nodes	6	(6.0%)
Abdominal TB.	3	(3.0%)
Miliary tuberculosis	2	(2.0%)
TB. Joints	1	(1.0%)
Total	100	(100.0%)

### Discussion

In the study under discussion children suffering from tuberculosis were studied to establish the clinical pattern of tuberculosis among the children along with various sociodemographic factors and vaccination status among the cases was also taken into consideration. As the demographic data concerned age distribution among cases, only 5.0% cases were in under one year age group while maximum (27.0%) cases were observed in age group 36-47 months. It indicates that the frequency of tuberculosis in children below 5 years increases with increase in age and the peak age is 2-4 years. The possible reason for high proportion of cases in this age might be due to increasing exposure to the environment, which starts with the weaning of the child. A recurrent episode of diarrhoea, acute respiratory tract infections and malnutrition decreases the body resistance and the immunity of the child. These findings of the study are similar to those in various studies conducted elsewhere.<sup>8,9</sup>

Tuberculosis shows a great diversity in clinical patterns and it can occur in any organ or tissue in the body. It can be classified as pulmonary or extra pulmonary tuberculosis depending upon the tissue involved. Commonly occurring varieties in children are;

- a Primary pulmonary tuberculosis
- b Miliary tuberculosis
- c Tuberculous Meningitis
- d Tuberculous lymphadenitis
- d Abdominal tuberculosis

Less commonly occurring varieties are;

- f Tuberculoma of CNS
- g Tuberculosis of bone and joints
- I Tuberculosis of skin
- j Tuberculosis of heart and pericardium
- k Tuberculosis of eye
- l Urogenital tuberculosis.

Primary pulmonary tuberculosis is the commonest thoracic form of tuberculosis, which is contributing half of the total tuberculous cases. While tuberculous meningitis is the commonest extra thoracic form.<sup>3,4,10</sup> In the study under consideration six clinically varieties of tuberculosis were observed among the cases included in this study. Pulmonary tuberculosis was the commonest type of tuberculosis followed by the tuberculous meningitis which is more lethal and crippling, while the tuberculosis of joint was least common. The clinical pattern observed in the study is similar to the pattern observed in India<sup>11</sup>. The present study has constraints to establish the rare form of clinical tuberculosis due to the smaller sample size and the lack of specific diagnostic facilities for atypical forms of tuberculosis. All the clinical types are grouped together to compare the socioeconomic and vaccination status of the tuberculous children.

Taking into consideration socio-demographic factors it was observed that the proportion of low income, overcrowding, and literate families is very high among the

tuberculous children. This gives an indication that tuberculosis is likely to be more prevalent in people with low socioeconomic status where illiteracy, low income and overcrowding is rampant. As in Pakistan 30% of the population is living below the absolute poverty line the high prevalence of tuberculosis is highly understandable.<sup>12</sup> Therefore development of tuberculosis may have the relationship with the low socioeconomic status. Keeping in view the fact that 40.0% of the children in Pakistan are underweight (moderate and severe), 87.0% of the cases in the study population are underweight, it can be reasonably assumed that malnutrition has some relationship with tuberculosis. The mean number of persons per room is more than 5, which indicates a high index of overcrowding among the families of tuberculous children.

However, as we have taken malnutrition as one of the clinical findings of tuberculosis therefore, it is difficult to conclude whether the malnutrition is a pre-existing risk factor for tuberculosis or it is one of the outcomes of tuberculosis. As tuberculosis remains the leading cause of death among the medically and economically deprived persons throughout the world and malnutrition is much prevalent in the developing countries where tuberculosis is more common therefore, malnutrition can be considered as one of the pre-existing risk factors for development of tuberculosis. The severity of malnutrition is increased with the development of the active disease.<sup>4,13</sup>

It is very surprising to note that the history of BCG vaccination and BCG scar among the study subjects is 76.0% and 66.0% respectively. This percentage among the tuberculosis patients can be compared with the National coverage of BCG. According to Multiple Indicators Cluster Survey of Pakistan, conducted by Ministry of Health, Government of Pakistan in collaboration with UNICEF. & Gallup Pakistan in 1995 the BCG coverage in children 12-23 months of age is as under

On the basis of card plus history;	75%
The BCG scar was observed;	61%

The BCG coverage among under 5 year age children under EPI program is even less than the observed among the tuberculous children indicating that the vaccination has almost no effect on prevention of tuberculosis among the children. These findings are supported by number of recent and old studies. The study in UK states as "The old reasons like unemployment, poor nutrition, overcrowding and low status of general health are responsible for the recent increase of tuberculosis in United Kingdom."<sup>5</sup> The incidence of tuberculosis has declined progressively and sometimes dramatically as the general condition of living and health status of people improved in USA., Japan and other developed countries.<sup>13,14</sup>

"The BCG vaccine is of value in developed countries but provided little or no protection when used in the developing countries. It is possible that the immunization is ineffective in the face of malnutrition and chronic intercurrent infections."<sup>10</sup>

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