

Original Research Article

Assessment of socio-clinical profile of paediatric TB cases admitted to tertiary health care centre, Odisha, India

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ABSTRACT

Background: Tuberculosis is continued to be a major killer of mankind. Childhood tuberculosis contributes to high mortality due to diagnostic difficulty. Different social factors are responsible for its causation. The objective of the study was to assess the socio clinical factors prevalent among paediatric TB cases admitted to MKCG Medical College.

Methods: It was a cross sectional study carried out in the indoor paediatric ward of MKCG medical college. Duration of the study was from August 2016 to July 2017. Study participants were all admitted paediatric cases of age group less than 14 years. Data collected through scientifically designed pretested questionnaires.

Results: Total 103 patients were admitted during study period of whom, 54% were male. Their median age was 8 years. They were mostly Hindu by religion (98%) and from lower socioeconomic classes (77%). Majority (60%) were from nuclear family (59%) and families of BPL card holder. Most of their parents had low educational status. Physical overcrowding, inadequate ventilation in the house and smoking were main epidemiological factors observed.

Conclusions: It was concluded from the above study group, socioeconomic and environmental risk factors were widely prevalent among them. So, control of these factors are the priority issues to be addressed and improvement of these conditions are recommended for effectiveness of the curative measures.

Keywords: Childhood TB, Epidemiology, Infection

INTRODUCTION

Tuberculosis remains a major global public health problem, the world facing today. In developing countries like India, tuberculosis occupies an important place and is regarded as the biggest killer of mankind. The incidence of childhood tuberculosis is very high in the country. Some social factors like ignorance, poor quality of life,

lack of education, lack of sanitation, overcrowding is still prevailing widely. Because of less developed immune system, children under 5 years of age are more prone to develop (up to 20%) the disease, mostly within 2 years following infection.¹

While the burden of childhood TB in India is not known, regional data from WHO indicate that sputum

microscopy smear-positive TB in children (<14 years old) accounts for 0.6%-3.6% of all reported cases.² However, because the majority of children are sputum microscopy smear negative, these data underestimate the true burden of childhood tuberculosis. It is estimated that childhood TB constitutes 10-20% of all TB, in high burden countries.³ It is accounting for 8-20% of TB related deaths. Number of paediatric cases, out of all cases (43,851) registered for treatment were 1922 in Odisha, as per estimated burden in 2016.⁴

Children are the most vulnerable group for the disease due to diagnostic difficulties and potential for developing more severe form of disease. M.K.C.G. Medical College and Hospital is the referral centre for more than 10 districts of Southern Odisha including Ganjam, which are mostly socially and economically backward.

Children suffering from tuberculosis admitted in this hospital were mostly referred from peripheral health institutions of these districts. Ganjam is also a district of high endemicity for HIV/AIDS, which favors transmission of tuberculosis in this age group.

Under this background, this study was intended to assess the epidemiological factors which are associated with its diagnosis and treatment. Objective was to study the socio-demographic profile of paediatric TB Patients admitted to the hospital.

METHODS

The study was conducted in In-Patient Department of Paediatric, M.K.C.G Medical College Hospital, Berhampur, which is situated in Ganjam district of Odisha. It was a hospital based longitudinal study. The period of study was from August 2016 to July 2017.

After reviewing various literatures, a questionnaire was designed scientifically for collection of data which was validated by pretesting. Questionnaire consisted of both closed and open-ended questions. Out of 125 paediatric tuberculosis cases in the age group 0-14 years admitted in the inpatient Department of Paediatric, the parents of only 103 cases were listed as study participants.

Data was collected from parents of these cases interviewed using the questionnaire. Secondary data was collected from hospital records of the cases. All caregivers or parents of paediatric tuberculosis patients, who were willing to give informed consent to participate in the study included as study participants. Those caregivers or parents who were not willing to participate and had not given consent to participate were excluded

Procedure

- Pre-testing: The questionnaire was pretested with 20 samples and accordingly necessary modifications were made to the questionnaire.

- Plan of data collection: All the cases admitted between the periods from August 2016 to July 2017 were approached and 103 cases were finally enlisted for study purpose. Their socio-demographic profiles were recorded. Data collected by interview method from the parents or caregiver after obtaining informed consent in a pre-designed pretested semi structured questionnaire using local language.

Data analysis and interpretation

The interview schedule was verified for the completeness of the data at the end of each interview and the collected data was coded and entered in the computer. The analysis of the data was carried out by using the Statistical Package for Social Sciences (SPSS) version 16.0, under the supervision of guide.

RESULTS

Total 103 participants were interviewed during the study period about their socio-demographic aspects. 56 (54.3%) cases were boys.

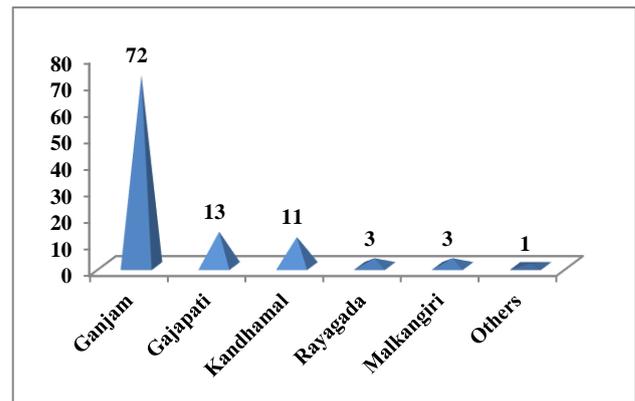


Figure 1: District wise distribution of cases.

It was revealed (Figure 1) that almost two-third (69.9%) of the study subjects were from Ganjam district followed by Gajapati (12.6%) and Kandhamal (9.7%). Rayagada and malkangiri districts are far away from the medical college.

Socio demographic variables were described in the Table 1. This Table shows that 24.3% cases were from general caste, SEBC/OBC constituted 13.6%, SC and ST constituted 31.1% each. Maximum numbers were from Hindu community. Lower middle class contribute more number (62.1%) of cases. Lower and lower middle class were around 77.6% of cases. As per type of family, 59% cases were from nuclear family and 41% were from joint family. It was observed that 31.1% cases had not started schooling yet, 67.0% were school students and only 2 (1.9%) of them were school dropouts girls, who helped in domestic work.

Table 1: Sociodemographic profile of study population.

Sociodemographic factors	Number	%
Gender		
Male	56	54.3
Female	47	45.7
Caste		
General	25	24.3
SEBC/OBC	14	13.6
SC/ST	64	62.2
Religion		
Hindu	101	98.1
Muslim	1	1.0
Socio economic class		
Upper	4	3.8
Upper middle	3	2.9
Middle	16	15.5
Lower middle	64	62.1
Lower	16	15.5
Type of family		
Nuclear	61	59
Joint	42	41
BPL Criteria		
Yes	62	60.2
No	41	39.8
Total	103	100

Assessing an important parameter i.e. maternal education, it was revealed in Table 2 that most (68.1%) of the mothers of paediatric TB cases were illiterate as compared to father (37.08%). Less mothers (23.69%) had primary education, compared to father (40.17%).

Table 2: Education of parents of study population (N=103).

Characteristic	Education of mothers		Education of fathers	
	No.	%	No.	%
Illiterate	60	61.8	36	37.08
Primary	23	23.69	39	40.17
Secondary	17	17.51	19	19.57
Higher secondary and above	3	3.09	9	9.27
Total	10	100	10	100

As described in Table 3, almost 86.4% of TB cases had inadequate ventilation in the house. Physical overcrowding was observed in 82.5% cases and 76.7% of families used wood as fuel, which was a known indoor air pollutant. Safe fuels like LPG, biogas and others were used by 6.8%, 14.6% and 1.9% of cases respectively. Family members of 67.0% cases were addicted to smoking, exposing their children to passive smoking. In

33.0% cases, no members in the family had addiction to smoking.

Analyzing the type of TB cases in Table 4, it was observed, only 17.5% were pulmonary TB, 82.5% were extra-pulmonary cases. TB meningitis was predominant type (32.0%) of extra pulmonary tuberculosis. Disseminated TB 15 (14.6%), TB abdomen 11 (10.7%), pleural effusion 8 (7.8%), TB lymph node 7 (6.8%), milliary TB 3 (2.9%), empyema thoracis 2 (1.9%), pericardial effusion 2 (1.9%) and TB spine 2 (1.9%) of each were the other type observed in the study.

Table 3: Prevalent risk factors among TB cases (N=103).

Risk Factors	No. of cases	%
Presence of overcrowding	85	82.5
Inadequate ventilation status	89	86.4
Wood used for cooking as fuel	79	76.7
Presence of smoking among family members	69	67
Total	103	100

Table 4: Type of diagnosed TB cases.

Types of TB cases	No of cases	%
Pulmonary TB	18	17.5
Extra pulmonary TB	85	82.5
TB lymph node	7	6.8
Pneumonia	1	1.0
Empyema thoracis	2	1.9
Milliary TB	3	2.9
Tuberculoma brain	1	1.0
TB meningitis	33	32.0
Pleural effusion	8	7.8
Pericardial effusion	2	1.9
Disseminated TB	15	14.6
TB spine	2	1.9
TB abdomen	11	10.7
Total	103	100

Table 5: Outcome of admitted cases.

Outcome	Number	%
Improved	90	87.4
Deteriorated and referred	3	2.9
Died	6	5.8
LAMA	4	3.9

Table 5 revealed the outcome of the case, during discharge. 87.6% improved during hospital stay, 2.9% deteriorated and referred to higher centre but 5.8% died during treatment. 3.0% cases of study population left against medical advice.

DISCUSSION

High prevalence from the district Ganjam itself, in present study may be due to proximity of the medical college, promoting healthcare seeking behaviour. Considering the type of residence, 73.8% of cases were from rural area, 14.6% from tribal and 11.7% from urban area. More prevalence of rural and tribal cases in the study, reflected the transmission of infection in these communities needing more screening efforts to bring them out to the health facility.

According to RNTCP District data sheet 2016, 206 (10.7%) cases of paediatric TB were detected in Ganjam district out of all new paediatric TB cases (1924) in Odisha (24). Data sheet of Ganjam has shown it as a high endemic district.

Median age of cases was 8 years which was much higher than that of the study of Jain SK et al, where it was 31 months but similar to study of Jani Y et al, where mean age of children was 8.41 ± 2.86 years.^{5,6} Number of cases among age group of 5-14 years was maximum among all age groups i.e. 38 (36.8%) in both the sexes. Greater age of onset may be due exposure to infection from outside source by their greater movement than smaller children who usually remains confined to home.

Karim MR et al, also mentioned that older children are increasingly likely to be infected from outside the household. In contrast to this, Gupta R et al, found in his study on children, indicating the high prevalence of childhood tuberculosis in the younger age group.^{7,8}

Similar findings were reported in hospital-based study done by Sharma S et al, on extra-pulmonary TB during January 1995 - July 2004 at LRS Institute of Tuberculosis and Respiratory Diseases, New Delhi. Patient's where, majority were females (61%) and males were 39%. In the study by Jain SK et al, the female constituted 46% of the cases.^{5,9}

More number of cases were from SC/ST categories. It could be due to their low socioeconomic status in the community which was related to disease prevalence. Similar findings of TB being more prevalent in backward castes were also obtained from some other studies in India.

Maximum number of paediatric TB cases were from Hindu Community (98.1%), Muslims and Christians each contributed 1%. In the study of Maria S et al, majority were Hindus (58.4%) by religion. The cause may be due to the study region being dominated by Hindus.¹⁰

In this study, lower middle-class family contributed maximum number of cases (62.1%). Middle and lower class each contributed 15.5%, followed by upper class (3.8%) and upper middle (2.9%). Similar findings were observed by Maria S et al, where majority of the patients

i.e. 95.2% belonged to low socioeconomic status.¹⁰ They observed increase in number of persons suffering from TB with decreasing SES. Same was observed for all the SES-variables (viz. education, income, crowding, housing, type of water supply etc.) in their study.

In more recent times, TB continues to involve the groups which are socioeconomically disadvantaged. This was supported by several studies from the west, even though data from India and other developing countries are relatively sparse.

While in a study by Bai SS et al in Kottayam district of Kerala slightly more than half (55.8%) belonged to low, 38.9% to middle and 5.3% to high socio-economic groups.¹¹

More families are nuclear type in the study. This could be due to commonest prevalence of nuclear families in present day. It is similar to study by Maria S et al, where majority (73.2%) of the patients lived in nuclear families.¹⁰

Almost 60.2% paediatric TB cases were from BPL families as compared to non-BPL (39.8%) in present study justifying the role of poverty in causation of this disease. School dropout children were also observed in the study. Children out of school are more vulnerable to be engaged as child labour exposing themselves to TB infection.

Mothers with high school education were 17.5% similar to that of fathers (19.57%) and mothers having higher secondary were only 3.09% though fathers were little more i.e. 9.27%. Overall education of mothers of cases was less even compared to father's education. Karim MR et al, showed association of maternal education with prevalence of TB cases was statistically significant ($p=0.002$) in their study.⁷

Similarly, Joshi S et al, showed that fathers of 24.24% paediatric patients were illiterate, 13.93% were from middle school, 13.33% from primary school, 32.12% high school.¹² 10.30% were intermediate, 4.24% were graduate and the fathers with highest level of education i.e. post-graduation was 1.81% only. Greater % of TB cases was noted among children also with fathers of low educational background.

Overcrowding was present in more than 80% of cases. Similar findings were observed in study of Maria S et al, in which about 89.5% lived in overcrowded houses.¹⁰ Bedroom occupancy (persons per bedroom) was significantly associated ($p<0.001$) statistically with childhood tuberculosis as observed by Karim MR.⁷

Over-crowding increases the risk of disease. Aerosol droplets containing tubercle bacilli are discharged into the atmosphere when an open case of tuberculosis coughs or sneezes. Fine droplet nuclei remain suspended in the

air stream that reaches the alveolar space, thereby starting the infection. Overcrowding, by decreasing the degree of air space that is shared, results in increased exposure to *M. tuberculosis*.

Jani Y et al, it was found overcrowding in his study was in 86.7% of the patients.⁶ Use of wood as fuel in 76% of cases were prevalent which is known epidemiological factor for TB. Smoking among family member was prevalent among 67% of cases.

As children are usually exposed to passive smoking which is hazardous in the form of damaging respiratory mucosa. Among all cases, 17.5% were pulmonary TB, 82.5% were extra-pulmonary cases.

Among the extra-pulmonary cases, TB meningitis was maximum in number 32.0% followed by disseminated TB (14.6%), TB abdomen (10.7%), pleural effusion (7.8%) and TB lymph node (6.8%). Miliary TB, empyema thoracis, pericardial effusion and TB spine were other type prevalent though small in number.

Occurrence of 82.5% of the extra-pulmonary tuberculosis in present study was contradictory to the observation by Mazta SR et al, who found extra-pulmonary tuberculosis in only 55% of the children.¹³ Jain SK et al, noted extra pulmonary cases were 46% in their study.⁵

A hospital-based study in paediatric patients with extra pulmonary TB by Maltezou HC et al, between 1982 and 1998 showed that lymphadenitis (47%) was the most common manifestation of extra pulmonary TB.¹⁴ But in present study, lymphadenitis was 6.8% and most common type of extra pulmonary TB was tubercular meningitis (33%). This could be due to referral of severe meningitis cases with complication from peripheral hospitals.

In present study, almost 90 (87.4%) had improved during treatment, 3 (2.9%) deteriorated and referred to higher centre, 6 (5.8%) died during treatment and 4 (3.0%) cases of study population left against medical advice. Similarly, Sharma S et al, found 94.4% overall treatment completion rate and 2.2% cases were defaulter in her study.⁹ However, it was too early to mention, overall outcome of treatment without following them for sufficient period which is beyond the scope of the study.

CONCLUSION

The present study throws light on the socio-demographic and clinical profile of paediatric TB cases admitted to inpatient department of Paediatric of the Medical College and Hospital Odisha. Most of the cases were from low SES families living in poor housing conditions. There was history of contact in about 50% of cases.

Birth weight and malnutrition were common determinants of infection. The most common type of TB

was TB meningitis followed by disseminated TB and pulmonary TB. Out of those who had been tested for HIV, 6% were positive. During their hospital stay, it was observed that, very less number were deteriorated and died but majority improved during treatment.

Recommendations

However, it was recommended early and effective treatment of adult case, universal BCG immunization, improvement in socio demographic indicator as well as provision of healthy environment will definite improvement in reduction of childhood TB burden in the area.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of M.K.C.G. Medical College and Hospital, Odisha, India

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