



Original Research Article

Current scenario of leprosy in post elimination era at a tertiary care hospital in central India

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ABSTRACT

Background: Leprosy is a chronic granulomatous infectious disease caused by Mycobacterium leprae primarily affecting the skin and peripheral nerves. Though India announced statistical elimination of leprosy as public health problem under the National Leprosy Eradication Programme in December 2005, still wide variations exist in prevalence rates of this disease across the country.

Objectives: Of the study were to determine the pattern, occurrence and trends of smear positive leprosy cases at Government medical college, Akola.

Materials and Methods: This is a retrospective study conducted from January 2018 to February 2020. All patients suspected of leprosy were confirmed by slit skin smear examination. Record details of age, type and duration of disease, deformity status were noted.

Results: Total 520 clinically suspected were examined. 175 were diagnosed smear positive foe acid fast bacilli. Males outnumbered females. Smear positivity was highest in 21- 40 years age group. Multibacillary cases were 103(58.85%) and paucibacillary were 72(41.14%).

Interpretation and Conclusion: Present study shows that despite statistical elimination, leprosy still continues to be a challenge. Approaches like destigmatising the disease, family counseling, integrating leprosy care into general health care systems, developing newer diagnostic and epidemiological tools, chemoprophylactic regimens and vaccines are needed to develop eradication strategy that can reduce the burden of leprosy in India.

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1. Introduction

In 1874, Armaur Hansen identified Leprosy as an Infectious disease caused by Mycobacterium leprae. India is home to 60% of the Leprosy patients worldwide, a situation that has remained unchanged despite massive decline in global prevalence of the disease.¹

Leprosy is regarded as a special disease because (1). Slow, generation time of the bacillus(two weeks). This results in long incubation period (average 5-7 yrs) and very slow development of pathology leading to slow and insidious clinical evolution and unclear epidemiological pattern. (2). The bacillus has never been conclusively grown in artificial medium and consequently the bacteriology of

leprosy was greatly delayed until 1960 when limited growth in mice was achieved. (3). This is the only bacillary disease with a predilection for nerve tissue and affects somatic and autonomic nerves, skin, eye, nasal mucosa, muscle, bone, testes. (4). Man alone gets leprosy, and is the reservoir of infection, although naturally infected armadillos have been found in the Southern USA and primates in Africa. (5). Leprosy is the best example of a disease which has a spectrum from complete absence of resistance by the host to effective immunity, which is often accompanied by extreme and destructive hypersensitivity. In lepromatous leprosy bacillary invasion is such that the number of bacilli in the dermis can reach 10⁹ per gram tissue. In tuberculoid leprosy on the other hand the cell mediated response to the presence of bacilli is so violent that it continues in the presence of a bacillary population which is too small to be

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detectable. (6). Leprosy causes permanent and progressive physical deformities and disabilities in patients but seldom kills, leading to crippled life coupled with stigmata creating grave socio-economic problems in the community.^{2,3} Social factors such as poverty, overcrowding, poor housing, lack of education and awareness, poor personal hygiene favours the spread of disease in the community.

Based on clinical manifestations, leprosy is classified as tuberculoid leprosy, lepromatous leprosy, indeterminate leprosy, borderline tuberculoid and borderline lepromatous leprosy.⁴ According to WHO, leprosy is divided into two groups paucibacillary and multibacillary.⁵ Lepra bacilli can be demonstrated in smears as acid fast bacilli present singly or in globi.⁶ Demonstration of acid fast lepra bacilli in stained smears is an approach to confirm the diagnosis, monitor the progress of disease, outcome of treatment and also for calculating bacteriological and morphological indices.⁶ Although India achieved statistical elimination from leprosy in 2006, a large proportion of leprosy cases reported globally consisted of India. The national prevalence being 0.67/ 10,000 population, the prevalence in Maharashtra is more than 2/10,000 population in March 2018.⁷ Since transmission of leprosy is from man to man, the only way to achieve elimination is early diagnosis and treatment.⁶ The present study was conducted to determine the pattern, prevalence and trends of smear positive leprosy cases in Government medical college and tertiary care hospital, Akola from January 2018 to February 2020.

2. Material and Methods

The Department of Microbiology, Government medical college Akola is a tertiary care hospital providing laboratory confirmation of leprosy by slit skin smear examination. This retrospective study was conducted over a period of 25 months commencing from January 2018 to February 2020. All the patients suspected of leprosy, visiting or referred to hospital were included in this study irrespective of their age & sex. Smears were prepared from 4 sites: one from each ear lobe and two from sites of lesion/ active disease. Slit and scrape method was used for collecting materials from ear lobes. The smears were stained with modified Ziehl-Neelsen stain and examined under oil immersion to look for both intra and extracellular acid fast bacilli and reported accordingly. Bacteriological indices were calculated. From OPD records details on age, type and duration of disease, deformity status were noted.

2.1. Bacteriological index (BI)

Density of lepra bacilli in smears including both solid and fragmented forms, BI is obtained by adding up the index from each site examined and dividing by the total by number of sites examined.

2.1.1. According to Ridley's Logarithmic Scale, Ranges of BI are

- 1+: 1-10 bacilli/100 fields.
- 2+: 1-10 bacilli/10 fields.
- 3+: 1-10 bacilli/one field.
- 4+: 10-100 bacilli/one field.
- 5+: 100-1000 bacilli/one field.
- 6+: > 1000 bacilli/one field.

3. Results

A total of 520 clinically suspected patients were examined. Males outnumbered the females and the male: female ratio was 1.98:1. 175 patients were diagnosed as smear positive for acid fast bacilli in which male: female ratio was 2.22:1 (Table 1). Age wise analysis of data reveals that majority of patients belonged to the age group 21-40 years. The number of smear positive cases also being highest in the same age group (Table 2). Analysis of bacteriological indices among smear positive cases shows that majority of smear positive cases had BI of 2 + (46%). Smear positive cases with globi (BI 6+) are 11% (Table 3). Year-wise analysis of data reveals a decline in number of smear positive cases from 41.04% to 27.83% (Table 4). Multibacillary cases outnumbered paucibacillary cases (Table 5) and 67 cases (38.28%) developed deformities of hands, feet (WHO Grade II disability). Reactional episodes with or without neuritis occurred in 84 patients (48%) of which 56 (32%) developed Type I reaction and 28 (16%) developed Type II reaction with lesions of erythema nodosum leprosum (ENL).

Table 1: Sex distribution of smear positive leprosy

Gender	Total cases	Smear Positive Cases
Male	343	121
Female	177	54
Total	520	175

Table 2: Age wise distribution of smear positive leprosy cases

Age Group	Number of Cases	Smear Positive Cases
0 – 20	101	0
21 – 40	211	101
41 – 60	179	55
61 – 80	29	19

Table 3: Analysis of BI among smear positive leprosy cases

BI	Males	Females	Total	Percentage (%)
1 +	20	2	22	12.57%
2 +	46	35	81	46.28%
3 +	20	6	26	14.85%
4 +	20	6	26	14.85%
5 +	0	0	0	0
6 +	15	5	20	11.42%

Table 4: Year wise analysis of smear positive leprosy cases

Year	Number of patients examined	Number of Smear positive patients	Percentage of Smear positive patients
January 2018 To January 2019	229	94	41.04%
February 2019 To February 2020	291	81	27.83%
Total	520	175	33.65%

Table 5: Distribution of cases as per type of the disease

Type of leprosy	Total	Percentage (%)
Paucibacillary	72	41.14%
Multibacillary	103	58.85%

4. Discussion

In our study, male preponderance was seen which is in concordance with trends prevalent in our country where males frequently self report for treatment and females are slow to self report.⁸ Males go for outdoor work more and hence have higher chance of getting infection than females. Increased mobility and frequent interaction with community also leads to increased opportunity for contacts in males.⁹ This is similar to findings reported by Seher et al and Singh et al.^{10,11} Majority of patients belonged to age group 21-40 years, which correlates with findings reported by Jindal et al & Mathan et al.^{12,13} The bacteriological indices of smear positive patients ranged from 1+ to 4+ with majority of patients (46.28%) having BI of 2+ indicating low bacillary load and good prognosis on treatment. But patients with BI 6+ (11.42%) having high bacillary load & disabilities are highly infectious and are more likely to transmit the disease in the community. A significant observation in this study period is declining smear positivity from 41.04% to 27.83% which may be the result of continuation of MDT and timely completion of treatment of large number of cases. In our study majority of cases (58.85%) belonged to multibacillary type which is correlating with other studies like Arora et al and Pandey et al.^{14,15} Other studies like Rao et al and Mahajan et al^{16,17} reported paucibacillary as the most common type among the leprosy cases. In our study 38.28% cases developed grade II deformity which is higher than the disability rates reported in studies like Jayakumar et al (22-27%), Norman et al (20-25%).^{18,19} This higher disability rate could be due to social stigma, late reporting to the hospital and delay in starting the treatment. In this study reactional episodes are seen in 48% cases which is consistent with other studies like Arora et al and Kumar et al.^{14,18} Increasing incidence of reactions over years perhaps shows increasing awareness in patients for

reactions which compels them to seek treatment from a hospital rather than field based clinics. We observed that the occurrence of neuritis significantly increases the risk of deformities especially in multibacillary cases. The hallmark of leprosy is the unique ability of *M. leprae* to survive within the Schwann cells of peripheral nerves. Hence the infected nerves and surrounding tissues can be damaged as the host mounts an immune response to bacterial antigens. Factors triggering these immune responses are not fully understood but if not treated properly can lead to permanent sensory, motor and or autonomic peripheral nerve damage which may result in severe disability. So rehabilitative measures such as physiotherapy and corrective surgeries should be offered to those patients. Bacteriological examination is an essential screening procedure for all suspected cases of leprosy and also considered to be important for confirmation of diagnosis, classification & management of leprosy.²⁰ Though the specificity of slit-skin smear is almost 100% but sensitivity ranges from 10% - 50%.²¹ Directorate General of Health Services, Central Leprosy Division, New Delhi has issued guidelines on strengthening of skin smear labs for leprosy control programs. However, to ensure reliability and uniformity continuous monitoring and supervision for the collection & processing of slit-skin smears are necessary.²² Although India has announced statistical elimination of leprosy but such a strategy can not be justified at the moment as new case detection rate not abating significantly. Approaches like destigmatizing the disease, family counselling, integrating leprosy care into general health care systems, developing newer diagnostic & epidemiologic tools, chemoprophylactic regimens and vaccines are needed to develop an eradication strategy which can reduce the burden of leprosy in India.

5. Conclusion

The present study shows despite statistical elimination, leprosy still continues to be a major public health problem and challenge to health. There is an urgent need for early diagnosis, treatment and prevention of disability, strengthened eradication strategy which can reduce the burden of leprosy. Main principles of leprosy control are (1). increasing the duration of treatment in multibacillary cases especially smear positive, BL and LL cases thereby decreasing the spread (2). timely detection of new cases and prompt treatment to prevent deformities in the affected and the spread of disease in community through increasing the surveillance activities. (3). Keeping families of patients under surveillance (4). Improving socio-economic conditions (5). Health education about leprosy, with emphasis on early presentation for diagnosis and the likelihood of cure by multiple drug therapy. Self presentation for diagnosis should be greatly encouraged. (6). Increasing community awareness utilising Information, Education, and Communication (IEC) activities at all levels

and in all states with more emphasis on endemic states should be launched. There is a need to sustain and provide quality leprosy services to all persons through general health system, including good referral system. Efforts need to be made to reduce deformity through early detection, self care, physiotherapy and reconstructive surgery and developing sound surveillance systems.

By early detection and increasing the duration of therapy and increasing community awareness utilising Informatoin, Education and Communication (IEC) at all levels, we can hope to achieve the dream of leprosy free India.

6. Limitations of the study

Community based surveys covering the district population could not be done

7. Source of Funding

No financial support was received for the work within this manuscript.

8. Conflict of Interest

The authors declare they have no conflict of interest.

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