

## Leprosy among the tribal population: A profile from a rural and tribal based tertiary care leprosy center of Eastern India

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### Abstract

**Introduction:** Leprosy is a chronic granulomatous disease mainly affecting the peripheral nerves and skin. Prevalence of leprosy dropped down worldwide after the advent of multidrug therapy. Very few studies on clinico-epidemiological patterns of leprosy had been reported among the tribal populations.

**Aims:** To observe the different clinical types of leprosy among the tribal population and to find out bacteriological index, frequency of deformity and lepra reaction at presentation.

**Materials and Methods:** It is an institution based cross sectional study conducted with 184 tribal leprosy patients attending leprosy OPD of a rural and tribal based tertiary care centre of west Bengal, from January 2016 to December 2016. Thorough history taking and clinical examination were done. Slit skin smear for AFB was performed to know the bacteriological index.

**Result:** Mean age of tribal leprosy patients was 36.2 years with a sex ratio of 1:2.06. Borderline tuberculoid was the commonest form (47.82%). Pure neuritic leprosy was not uncommon (15.21%). Predominant location of skin lesion was upper limb. Commonest nerve involved was ulner nerve. Garde II deformity was noted in around 30% cases. High bacteriological index (BI> 3) was observed in 10.86% cases. Lepra reaction was observed in 25.9% cases.

**Conclusion:** Pure neuritic leprosy and deformity of hand, feet and eye were common in this study. Early diagnosis and proper treatment should be made to prevent these deformities.

**Keywords:** Tribal, Leprosy, Borderline tuberculoid, Pure neuritic, Deformity.

### Introduction

Leprosy is a chronic granulomatous disease caused by mycobacterium leprae. It is essentially a disease of the peripheral nerves but can affect the skin and other internal organs.<sup>1</sup> The disease manifests itself in two polar forms, namely tuberculoid and lepromatous leprosy lying at the two ends. Between the two polar types borderline and intermediate form of leprosy occurring depending upon the host response to the bacteria. Depending upon the clinical, immunological, histopathological and bacteriological aspect, leprosy have classified by Ridley and Jopling into five types. They are tuberculoid tuberculoid (TT), Borderline tuberculoid (BT), Mid borderline (BB), Borderline lepromatous (BL), and Lepromatous lepromatous (LL).<sup>2</sup> Indian leprologists classified leprosy mainly depending upon the clinical features into five types, like tuberculoid type, borderline type, lepromatous type, pure neuritic type and intermediate type<sup>3,4</sup>. WHO has classified leprosy simply into two types for treatment purpose as multibacillary (MB) and paucibacillary (PB).<sup>5</sup> Though different classification is necessary to know different clinical patterns of leprosy but WHO classification is essential in the global campaign to eliminate leprosy as a public health problem. The global prevalence of leprosy in 1985 was 12 per 10000. Since then there have been a steady decline of leprosy cases and it has come down to <1 per 10000 by 2008. But still India have the major burden of leprosy cases worldwide. In 2007-08 the prevalence rate was 0.72 per 10000. 487 districts out of 600 districts in India have achieved leprosy elimination by March 2007.

Bihar, Chattisgarh, Jharkhand, West Bengal and Chandigarh have prevalence between 1-2/10000 populations.

Our leprosy centre is western part of west Bengal, India, within the Chotanagpur plateau. It was inhabited by various Proto-Australoid and a few Proto-Dravidian tribes since very long. In spite of cultural admixture they are still socially backward in many ways. Demographic diversity and inaccessibility, social non acceptance and scarcity of health care facilities and difficulties in implementing national programme made them susceptible to many diseases including leprosy.

### Aims

The present study aimed to find out the patterns of leprosy among the tribal population who attended leprosy OPD of a rural and tribal based tertiary care centre and to demonstrate bacteriological index in them. The study was also subjected to determine the frequency of deformities and lepra reaction at the time of diagnosis.

### Materials and methods

It was an institution based cross sectional study done with consecutive tribal leprosy patients irrespective of their age and sex who attended the leprosy OPD of Bankura Sammilani Medical College between Jan'16 to Dec'16. The only exclusion criteria was those patients or parents (in case of minors) who refuse to give consent to take part in the study. Thorough history was taken and clinical examination was done. Slit skin smear for acid fast bacilli (AFB) was done in all patients and the smears were studied by using Ziehl-Neelsen technique<sup>6</sup> and bacteriological index were

determined by using Ridley scale.<sup>7</sup> Histopathological examination and fite staining were done when it was necessary. The occurrence of deformity and lepra reaction were noted. All the data were collected in a pre-structured case data sheet and were analyzed by using appropriate statistical software (Medcalc version 10.2.0.0 by Acaciaaan 22, B-8400, Ostend, Belgium).

**Results**

184 tribal leprosy patients were included in the study. Ages of the patients ranged from 7 to 68 years with a mean of 36.2 and median 37.4 ± 2 SD. More than 50% patients were between 21-40 years of age [Vide Table No.1]. More than 2/3 patients were male with a sex ratio of 1: 2.06. In the study population borderline tuberculoid-multibacillary (BT-MB) leprosy was the commonest (48.37%) followed by borderline tuberculoid-paucibacillary (BT-PB) (14.67%), borderline lepromatous (8.69%), polar lepromatous leprosy (5.98%), polar tuberculoid (4.34%) [Vide Table No 2]. Mid borderline leprosy was noted only in 2(1.09%) cases and histoid leprosy was observed in 3 (1.63%) cases. Pure neuritic leprosy was found in more than 15% cases in the study, of them 8.69% was multibacillary and 6.52% cases were paucibacillary.

Most of the patients (around 85%) presented with skin lesion. Anaesthesia or hypoesthesia was observed in 134 patients (72.82%). Other presenting symptoms were swelling of legs, trophic ulcer; pain, tingling sensation, numbness, deformity etc [Vide Table No 3]. Fever was present in 27 cases (14.67%) and all of them presented with lepra reaction.

Majority of patients presented with macule (47.82%) followed by plaque (39.13%), nodule (5.97%), papule (2.17%), ulcers (6.52%). Dry skin lesion with hair loss was noted in 85 (46.29%) cases and glistening surface was observed in 22 (11.59%) cases, all of them were having lepromatous leprosy. Only 5 (3.37%) lepromatous patients had dry skin surface. Sensory impairment was noted among 148 (80.43%) patients. The most common nerve involved was ulnar nerve (35.86%). Other nerves involved in upper extremities were radial nerve (6.62%) and median nerve (5.43%). In the lower limb most common involved nerve was common peroneal nerve (28.26%) followed by posterior tibial nerve (8.15%) and anterior tibial nerve (6.52%). In head neck region commonest nerve involved was great auricular nerve (3.8%). Feeding nerve to the lesion was noted in 13.43% cases [Vide Table No 4]. All of them belong to BL and LL spectrum.

In this study slit skin smear for AFB was positive in 15.76% cases. All the smear positive cases were within lepromatous spectrum. Only two BL cases showed AFB negative. AFB was demonstrated on them by doing Fite staining on histology. BI ≥ 3 was noted among 10.86% (20 out of 184) cases [vide Table No.5]. At presentation lepra reaction was present in 28 (25.48%) cases, of them 14.57% had Type 1 reaction and 11.41% had type 2 reaction.

Grade II deformity was noted in 20.17% cases in the present study, amongst 27 patients had pure neuritic leprosy and 10 patients had other types of leprosy [Vide Table No. 6]. The commonest deformity was claw hand (8.15%) followed by trophic ulcer (6.52%), foot drop (4.89%), claw toe (2.17%). Among the pure neuritic leprosy patients, grade II limb deformity were noted in 96.42% cases.

**Table 1: Age distribution of the leprosy patients.**

Age group	No of the patients n=184	percentage
<10	4	2.17
11-20	32	17.4
21-30	56	30.43
31-40	44	23.91
41-50	32	17.4
51-60	9	4.89
>60	7	3.8

**Table 2: Types of leprosy.**

Clinical type	No of patients n=184	Percentage
Polar tuberculoid	8	4.34
Pure neuritic PB	12	6.52
Pure neuritic MB	16	8.69
Borderline tuberculoid PB	27	14.67
Borderline tuberculoid MB	89	48.37
Borderline	2	1.09
Borderline lepromatous	16	8.69
Polar lepromatous	11	5.98
Histoid	3	1.63

**Table 3: Presenting complaints.**

Presenting complains	No of patients	Percentage
Skin lesions	156	84.78
Anaesthesia/Hypoesthesia	134	72.82
Trophic ulcer	12	6.52
Swelling of leg	10	5.43
Tingling & numbness	18	9.78
Deformity of limb	18	9.78
Pain	30	21.72
Fever	27	14.67

**Table 4: Nerve involvement.**

Nerve	No of the patients	Percentage
Ulnar	66	35.86
Radial	12	6.52
Median	10	5.43
Common peroneal	52	28.26
Posterior tibial	15	8.15
Anterior tibial	12	6.52
Sural	6	3.26
Great auricular	7	3.80
Feeding nerve	24	13.43
Radial cutaneous nerve	6	3.26
Ulnar cutaneous nerve	11	5.97
Great scapular nerve	3	1.63
Suprascapular nerve	2	1.08
Supra trochlear nerve	2	1.08
Supra orbital nerve	2	1.08

**Table 5: Bacteriological index of the patients.**

Bacteriological index	No of cases	Percentage
BI 0	155	84.23
BI 1+	6	3.26
BI 2+	3	1.63
BI 3+	2	1.08
BI 4+	4	2.17
BI 5+	9	4.89
BI 6+	5	2.17

**Table 6: grade II deformity.**

Total grade II deformity (n=184)	37	20.17%
Among the pure neuritic patients (n=28)	27	96.42%
Other than pure neuritic patients (n=156)	10	6.41%
Claw hand (n=184)	15	8.15%
Foot drop (n=184)	9	4.89%
Claw toe (n=184)	4	2.17%
Trophic ulcer (n=184)	12	6.52%

**Discussion**

Amongst the communicable diseases, leprosy is a major cause of permanent physical disability. Due to involvement of peripheral nerves, there are weakness of muscle and loss of sensation of hand, feet and eye leading to ulceration and deformity. Early diagnosis and proper treatment (including lepra reaction) prior to the nerve damage is of utmost importance to prevent the disability.

Social stigma and discrimination associated with leprosy is primarily due to ulceration and disability caused by the disease. With proper treatment, the leprosy patients can lead a productive life in the community. To know the prevalence of different types of leprosy is very important for a specified community or to plan health care activities in that community. Our study was aimed to find out

different clinical types of leprosy in tribal population for epidemiological purpose.

In the present study BT-MB (48.37%) was the commonest form of leprosy, followed by BT-PB(14.67%). Mid borderline leprosy which is very unstable type, was found only in two (1.09%) cases. So as a whole borderline spectrum of leprosy was noted around 63% cases. This data were more or less comparable with study conducted in Jammu in 2008<sup>8</sup>, Grece during 1988-2000<sup>9</sup> and in Surat in 2008<sup>10</sup>, but the difference is, percentage of borderline leprosy cases among the tribal population is much higher than those studies.

The occurrence of pure neuritic leprosy was around 15% in our study which is much higher than the study done in Poona (4.6%)<sup>11</sup>, study done in Oman (6.2%)<sup>12</sup> and study by Kumar et al.<sup>13</sup> So again like borderline leprosy, pure neuritic leprosy was quite high among the tribal population. Nerve thickening was noted among 148 cases (80.43%) which is lower than the study done at Etheopia (>90%) but it is still much higher than different studies from India.<sup>8,10</sup> The most common nerve involved was ulnar nerve (35.86%), followed by common peroneal nerve (28.26%), posterior tibial nerve (8.15%), anterior tibial nerve (6.52%) etc. The nerve involvement was more or less similar with the study in Etheopia<sup>14</sup> and in India.<sup>11</sup> Thickened feeding nerve was observed in 24 cases (13.43%) which were quite higher than the Indian study done by Kumar et al.<sup>11</sup>

Grade II deformity was noted in more than 20% cases in the present study. The burden of grade II deformity were much higher than the global data (7.04%) and also from Indian data (28%).<sup>15</sup> Among the pure neuritic leprosy patients grade II limb deformity were noted in 96.42% which is nearly double in the study done at Poona (48.6%). This clearly denotes that the burden of leprosy deformity is still very much high among the tribals.

In our study AFB positivity was noted among 15.76% cases. All the smear positive cases were within lepromatous spectrum which was consistent with the study done at Wardha by Naik et al.<sup>16</sup> In their study BI  $\geq$  3 was noted among 9.23% cases but in our study BI  $\geq$  3 was noted among 10.86% cases. This clearly denotes higher BI among the AFB positive patients indicating possibility of a rapid spread among the tribals.

The prevalence of lepra reaction in the present study was near 26%, of them type I reaction present in 14.57% and rest are type II. This is quite higher than the occurrence of lepra reaction in a study done at Jodhpur in 1995.<sup>17</sup> It can be appreciated from the data that lepra reaction is much more prevalent among the tribal population.

## Conclusion

The present study showed higher prevalence of borderline leprosy among the tribals indicating higher degree of CMI in them. Pure neuritic leprosy and grade II deformity and lepra reaction is quite high in them. High

bacillary index i.e BI  $\geq$  3 is much more prevalent among the tribals indicating high possibility of spread of leprosy. This data clearly suggest that this tribal community needs much more attention for prevention of deformity as well as intercommunity and intra community spread of leprosy.

As it was a hospital based study, not a community based study, it is very difficult to predict the exact burden of leprosy and its deformity in the concerned population. For this a community based study with door to door survey is required.

**Conflict of Interest:** None.

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