Leprosy: Current status in a Tertiary Care Hospital after 65 Years of Different National Leprosy Control Programs in India

Archana Chintaman Choure*, Rajeev Kishor Saxena and Sachinkumar Vasantrao Wankhede

Department of Microbiology, Smt. Kashibai Navale Medical College and General Hospital, Pune, India

*Corresponding author

ABSTRACT

Many infectious diseases are prevalent in India, but after the emergence of HIV/AIDS, the due importance has not been given to leprosy and hence neglected by medical researchers’ and government bodies. Leprosy (Hansen’s disease) is one of the Neglected Tropical Diseases (NTDs) in India. On the occasion of World first Neglected Tropical Disease Day i.e. January 30, 2020 this motivated us to study status of leprosy in our institute retrospectively. To diagnose leprosy by slit skin smears (SSS) examination and profiling of leprosy patients in a tertiary care hospital. Total 446 slit skin smears were examined from Jan 2015 to Dec 2019 for leprosy diagnosis by following standard microbiological methods. Among all clinically suspected patients 75.8% were IPD patients. Among all clinically suspected leprosy patients 10.9% were positive by Slit Skin Smear (SSS) examination. SSS positive leprosy patients were more during year 2017. There was male predominance (67.3%) among all SSS positive leprosy patients. Total 59% SSS positive leprosy patients were from urban area. Leprosy is still prevalent in India after 65 years of different national leprosy control programs. It is the need of hour for medical fraternity to screen patients actively for leprosy. Early diagnosis and treatment is the key to reduce the prevalence, so high index of suspicion is required. Each and every infectious disease has its own impact on community health so all infectious diseases to be given equal importance for early diagnosis, treatment and prevention by medical researchers and government bodies. These approaches will reduce the burden of leprosy as a Neglected Tropical Disease in India.

Keywords
Leprosy (Hansen’s disease), NTD (Neglected Tropical Disease), Current status, Slit skin smear (SSS) & India

Introduction

Despite advances in all fields of health science, leprosy continues to be a major public health challenge in developing countries like India1. Leprosy is caused by Mycobacterium lepare and very well known in history since long time2:

Vedic times in India (described as KushthaRoga in SushrutaSamhita, 600 BC).

Biblical times in the Middle East

Hippocrates, 460 BC.

G. H. Armauer Hansen (1873) in Norway discovered Mycobacterium lepare. It was first
bacterial pathogen to humans but still it
remains one of the least understood bacteria
because of it’s non-cultivable nature.
However Shepard (1960) was able to multiply
these bacteria in footpad of mouse².

India’s major 11 NTDs (Neglected Tropical
Diseases) are Ascariasis, Hookworm disease,
Trichuriasis, Dengue, Lymphatic Filariasis,
Trachoma, Cysticercosis, Leprosy, Ehinococcosis, Visceral Leishmaniasis and
Rabies.³ Leprosy (Hansen’s disease) is one of
the Neglected Tropical Diseases (NTDs) in
India. According to WHO, India may account
for more than one-half of the global prevalent
and new cases of leprosy.⁴

In Maharashtra, it is found that very few
districts within the state or very few pockets
within the district are actually having leprosy
burden. It is more in Vidarbha region
followed by Rest of Maharashtra and
Marathwada.⁵ On the occasion of World first
Neglected Tropical Disease Day i.e. January
30, 2020 we have been motivated to study
current status of leprosy in our Institute
retrospectively. This paper will focus
on leprosy cases in a tertiary care hospital
located in Rest of Maharashtra.

The main objectives of this study include to
diagnose leprosy by doing slit skin smears
(SSS) examination And also to study the
profile of leprosy patients visiting a tertiary
care hospital.

Materials and Methods

This study was done in the Department of
Microbiology, Smt. Kashibai Navale Medical
College and General Hospital, Pune. A
retrospective study was done on leprosy
patients.Total 446 slit skin smears were
examined for diagnosis of leprosy during the
period from Jan 2015 to Dec 2019.

Slit skin smears were prepared by collecting
skin, ear lobe& eyebrows specimens from six
sites of clinically suspected leprosy patients.
These smears were stained by Ziehl-
Neelsen technique by using 5% sulfuric acid
for decolorization. Under oil immersion
objective, red acid fast bacilli arranged singly
or in groups (cigar like bundles) were
observed.² All SSS positive patient details
were entered in MS EXCEL sheet and data
related to gender, OPD/IPD and area wise
distribution was studied and compiled in
graphs and charts for analysis.

Results and Discussion

Among all clinically suspected leprosy
patients 75.8% were IPD patients (Table-1).
Among all clinically suspected leprosy
patients 10.9 % were positive by Slit Skin
Smear (SSS) examination (Table-2).
SSS positive leprosy patients were more
during year 2017 (Table-3).
There was male predominance (67.3%)
among all SSS positive leprosy patients
(Table-4).
Total 59% SSS positive leprosy patients were
from urban area (Table-5).

India experiences the world's largest absolute
burden of at least 11 major NTDs. Excluding
NTDs that are spatially bound by their
requirement for unique insect vectors or snail
hosts (e.g., schistosomiasis, onchocerciasis,
human African trypanosomiasis, and Chagas
disease), India leads the world in terms of the
total number of cases for each of the major
NTDs, as defined by the World Health
Organization (WHO). Ascariasis, Hookworm
disease, Trichuriasis, Dengue, Lymphatic
Filariasis, Trachoma, Cysticercosis, Leprosy,
Ehinococcosis, Visceral Leishmaniasis and
Rabies are the major NTDs in India.³
**Table 1** Distribution of clinically suspected leprosy patients visiting a tertiary care hospital

<table>
<thead>
<tr>
<th>Year</th>
<th>OPD Patients (%)</th>
<th>IPD Patients (%)</th>
<th>Total Patients (n=446)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>22</td>
<td>87</td>
<td>109</td>
</tr>
<tr>
<td>2016</td>
<td>23</td>
<td>89</td>
<td>112</td>
</tr>
<tr>
<td>2017</td>
<td>23</td>
<td>29</td>
<td>52</td>
</tr>
<tr>
<td>2018</td>
<td>12</td>
<td>70</td>
<td>82</td>
</tr>
<tr>
<td>2019</td>
<td>28</td>
<td>63</td>
<td>91</td>
</tr>
<tr>
<td>Total</td>
<td>108(24.2)</td>
<td>338(75.8)</td>
<td>446</td>
</tr>
</tbody>
</table>

**Table 2** Distribution of leprosy patients diagnosed by slit skin smear examination

<table>
<thead>
<tr>
<th>Year</th>
<th>Clinically Suspected Leprosy Patients (n=446)</th>
<th>Diagnosed By Slit Skin Smear Examination (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>109</td>
<td>9</td>
</tr>
<tr>
<td>2016</td>
<td>112</td>
<td>13</td>
</tr>
<tr>
<td>2017</td>
<td>52</td>
<td>15</td>
</tr>
<tr>
<td>2018</td>
<td>82</td>
<td>4</td>
</tr>
<tr>
<td>2019</td>
<td>91</td>
<td>8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>446</td>
<td>49(10.9)</td>
</tr>
</tbody>
</table>

**Table 3** Distribution of leprosy patients diagnosed by slit skin smear (SSS) examination

<table>
<thead>
<tr>
<th>Year</th>
<th>OPD Patients</th>
<th>IPD Patients</th>
<th>Total SSS Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>0</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>2016</td>
<td>1</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>2017</td>
<td>2</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>2018</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2019</td>
<td>3</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>43</td>
<td>49</td>
</tr>
</tbody>
</table>

**Table 4** Gender distribution of all SSS POSITIVE patients

<table>
<thead>
<tr>
<th>Year</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total(n=49)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>2016</td>
<td>8</td>
<td>5</td>
<td>13</td>
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<tr>
<td>2017</td>
<td>11</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2019</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>33(67.3)</td>
<td>16(32.7)</td>
<td>49</td>
</tr>
</tbody>
</table>
Among all clinically suspected patients 75.8% were IPD patients

Among all clinically suspected leprosy patients 10.9% were positive by Slit Skin Smear (SSS) examination

SSS positive leprosy patients were more during year 2017

There was male predominance (67.3%) among all SSS positive leprosy patients
Leprosy is chronic infectious disease of skin and neurons, caused by *Mycobacterium leprae* and *Mycobacterium lepromatosis*. The global leprosy status has changed significantly over the last four decades after the initiation of multidrug therapy (MDT) in 1982 with a reduction in prevalence from over 5 million cases in the mid-1980s to less than 200,000 at the end of 2016. The WHO launched a 5-year “Global leprosy strategy 2016–2020” in April 2016 titled ‘Accelerating towards a leprosy-free world’. Strategy for years 2016–2020 was based on three pillars: (i) to strengthen government ownership, coordination, and partnership; (ii) to stop leprosy and its complications; and (iii) to stop discrimination and promote inclusion. NLEP (National Leprosy Elimination Programme) had introduced the *Mycobacterium indicus* Prani (MiP) vaccine in a project mode in India from the year 2016.

MIP vaccine has been shown to have both immunotherapeutic and immune-prophylactic effects in multibacillary leprosy patients and their contacts in both hospital and population-based trials. It also reduced the bacillary load, upgraded the lesions histopathologically, led to complete clearance of granuloma, reduced reactions, and neuritis. *M. leprae* is a nonmotile, non-sporeforming, microaerophilic, acid-fast-staining bacterium that usually forms slightly curved or straight rods. *M. leprae* is non-cultivable but can be maintained in axenic cultures in what appears to be stable metabolic state for a few weeks. As a result, propagation of *M. leprae* has been restricted to only animal models, including the armadillo and normal, athymic, and gene knockout mice. These methods have provided the basic information for genetic, metabolic, and antigenic studies of the bacillus. Growth of *M. leprae* in mouse footpads also provides a tool for testing the drug susceptibility of clinical isolates. Tilldate Slit Skin Smear examination is the mainstay for diagnosis of leprosy patients.

In our study it was observed that among all clinically suspected leprosy patients, 75.8% were IPD patients (Table-1). Among all clinically suspected leprosy patients 10.9 % were positive by Slit Skin Smear (SSS) examination (Table-2). It indicates the screening of all patients was actively done for leprosy diagnosis. India, Brazil and Indonesia were the countries where leprosy new cases were more than 10,000 per year. During 2017 India accounted for 66% of total cases globally. In other words, two out of every three new global leprosy cases are detected in India.
The proportion of child cases was 8.7% at national level and 10.18% in Maharashtra during 2017.\textsuperscript{14}Our study reflected that all 10.9% (49 patients) SSS positive leprosy cases were from adult age group, but surprisingly not a single case from children age group. It suggests that active screening of cases to be done in pediatric patients also.

In Maharashtra, a total of 15,498 new cases diagnosed, of these 8325 MB, 6770 (43\%) were women and 1912 (12\%) were children. Even within state of Maharashtra better performing districts like Satara and Pune (with PR around 0.5/10,000) showing gender-wise, urban-rural area wise, MB cases-wise disparities.\textsuperscript{15-17}Our observation was that leprosy patients were more during year 2017 and least number of cases were during 2018(Table-3). There was male predominance (67.3\%) among all SSS positive leprosy patients (Table-4). Bhattacharya et al\textsuperscript{18} & Mathan R et al.,\textsuperscript{19} also observed higher incidence in male patients. Ramos et al\textsuperscript{20} reported 64.5\% male, 35.6\% female and 3.2\% children leprosy cases in their seven and half year study.

Leprosy, a NTD primarily affect the poorest sectors of society, especially the rural poor and the most disadvantaged urban populations.\textsuperscript{21,22} The present study showed 59\% leprosy patients were from urban area (Table-5).

The year 2020 was a crucial year for the future global response on NTDs. It was expected that the progress against the 2020 NTD roadmap targets will be assessed and new 2021-2030 NTD roadmap will be launched by WHO.\textsuperscript{23} Unfortunately the pandemic of SARS CoV-2 disturbed all calculations of researchers, as the number of new cases of COVID-19 infection increases, the incidence of leprosy reactions may also increase considerably.\textsuperscript{24}

In conclusion,

Leprosy is still prevalent in India after 65 years of different national leprosy control programs. It is the need of hour for medical fraternity to screen patients actively for leprosy.

Early diagnosis and treatment is the key to reduce the prevalence, so high index of suspicion is required.

Each and every infectious disease has its own impact on community health so all infectious diseases to be given equal importance for early diagnosis, treatment and prevention by medical researchers and government bodies.

These approaches will reduce the burden of leprosy as a Neglected Tropical Disease in India.

Acknowledgement

All authors are thankful to entire department of skin and dermatology for sending samples for Slit Skin Smear examination for diagnosis of leprosy.

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How to cite this article: