

## Clinical profile of Tuberculosis in BCG Vaccinated and Unvaccinated Children

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### Abstract

**Background:** To study the clinical profile of tuberculosis in vaccinated and unvaccinated children

**Methods:** A total of 100 consecutive children below 12 years of age suffering from various forms of tuberculosis attending pediatric outpatient department/ receiving inpatient care at a district level hospital. The present study was conducted at district Saadat hospital Tonk between 2020 to 2022.

**Results:** BCG vaccinated group prominent symptoms were fever (96.6%), Cough (53.3%), Convulsion (40%), Altered sensorium (53.3%), vomiting (50%), followed by constipation (30%), respiratory distress (26.6%), pain abdomen (20%). In BCG unvaccinated group fever was present in 98.6%, convulsion (67.1%), altered sensorium (65.7%), vomiting (57.14%), respiratory distress (27.1%), constipation (27.1%), abnormal movements were present in 10% cases in unvaccinated group.

**Conclusion:** Higher incidence of pulmonary tuberculosis in BCG vaccinated group was not statistically significant. However, high incidence of neuro-tuberculosis in BCG unvaccinated group was statistically significant. The underlying risk factors were poor socio-economic status, malnutrition and poor immunization coverage and should be taken into consideration in order to prevent morbidity and mortality due to tuberculosis in children

**Keywords:** BCG, Pulmonary tuberculosis, vaccinated, Unvaccinated

### Introduction

The control of tuberculosis in an individual today is not difficult and there is reasonable certainty of cure. However, at the community, national and global level this promising vista is not seen. Tuberculosis affects all age groups, with 1.3 million cases of tuberculosis and 40,000 deaths

occurring in children under 15 years in developing countries.<sup>1</sup> Of the nearly 2.5 million tuberculosis deaths in 1990, 0.6 million were in India.

The BCG vaccine was discovered in 1924 and is in use for nearly 70 years. It has not made the impact that was expected. Several epidemiological studies have shown very wide variations in the protection offered by BCG vaccine.<sup>2</sup> The little protection that the vaccine provides in turn modifies the disease pattern. Studies have demonstrated the changing spectrum of tuberculosis in children who have been vaccinated<sup>3</sup>

### Material and Methods

A total of 100 consecutive children below 12 years of age suffering from various forms of tuberculosis attending pediatric out patient department/ receiving inpatient care at a district level hospital constituted the study population of this prospective study. Detailed history was obtained from the parents including nutrition, BCG status, contact history and socio-economic status. After a thorough clinical examination, necessary investigations were done.

### Results

**Table 1: Age and sex distribution of cases**

Age	BCG vaccinated				BCG unvaccinated			
	Male	Female	Total	%	Male	Female	Total	%
0-3 year	17	-	17	56.6	36	14	50	68.5
3-6 year	5	1	6	20	3	1	4	5.7
6-9 year	-	1	1	3.3	3	1	4	5.7
9-12 year	5	1	6	20	6	6	12	17.1
Total	27	3	30	100	48	22	70	100

This table shows that majority of cases of tuberculosis occur in age group 0-3 years both in BCG vaccinated (56.6%) and unvaccinated group (68.5%)

The overall M:F ratio in cases of TB is 3:1 (75:25).

**Table 2: Distribution according to maternal literacy**

	BCG vaccinated		Unvaccinated	
	Count	%	Count	%
Literate	8	26.6%	3	4.3%

Illiterate	22	73.3%	67	95.7%
Total	30	100%	70	100%

This table shows that high maternal illiteracy is associated with unvaccination with BCG as shown by table, the maternal literacy is 26.6% in BCG vaccinated group as compare to 4.3% in unvaccinated group.

**Table 3. Distribution of cases as per Nutritional status**

PEM Grade	BCG vaccinated	Unvaccinated
Normal	5 (16.6%)	12 (17.1%)
I	6 (20%)	11 (15.7%)
II	9 (30%)	23 (32.6%)
III	7 (23.3%)	15 (21.42%)
IV	3 (10%)	9 (12.6%)
Total	30 (100%)	70 (100%)

This table depicts that most of the cases were malnourished and belong to PEM Gr. II, III and IV in both the groups.

**Table 4. Symptomology of cases**

Symptoms	BCG vaccinated	Unvaccinated
Fever	29 (96.6%)	69 (98.6%)
Cough	16 (53.3%)	27 (38.6%)
Respiratory distress	8 (26.6%)	19 (27.1%)
Headache	5 (16.6%)	12 (17.1%)
Convulsion	12 (40%)	47 (67.1%)
Altered sensorium	16 (53.3%)	48 (65.7%)
Abnormal movements	-	7 (10%)
Limb weakness	3 (10%)	17 (24.3%)
Abdominal distension	2 (6.66%)	8 (11.4%)
Loss of appetite and Wt.	13 (43.3%)	23 (32.6%)
Diarrhoea	4 (13.3%)	10 (14.3%)

This table shows that in BCG vaccinated group prominent symptoms were fever (96.6%), Cough (53.3%), Convulsion (40%), Altered sensorium (53.3%), vomiting (50%), followed by constipation (30%), respiratory distress (26.6%), pain abdomen (20%). In BCG unvaccinated group fever was present in 98.6%, convulsion (67.1%), altered sensorium (65.7%), vomiting

(57.14%), respiratory distress (27.1%), constipation (27.1%), abnormal movements were present in 10% cases in unvaccinated group.

**Table 5. Distribution of cases according to duration of presenting symptoms**

Symptoms	BCG vaccinated	Unvaccinated
Acute <1 week	7 (23.3%)	14 (20%)
Sub-acute (1-3 weeks)	17 (56.6%)	34 (48.6%)
Chronic (>3 weeks)	6 (20%)	22 (31.4%)
Total	30	70

This table shows that majority of cases in both BCG vaccinated and unvaccinated group presented with duration between 1 to 3 weeks. In BCG vaccinated group acute presentation (23.3%), sub-acute presentation (56.6%) and chronic (20%). Similar figures for unvaccinated group are 20%, 48.6% and 31.4% respectively.

**Table 6. Clinical findings on systemic examination**

System examined	BCG vaccinated	Unvaccinated
Respiratory	-	-
Bronchopneumonia	5 (16.6%)	13 (18.6%)
Pleural effusion	1 (3.33%)	1 (1.4%)
Collapse consolidation	1 (3.33%)	-
Gastrointestinal		
Abdominal distension	1 (3.33%)	8 (11.4%)
Hepatomegaly	7 (23.3%)	10 (14.3%)
Hepatosplenomegaly	3 (10%)	12 (15.1%)
Ascites	-	2 (2.6%)
Cardiovascular		
Haemic murmur	5 (16.6%)	4 (5.7%)
Pericardial effusion	1 (3.33%)	-
Total Cases	30 (100%)	70 (100%)

By this table it is clear that both in BCG vaccinated and unvaccinated group the commonest clinical finding in respiratory system was bronchopneumonia and gastrointestinal system in both group enlargement of liver and spleen were most common finding. In cardio vascular system one case of pericardial effusion was present in BCG vaccinated group.

## Discussion

Tuberculosis is more prevalent in younger age group. In this study, majority of cases of tuberculosis occur in age group 0-3 years both in BCG vaccinated (56.6%) and unvaccinated group (68.5%) Most affected age group in a study by Qazi et al was between 2-5 years.<sup>4</sup> Saleem et al noted abdominal TB in older children aged above 10 years while we found pulmonary TB to be commonest in this age group.<sup>5</sup>

In present study both sexes were equally affected, same was reported by Iqbal et al.<sup>6</sup> Close contact with TB patient in last two years was present in 76 patients and out of them 43(56.6%) were BCG vaccinated children. This is similar to an Indian study.<sup>7</sup> Mantoux test, is useful supportive evidence of active TB in patients with pulmonary and extrapulmonary TB, in BCG vaccinated children as well.<sup>8</sup>

## Conclusion

Higher incidence of pulmonary tuberculosis in BCG vaccinated group was not statistically significant. However, high incidence of neuro-tuberculosis in BCG unvaccinated group was statistically significant. The underlying risk factors were poor socio-economic status, malnutrition and poor immunization coverage and should be taken into consideration in order to prevent morbidity and mortality due to tuberculosis in children.

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