

Spectrum of leprosy among suspected cases attending a teaching hospital in Western Rajasthan, India

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ABSTRACT

Background: Leprosy is a chronic granulomatous infectious disease, which mainly involves skin, peripheral nerves, mucosa of the upper respiratory tract, and eyes. According to National Leprosy Eradication Programme 2017-18 annual report, the annual new case detection rate from Rajasthan is 1.27 per 1 lakh population and prevalence rate is 0.14. **Aims and Objective:** The main objective of this study was to determine the spectrum of *Mycobacterium leprae* infections among suspected cases attending a teaching hospital in western Rajasthan, India. **Materials and Methods:** This is a retrospective study conducted in the Department of Microbiology, in a teaching hospital, western Rajasthan, between the period of January 2017 and April 2019. The records of modified Ziehl-Neelsen staining during the study period were analyzed. The demographic data like age and sex along with clinical diagnosis were also recorded from laboratory register and hospital information system. **Results:** Out of total 91 suspected cases, 30.77% was microbiologically confirmed cases of leprosy. Out of total positive cases, 71.43% were male and 28.57% were female. A maximum number of positive (50%) were found in the age group of 31-50 years. **Conclusion:** Present study gives an insight about the spectrum of leprosy in the region. The large number of positive cases signifies that leprosy awareness and programs aimed at elimination need to be more vigorously implemented. To achieve complete eradication from this menace, newer strategies like effective vaccine development and drug-resistance testing should be implemented.

Keywords: Leprosy, *Mycobacterium leprae*, slit skin smear

Introduction

Leprosy is a chronic granulomatous infectious disease caused by *Mycobacterium leprae* (*M. leprae*) and mainly involves skin, peripheral nerves, mucosa of the upper respiratory tract, and eyes. Leprosy is curable and disability can also be prevented with proper treatment, especially when the treatment is initiated during early stages. In 2016, the World Health Organization (WHO) launched a new global strategy which aims to reenergized efforts to control leprosy and negate disabilities, especially among children affected by the disease in endemic countries.^[1] A 1991 World

Health Assembly resolution for leprosy “elimination” (reducing the prevalence to 1 case of leprosy per 10,000 people) by the year 2000 was achieved at the global level.^[2] From ancientness to modernity, leprosy is treated as a stigma by Indian society, mainly because of inadequate scientific knowledge and cultural attitudes among people. Leprosy is still called kushtha in most of the Indian languages. Leprosy is a quiescent disease and hence there may be significant delay before the patient seeks treatment. A study from Ethiopia showed that the average detection delay in treatment exceeded 2 years, although there are no such studies from India.^[3] There is possibility of rapid infections among close contacts of a leprosy patient.^[4] There is a need for simple and effective screening test that can identify individuals or populations with subclinical disease or asymptomatic infections to decrease the delay between onset and detection. Persistence of bacteria and relapse is another unsolved

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problem after completion of recommended treatment. Contrary to expectations, use of multidrug therapy (MDT) has not solved the problem of persistence of *M. leprae*, which by definition are drug-sensitive organisms which remain dormant.^[5] According to National Leprosy Eradication Programme 2017–18 annual report, the annual new case detection rate from Rajasthan is 1.27 per 1 lakh population and prevalence rate is 0.14.^[6] According to WHO, Global leprosy update, 2017: reducing the disease burden due to leprosy, there is not very much difference in the new case detection trends in India from 2008 to 2017.^[7] Although the prevalence is low in Rajasthan, we are experiencing good number of positives among suspected cases. The main objective of this study was to determine the spectrum of *M. leprae* infections among suspected cases attending a teaching hospital in western Rajasthan, India.

Materials and Methods

Present study is a retrospective study conducted in the Department of Microbiology, in a teaching hospital, from western Rajasthan, between the period of January 2017 and April 2019. The records of modified Ziehl–Neelsen (ZN) staining of slit skin smear during the study period were analyzed. Slit skin smear samples were collected in the microbiology laboratory from suspected cases of leprosy for modified ZN staining, which as advised by physician were included in the study. The demographic data of each case, that is, age and sex, microscopic examination findings along with clinical diagnosis, were recorded from mycobacteriology laboratory register and hospital information system. All slit skin smear samples were tested as per the standard laboratory protocol. In all cases, modified ZN staining was performed by using 5% sulfuric acid as decolorizer. This study is approved by hospital ethics committee (2019–20/883).

Statistical analysis

The interpretation and analysis of the data were done by using Microsoft Excel. The quantitative data were expressed as number, percentages in tabular form, and charts.

Results

Out of 91 suspected cases, 28 (30.77%) were positive for acid fast bacilli (AFB) suggestive of *M. leprae*. Total 64 were males, of which 20 (71.43%) were positive; and among 27 suspected females, 8 (28.57%) were found to be positive. The male:female ratio was 2.37:1. A maximum number of positive cases, 14 (50%), were seen in the age group of 31–50 years. Age and sex distribution are shown in Table 1. Slit skin smear was collected from the suspected lesions, both eye brows, both ears, and nose in most of the cases. Maximum positivity was seen in smears prepared from ear lobes and eye brows. Among positive cases, three cases were migrants from other states, out of which two were from Uttar Pradesh and one from Bihar. District-wise distribution of cases is shown in Table 2. Out total 28 positive cases, 23 (82.14%) cases were diagnosed clinically as leprosy,

Table 1: Age and sex-wise distribution of positive cases

Age (years)	AFB positive, n (%)	Male, n (%)	Female, n (%)
11-30	03 (10.71)	3 (10.71)	Nil
31-50	14 (50)	8 (28.57)	6 (21.43)
51-70	11 (39.29)	9 (32.15)	2 (7.14)
Total	28 (100)	20 (71.43)	8 (28.57)

AFB=Acid fast bacilli, n=total number

Table 2: District wise distribution of positive cases

District name	Number of positive cases, n (%)
Jodhpur	14 (50)
Jalore	1 (3.6)
Nagaur	3 (10.7)
Pali	7 (25)

n=total number

and in other 5 (17.86%) cases, slit skin smear was advised to rule out leprosy. In three (10.71%) cases, type 2 lepra reaction was diagnosed. Overall bacillary index in the present study was <2 in 16 (57.14%) cases and >2 in 12 (42.86%).

Discussion

Leprosy can be present as variety of clinical presentations, depending on the cell-mediated immunity of the host. Depending on the number of lesions, leprosy is classified by the WHO as paucibacillary and multibacillary diseases. Ridley Jopling classification divides leprosy in five groups: tuberculoid, borderline tuberculoid, borderline (BB), borderline lepromatous, and lepromatous (LL). The Indian classification includes an additional class known as pure neuritic. The diagnosis of leprosy is mainly clinical, but slit skin smear and histopathology are means to aid in diagnosis. Demonstrating AFB is still considered as important tool for diagnosis, classification, and management of leprosy.^[8,9] However, the sensitivity of slit skin smear is poor (10–50%).^[10] A recent Indian study has showed overall smear positivity in 29.6% of leprosy cases with an increasing trend of smear positivity over the years.^[11] Although AFB are better demonstrated in biopsies,^[12-14] it is technically demanding, invasive, and has no definite role in the management of leprosy. Present study mainly emphasizes on the detection of AFB in slit skin smear from suspected cases of leprosy. The majority of AFB-positive cases in this study belonged to middle age group (31–50 years), similar to finding showed by other studies.^[11,15] The incidence of leprosy is said to increase between 10 and 20 years of age and peaks between 20 and 35 years of age.^[16] The higher male-to-female ratio in the present study is also similar to another study.^[11] From the sulfone era, leprosy has been associated with male predisposition and this association was also seen in this study which might be attributed to greater mobility and increased accessibility to health care of male patients. Leprea reactions were seen in 10.71% patients with type 2 reaction being the only diagnosed in this study before initiation of treatment. Almost similar observations have been made by another study, who observed reactions in

11.1% cases with type 2 reaction being four times more in frequency than type 1 reaction.^[17] This indicates that many patients ignore their disease and seek medical care only when they develop reactions. Another study has shown an even higher percentage of patients with lepra reactions as a presenting manifestation.^[18] Three (10.71%) cases were migrant workers from Uttar Pradesh and Bihar, travel to Rajasthan for employment. It is very much common that one of the reasons for the high number of new cases is due to migrant population from high endemic areas. Such demographic changes have been also showed by other study from different parts of India as well.^[11] Only limited efforts have been made in India to include the numerous nonallopathic practitioners in control as well as elimination of leprosy, but their inclusion is important to its success.^[19] Sustaining the gains made so far and further reducing the disease burden in India, an innovative, integrated approach that includes ongoing education, efforts to identify interventions which can reduce stigma are required and there is a need of inclusion of nonallopathic practitioners in disease control programs.^[20] In a study, over 15% of 65 BB LL cases assessed at 6-month post release from 12-month MDT regime showed presence of viable *M. leprae* which was evidenced by the growth in foot pads of immunocompetent mice.^[21] This suggests that long-term follow-up of multibacillary cases is required after they complete their treatment. Relapses are being reported worldwide in both paucibacillary and multibacillary cases following MDT and so is the stray incidence of resistance of *M. leprae*, proven either by inoculating in the mouse foot pad or using molecular tools.^[22,23] In 2011, 690 relapse cases were reported from India which is probably much less than the actual numbers due to lack of defined criteria for relapse and inability of the field staff to suspect relapse.^[24] In a recent study, across three countries (Myanmar, Indonesia, and Philippines), it was found that from new cases 3% were dapson-resistant and 2% were rifampicin-resistant. In samples from relapsed patients, 15% were dapson-resistant and 8% were found to be rifampicin-resistant.^[25] In primary-care level, family medicine specialists can play a vital role in the care of general public, particularly those who could not afford private care which constituted majority of the patients in India. Patients with leprosy are usually belongs to low socioeconomic group, who generally seek treatment in government facilities with family medicine specialists. Thus, it is very important for family medicine specialists to have adequate knowledge and confidence in diagnosing and managing leprosy patients to prevent disease-related complications. WHO global leprosy strategy (2016–2020) established a goal of further reduction of the leprosy burden with primary target, emphasizing on early detection and reduction of grade 2 disabilities at the time of diagnosis and reduction of transmission.^[1] With adequate knowledge regarding diagnosis, clinical presentation, and epidemiology, family medicine specialists can contribute in achieving this goal. The limitations of this study are its retrospective nature and correlation of microscopic findings, with histopathological findings are not done which could have given better clarification about the positive cases.

Conclusion

As present study was conducted in a teaching hospital, it certainly is not representative of the situation on the field. Still, it gives an insight about the spectrum of leprosy in the region. The large number of positive cases signifies that leprosy awareness and programs aimed at elimination need to be more vigorously implemented. There has not been very much decline in the occurrence of new leprosy cases in India since 2008 despite several measures. Thus, effective and sustained measures such as awareness about the disease, facilities for investigations, and unrestrained provision of therapy are needed. To achieve complete eradication from this menace, newer strategies like effective vaccine development and drug-resistance testing should be implemented.

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Conflicts of interest

There are no conflicts of interest.

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