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A clinico-bacteriological study of leprosy cases in a tertiary care hospital of North-East India

Borah AK[1], Bora Simi[2], Kataki Monjuri[3], Hussain Ezaz[4]

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ABSTRACT

Introduction: *Leprosy is a chronic infectious disease caused by Mycobacterium leprae. Although the elimination target has been achieved at the national level, leprosy still continues to be an important disease in several parts of India. Slit-skin smear microscopy plays an important role in an early and accurate diagnosis.* ***Materials and methods****: All clinically suspected referred cases of leprosy from dermatology department during the time period were included in the study. After taking detailed history and physical examination, Slit Skin Smears were done in all cases. All the slit skin smear were examined by doing Z-N staining and cases were classified as multibacillary or paucibacillary on the basis of result of smear examination.* ***Result****: Out of 144 cases, 72.22% (104/144) were male and 27.78% (40/144) were female. Age of the patients ranged from 7 years to 72 years. Majority of cases 48.61% (70/144) were of age group 20-39. Majority of the patients (121/144, 84.03%) were from lower socio-economic background where as 15.97% (23/144) patients were from middle income group. Hypopigmented patch (63.89%, 92/144) and nodular lesions (59.72%, 86/144) were common presentations and few cases with loss of extremities along with ulcer. Out of 144 cases, 36 cases (25%) showed smear positive and 108 cases (75%) showed smear negative on slit skin smear examination.* ***Conclusion****: So many years after the study, leprosy still remain as important problem to bring it under expected level of control. This study indicates high circulation of lepra bacilli in the community in the "elimination era". There is an urgent need for early diagnosis and appropriate treatment to prevent spread of the bacilli and development of disabilities.*

Keywords: *Hypopigmented; Acid fast; Multibacillary; Slit skin smear; Paucibacillary; Nodular.*

INTRODUCTION

Leprosy (Hansen's disease) is a chronic granulomatous disease caused by a bacillus, Mycobacterium leprae, mainly affecting the peripheral nerves, skin, mucosa of the upper respiratory tract and eyes. It is an infectious disease transmitted by droplets from the nose and mouth of untreated cases.[1]

Leprosy is one of the oldest known human diseases associated with serious physical and functional disabilities. Due to the case load and social stigma attached to the disease, leprosy still continues as a disease of public health concern.[2] According to WHO report (updated on October 2017), 1,76,176 cases of leprosy were prevalent (0.18 cases per 10,000 people) at the end of 2015 and 2,11,973 people developed leprosy (0.21 new cases per 10,000 people) during the year globally. According to this report, 2,13,899 and 2,15,656 number of new cases was reported in the year 2014 and 2013 respectively indicating the degree of continued transmission of infection.[1]

Pockets of high endemicity still remain in some areas of many countries including India. India alone accounted for 58.85%[3,4] of the global leprosy burden and a total of 1,27,000 new cases were detected during 2013-14. A total of 86,000 cases

Address for correspondence:
[1]Assistant Professor
Email: borahamrit6@gmail.com
Mobile: +917002953295
[2]PGT (**Corresponding author**)
Email: simibora10@gmail.com
Mobile: +918822737765
[3]Associate professor, [4]Statistician
Dept. of Microbiology
Assam Medical College and Hospital, Dibrugarh, Assam.

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were recorded on April 1, 2014 (prevalence rate of 0.68 per 10,000 population).[4,5]

India is one of the highest disease burden country due to leprosy. The current scenario reflect high circulation of lepra bacilli in the community. Prompt early detection of cases and appropriate treatment is required to prevent the spread of bacilli and development of disabilities.[5]

The three cardinal signs for confirmation of diagnosis of leprosy include hypo-pigmented or reddish skin lesion with definite sensory deficit, involvement of the peripheral nerves, demonstration of M. leprae in the lesions.[6] Leprosy is most commonly diagnosed by clinical signs and symptoms.[7] Demonstrations of M. leprae in the lesions by examination of the slit skin smear confirm the diagnosis. Bacteriological identification by slit skin smears examination plays an important role in early and accurate diagnosis of leprosy. In some multibacillary cases with infiltrative lesions of the skin without loss of sensation especially during early stages, positive skin smear may be the only conclusive sign for diagnosis of the disease.[6] With these concern, the present study aims at describing the epidemiological and clinico-bacteriological pattern of leprosy patients depending upon bacterial load based on "Slit skin smear" technique among the patients mainly from upper Assam area in order to help strengthen control activities in the "post elimination era."

MATERIALS AND METHODS

This was a prospective, observational study. The study was conducted at the department of Microbiology, Assam Medical College and Hospital (AMCH) during a period of one year from October 2016 to September 2017. All clinically suspected referred cases of leprosy from dermatology department during the time period were included in the study.

Informed consent was taken from all patients enrolled in the study and data was recorded. In each case, detailed history was taken and physical examination was done. Demographic data and clinical details were recorded with particular reference to the symptoms, duration, initial site of appearance of lesion, extension of lesions, distribution and colour of lesions, presence of nerve involvement in the form of thickening or tenderness, presence of disability, history of contact with leprosy cases, family history of leprosy, socioeconomic background.

Slit Skin Smears were done in all cases. Skin smears were collected from 4 sites including both the ear lobules, and margins of active lesions and nasal swab specimens. The air-dried and heat fixed smear were stained with Zeihl Nelson stain and cases were classified as multibacillary or paucibacillary on the basis of result of smear examination.[8]

Statistical analysis was carried out using Microsoft Office Excel 2007 software. Data was analyzed for descriptive statistical analysis using percentage & proportion.

RESULTS

Total 144 clinically diagnosed cases were included in the study during the period of one year.

Table 1 Distributions of cases according to socio-economic characters

Socio-demographic factors		Frequency (n=144)	Percentage (%)
Age (years)	0-9	4	2.78
	10-19	27	18.75
	20-29	32	22.22
	30-39	38	26.39
	40-49	22	15.28
	50-59	14	9.72
	60-69	6	4.17
	70-79	1	0.69
Gender	Male	104	72.22
	Female	40	27.78
Residence	Rural	118	81.94
	Urban	26	18.06
Socioeconomic group	Lower group	121	84.03
	Middle group	23	15.97
	Higher group	0	0
Family history/history of contact	Yes	18	12.50
	No	126	87.5
Occupation	Tea garden worker	48	33.33
	Agriculture labour	34	23.61
	Others	62	43.06

Demographic characteristics:

Age of the patients ranged from 7 years to 72 years. Maximum patients 48.61% (70/144) (**Table 1**) belonged to age group 20-39 years and 8.33% (12/144) of total patients were children. The percentage of cases in infants were nil.

Gender wise male patients (72.22%, 104/144) were more common than females (27.78%, 40/144). Male to female ratio (M:F) was 2.6:1.

Most of the cases in this study were without past history of exposure, only few had intra-familial contact history (18/144, 12.50%). 81.94% of cases were from rural area and 18.06% from urban area.

Majority of the patients (121/144, 84.03%) were from lower socio-economic background where as 15.97% (23/144) patients were from middle income group. There were no patients from high income group.

Maximum number of patients 48(33.33%) were found to be tea garden worker. The next common was agriculture labour 34(23.61%).

Clinical pattern:

Maximum number of patients 73(50.69%) (**Table 2**) in this study had the duration of illness less than 6 months, between 1-5 yrs in 39 cases (27.08%) and 6-12 months in 32 cases (22.22%).

Hypopigmented patch was the commonest presentation (63.89%, 92/144), extremities (119 cases, 82.64%) were the most common sites involved followed by nodular lesions (59.72%, 86/144), loss of sensation (53.47%, 77/144), thickened nerves (35.42%,51/144), erythematous patches (34.02%, 49/144), trophic ulcers (17.36%, 25/144), limb deformities (3.47%, 5/144), loss of extremities (2.78%, 4/144).

Among the patients presenting with hypopigmented patches, majority of the patients (64/92, 70.65%) had patches ranging between 2 to 5, 12(13.04%) patients had patches 6 or more than 6 and 16 patients (17.39%) had single patch. Patches were located mainly on uncovered part of body or the part of body which can be easily discovered by patient such as face, hands. Only 21(22.83%) patients had patches on covered area or the area which is not accessible to be seen by patient; whereas 71 patients (77.17%) had at least one or some patches on the uncovered body part or the area which can be seen by patient easily.

Nerve involvement was seen in 35.42% patients. Multiple nerve involvement was present in 27(18.75%) patients. Ulnar nerve (23, 45.09%) was the most commonly affected nerve. Non healing ulcer on extremities was seen in 25(17.36%) patients.

5(3.47%) cases had bony deformity in the form of claw hand. No cases of foot drop were observed. 2(1.38%) patients presented with nasal flattening. There was no case observed as ocular manifestation. 4 cases (2.78%, 4/144) presented with loss of extremities or limb amputation.

Bacteriological findings:

On examination of Slit skin smears after AFB staining, 36 cases (25%) (**Table 3**) showed smear positive (multibacillary) and 108 cases (75%) showed smear negative (paucibacillary).

Table 2 Distribution of cases according to duration of illness

Duration	Frequency (n=144)	Percentage (%)
<6 months	73	50.69
6-12 months	32	22.22
>1 year	39	27.08

Table 3 Classification of cases according to Slit skin smear results

Classification	Frequency (n=144)	Percentage (%)
Paucibacillary	108	75
Multibacillary	36	25

DISCUSSION

Leprosy can occur at all ages ranging from early infancy to very old age.[9] In the present study, majority of patients (70; 48.61%) belonged to the age group of 20-39 years which represents the reproductive active age group in both sexes. According to this study, patients below 7 years were affected the least.

Similar observations were made by Guha et al.,[10] Kaur et al.,[11] Sehgal et al.,[12] Moorthy et al.,[13] Kaur et al.,[14] Thakkar et al.,[15] Swarnakumari et al.,[16] Premalatha et al.,[17] Pokhrel et al.[18] Thus, the age distribution observed in present study correlates well with that of the other previous studies.

The frequency of leprosy cases in children is an indicator of the level of transmission of the disease in the community. In the 7-19 years of age group, there were a total of 31 cases and 8.33% (12/144) of total cases were children (7-12 years). This indicates a high infectivity status in the community.

Leprosy affects both sexes. But, in most parts of the world, males are affected more frequently than females often in the ratio of 2:1.[9] The present study also showed concurrence with the ratio of 2.6:1 indicating the same. This was also observed in the studies by Sehgal et al.[12] and Moorthy et al.[13] Male predominance may be due to factors like industrialization, urbanization, more opportunities for contact in males, difference in health seeking behaviour of males and females who are often slow to self report.

In the present study, 84.3% of the patients were from low income group and 15.97% were from middle income group. This results correlates with some other previous studies. Similar observations were made by Swarnakumari et al.[16] where 80% of the patients were from low income group. Sing et al.[19] found that 57.1% of the respondents belonged to poor socio-economic status followed by 21.6 % in lower-middle class group. Major percentage of cases in lower

income group may be due to factors like poor living conditions, overcrowding, poor sanitation, poor nutrition, lack of personel hygine and illiteracy.

It has been documented that the risk of developing leprosy is nine times higher in household of patients and four times higher in direct neighboring houses of patients compared to households that had had no such contact with patients.[20] The present study showed that only a small proportion of leprosy cases (12.50%) had history of contact with leprosy patients. This is a positive sign. Similar observations were also made by Thakkar et al.[15] and Swarnakumari et al.[16]

The present study showed majority of patients from rural area (81.94%) which may be due to factors like lack of awareness, low accessibility to health care facilities, lack of adherence to therapy, lack of knowledge regarding the consequences of the disease and inhibition of reporting for treatment due to the social taboos and customs. Kadam et al also found that major percentage of cases belonged to rural area.[21]

In the present study, the duration of the illness by the time of presentation were less than 6 months in 50.69%, 6-11 months in 22.22% and 1-5 yrs in 27.08% of cases. Similar observation was also made by Swarnakumari et al.[16] Majority of patients (50.69% of cases) reported relatively early i.e. within 6 months of disease. But the percentage of early reporting must be further increased to prevent disease complications. Due to factors like lack of knowledge, ignorance, social taboo and customs, patients tend to hide their disease and delay their treatment at the time when they could have been easily cured.

In the present study, the disease was most common among the tea garden workers (33.33%). Agriculture labour (23.61%) was the next common occupational group. Factors like illiteracy, ignorance, lack of knowledge about the consequences of the disease, overcrowding, poor personal hygiene, malnutrition which are associated with low economic status are also more common among people persuing the manual labour work.

In the present study, hypopigmented patches (63.89%) were the most common clinical presentation followed by nodular lesions (59.72%). Extremities (82.64%) were the most common site involved. These results correlates well with other similar studies. Kadam et al[21] also observed that 76.19% cases were presented with patches. Grover et al[22] found that upper extremity (29% cases) was the most common site involved followed by lower extremity (23% cases).

In this study, 17.36% cases showed trophic ulcers, 3.47% cases had bony deformity in the form of claw hand, 1.38% cases presented with nasal flattening and 2.78% with loss of extremities or limb amputation. These results suggest delay in diagnosis and treatment and lack of disease awareness in the patients.

In our study, 36 cases (25%) showed smear positive (multibacillary) and 108 cases (75%) showed smear negative (paucibacillary). Another study by Kakkad et al[23] observed that majority (thirty-five) of the cases were AFB positive (multibacillary) and fifteen were AFB negative (paucibacillary) out of 50 cases. A study on childhood leprosy by Vukkadala et al[24] found that 73.17% of cases belonged to paucibacillary and 26.83% cases to multibacillary.

Limitations: Patient attending the out-patient and in-patient department of Dermatology, Assam Medical College and Hospitals, Dibrugarh. Patients were mainly from upper-Assam area. Hence, there is limited information about the epidemiology of the disease. The study duration was only one year. So, further studies with longer duration are required to know the disease status better.

For diagnosis of leprosy, there is no independent gold standard method. Taking any of the clinical signs and symptoms, slit skin smear results, histopathological parameters as a gold standard is not ideal. Variation of results in different studies may be due to different criteria used to select the cases. Various factors also influence the results such as differences in sample size, age of the lesion, immunological and treatment status of the patient at the time of taking smears for SSS examinations.

CONCLUSIONS

Leprosy still remain as important problem to bring it under expected level of control. This study indicates high circulation of lepra bacilli in the community in the "elimination era". There is an urgent need for early diagnosis and appropriate treatment to prevent spread of the bacilli and development of disabilities. Awareness programmes should be designed to motivate the community for self-examination and reporting.

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REFERENCES

1. WHO/Leprosy-World Health Organization. [Online]. 2017 Oct. [cited 2017 Nov]; Available from:http://www.who.int/mediacentre/factsheets/fs101/en/
2. Khubchandani, J. State of the Globe: Many challenges of the multifaceted leprosy. J Global Infect Dis 2011 Oct-Dec;3(4):315-6.
3. Global leprosy update, 2013; reducing 1. disease burden. Wklyepidemiol Rec 2014;89:389-400.
4. Kumar B. World leprosy day 2015: renewing commitment for a leprosy free world. Indian J Med Res 2015 Jan;141(1):1-4.
5. Enhanced Global Strategy for further reducing the disease burden due to leprosy (2011-2015).[Online].[cited 2017 Nov];Available from:http://www.searo.who.int/entity/global_leprosy_programme/documents/enhanced_global_strategy_2011_

2015...._operational _guidelines.pdf.

6. Diagnosis of leprosy-National leprosy eradication programme. [online]. [cited 2017 Nov]. available from:http://nlep.nic.in/pdf/manual3.pdf
7. WHO/Diagnosis of leprosy.[online].[cited2017Nov]. available from:http://www.who.int/lep/diagnosis/en/
8. WHO/Classification of leprosy. [online]. [cited 2017 Nov]. Available from: http://www.who.int/lep/classification/en/
9. WHO/Leprosy elimination. [online]. [cited 2017 Nov]. Available from:http://www.who.int/lep/transmission/en
10. Guha PK, Pandey SS, Singh G, Kaur P. Age of onset of leprosy. Lepr India 1981;53:83-7.
11. Kaur S, Kumar B, Roy SN. Endemicity of leprosy in the Union Territory of Chandigarh and surrounding states. Lepr India 1982;54:428-40.
12. Sehgal VN, Ghorpade A, Saha K. Urban leprosy – an appraisal from northern India. Lepr Rev 1984;55:159-66.
13. Moorthy NB, Kumar P, Chatura KR, Chandrasekhar HR, Basavaraja PK. Histopathological correlation of skin biopsies in leprosy. Indian J Dermatol Venereol Leprol 2001;67:299-301.
14. Kaur I, Indira D, Dogra S, Sharma VK, Das A, Kumar B. Relatively spared zones in leprosy: a clinicopathological study of 500 patients. Int J Lepr other Mycobact Dis 2003;71:227-30.
15. Thakkar S, Patel VS. Clinical profile of leprosy patients: a prospective Study. Indian J Dermatol 2014;59(2):158-162.
16. Swarnakumari G, Rao TV, Ngeswaramma S, Vani T, Ch R, Neenavathu RN. A Study of clinical profile of leprosy in post leprosy elimination era. IOSR-JDMS 2015 Nov;14(11):04-12.
17. Premalatha P, Renuka IV, Meghana A, Devi SI, Charyulu PAVK, and Sampoorna G. Utility of Bacillary Index in slit skin smears in correlation with clinical and histopathological alterations in Hansen's disease: an attempt to revive a simple useful procedure. Ann Med Health Sci Res 2016 May-Jun;6(3):181-4.
18. Pokhrel K, Parajuli S, Shah M, Subedi S. Clinico-histopathological correlation of leprosy in western region of Nepal- a pioneer pilot study. Indian J clin exp dermatol 2016 July-Sep;2(3):93-7.
19. Singh S, Sinha AK, Banerjee BG, Jaswal N. Participation level of the leprosy patients in society. Indian J Lepr 2009;81:181-7.
20. Vanbeers SM, Hatta M, Klatser PR. Patient contact is the major determinant in incident leprosy: implications for future control. Int J Lepr Other Mycobact Dis 1999;67:119-28.
21. Kadam YR, Ashtekar RS, Pawar VR and Pimpale AN. A study of leprosy patients attended tertiary care hospital. Int J Community Med Public Health 2016 Dec;3(12):3419-22.
22. Grover S, Agale SV, D'costa GF, Valand AG and Gupta VK. Clinico-histopathological spectrum of infectious granulomatous dermatoses in western India- a representative study from Mumbai. J Clin Diagn Res 2016 Apr;10(4):10-4.
23. Kakkad K, PadhiT, Pradhan K and Agrawal KC. A study of clinical, bacteriological & histopathological correlation in leprosy cases attending a government medical college in Western Odisha: some observations. Indian J Lepr 2016;88:97-103.
24. Vukkadala ND, Kishore JC, Varada V. Clinical, bacteriological and histopathological profile of childhood leprosy. J Evolution Med Dent Sci 2017 Mar 6(24):2042-5.