

Clinical Profile of Leprosy among Patients Diagnosed at a Tertiary Referral Centre in Central Part of Karnataka: A Five - Year Retrospective Data Analysis

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Abstract: *The National Leprosy Eradication Programme of India declared in December 2005 that leprosy will no longer be recognized as a public health issue on a national scale. Nonetheless, India continues to diagnose a sizable number of new cases. This study was conducted in the Department of Dermatology, Venerology and Leprology at JJMMC, Davanagere. Clinicoepidemiological profiles of leprosy cases that were registered between August 2018 and September 2023 were retrospectively analyzed. Of the 144 new and default leprosy patients who came to our department, the majority were in the 40–49 age group, followed by the 30 - 39 and 20–29 age groups. The remaining patients belonged to different age groups. Males comprised the majority. The majority of patients worked as laborers and farmers. For morphological types, borderline tuberculoid was the most common. In general, the most common form of leprosy cases were multi - bacillary cases. A reaction was seen in 34% (49) of the patients; type 1 was shown in 40% (20) and type 2 in 60% (29). 54 (37.5%) patients were determined to have disabilities, of which 24 (16.7%) had Type 1 disabilities and 30 (20.88%) had Type 2 disabilities. Ninety - five patients had peripheral nerve enlargements that were clinically thickened. The most frequently affected nerve was shown to be the ulnar nerve. Fifteen cases had a history of contact. 51 cases came from urban areas, whereas 93 patients were from rural areas. The high percentage of multi - bacillary infections, reactions, and disability rates point to the necessity of comprehensive community - level research as well as suitable corrective public health interventions.*

Keywords: Leprosy, Borderline, Tuberculoid, Lepromatous, Histoid Leprosy, Indeterminate Leprosy

1. Introduction

Leprosy is a chronic disease, infectious in some cases, caused by *Mycobacterium leprae*. The peripheral nerve system is the primary target, with skin and other tissues being affected subsequently. Leprosy may affect anybody at any age, from early infancy to old age. Various clinicopathological manifestations of leprosy arise based on the host's immunological state. The standard research classification follows that of Ridley and Jopling (Ridley and Jopling 1996), which is based on immuno - pathologic data. Leprosy manifests in a wide variety of clinical features that are correlated with the individual's immune status and histological alterations. Tuberculoid leprosy (TT), which has minimal lesions and a dearth of organisms, is at one extreme of the spectrum. At one end of the spectrum is Tuberculoid Leprosy (TT), which is manifested with few lesions and a paucity of organisms. At the other end is Lepromatous Lepromatous leprosy (LL), in which there are numerous lesions with myriad bacilli and an associated absence of cellular immune response. Borderline Lepromatous (BL), Borderline Tuberculoid (BT), and Borderline Borderline (BB) leprosy are found in between these poles. The most labile forms are the Borderline forms (BB), and the most stable forms are the Polar forms (TT and LL). It is well known that leprosy is considered an important disease mainly because of its potential to cause permanent and progressive physical deformities/ disabilities with serious social and economic consequences. The registered global prevalence of leprosy was 192713 cases (0.25/10000 population) at the end of 2017 (WHO Global leprosy update 2017). In 1982, MDT came into use, in response to the recommendation of WHO study group, Geneva (1981). In 1991, World Health Assembly resolved to eliminate

Leprosy at a global level by the year 2001. Leprosy was declared eliminated as a public health problem in India at national level in the month of December 2005, with prevalence less than one per 10000 populations. However, still India continues to top the table globally as far as detection of new cases of leprosy. Three countries with the highest burdens, India, Brazil and Indonesia accounted for 80.2% of the new caseload globally in 2017 (WHO Global leprosy update 2017). A total number of 88166 leprosy cases were recorded on 1st April 2017 with PR 0.66 per 10,000 populations as against 86,028 cases in April 1, 2016. Detailed information on new leprosy cases detected during 2016 - 17 indicates the proportion of MB (49.57%), Female (39.17%), and Child (8.7%).

2. Material and Methods

This five years study was conducted in the Department of Dermatology, Venerology and leprology in JJMMC and CG Government hospital, Davanagere. We have retrospectively analysed the data retrieved from our leprosy clinic register for August 2018 to Sep 2023. All freshly diagnosed cases as well as defaulters requiring treatment were included in this analysis. The leprosy register included details of their demographic profile, occupation, a detailed clinical history, physical examination finding, slit skin smear and skin biopsy reports. Diagnosis of leprosy was made clinically, histopathologically and bacteriologically by standard criteria (Ridley and Jopling 1966, IAL 1982).

Disability grading criteria was that of WHO (Brandsma and van Brakel 2003). These cases were classified into paucibacillary (PB) and multi - bacillary (MB) types for treatment purposes as were WHO criteria (WHO 1994)

followed by NLEP (2009). Descriptive statistical analysis was carried out as per study need and objectives.

3. Results

Among 144 patients included in this study, more than 2/3 (97) (67.36%) were between 20 - 49 years of age. Among them 24.35% (35) were in the age group of 40 - 49 years, followed by 30 - 39 years (22.91%) (33) and 20 - 29 yr (20.1%) (29). The rest of the age wise distributions of patient are given (Fig.1). There were 92 (63.8%) males and 52 (36.2%) female. 8 cases were children (patients below 15 year of age). Cases from rural area i.e. 93 (64.5%) were higher than cases from urban area i.e. 51 (35.41%). By occupation maximum number of cases was farmers 36 (25%), followed by labourers 25 (17.37%).

Occupation wise distribution of all patients is presented in Table 1.

Clinically majority of the patients 42 (29.17%) belonged to Borderline Tuberculoid (BT) group, followed by Lepromatous Leprosy (LL) 30 (20.9%), Borderline Lepromatous (BL) 25 (17.37%), Borderline Borderline (BB) 14 (9.74%), Pure Neuritic 15 (10.41%), Tuberculoid 8 (5.5%), Indeterminate form 7 (4.86%), and lastly Histoid leprosy 3 (2.08%) (Table 2). Compared with PB (20.13%) the proportion of multibacillary cases, MB (79.86%) as per WHO classification (followed by NLEP) was observed to be very high (Table 3). All MB cases were positive for acid fast bacilli in their slit skin smears.

Multiple nerves were found to be thickened in 100 patients (69.44%). Ulnar nerve was the most common nerve involved, followed by common peroneal nerve, Radial nerve, Median nerve, Radial cutaneous nerve, Greater auricular nerve, Sural nerve in decreasing order, as shown in Table 4. It was observed that 54 (37.5%) patients suffered from various types of deformities/ disabilities. Prevalence of type 2 deformities/ disabilities in 30 (20.83%) of cases was higher than type 1 deformities 24 (16.64%). Age wise distribution of patients having disabilities is summarised in Table 5.

Among the total 144 patients, 49 (34.02%) had signs and symptoms of reactions. 20 (40.81%) patients had lesions suggestive of type 1 reaction while 29 (59.19%) had lesions suggestive of type 2 reactions. History of contact was elicitable in 15 (10.41%) of total patients. The contacts included were household contacts (7.75%) and neighbourhood contacts (2.66%). The status of contact either multibacillary or paucibacillary was not available from the records.

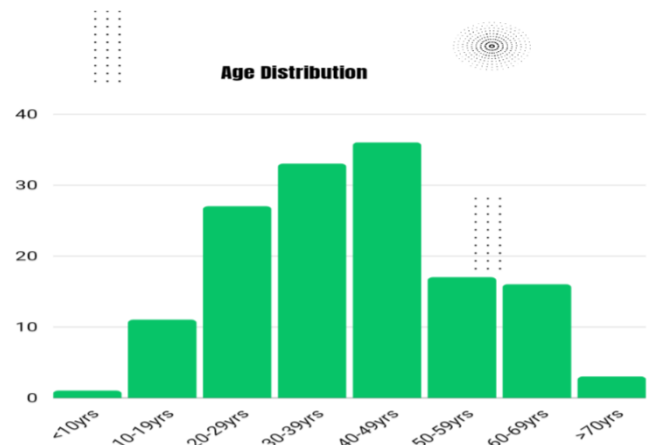


Figure 1: Age distribution of leprosy cases included in the study (both numbers and percentages shown)

Table 1: Occupation of patients

S. No	Occupation	No. of Patients	Percentage
1	Students	19	13.19%
2	Farmers	38	26.38%
3	Housewives	20	13.88%
4	Labourer	25	17.36%
5	Employed	18	12.5%
6	Unemployed	8	5.55%
7	Business	16	11.11%

Table 2: Clinical Disease spectrum among various patients

S. No	Spectrum	No. of Cases	Percentage
1	TT	8	5.55%
2	BT	42	29.16%
3	BB	13	9.02%
4	BL	24	16.66%
5	LL	32	22.22%
6	Indeterminate	14	9.72%
7	Pure Neuritic	6	4.16%
8	Historic Leprosy	5	3.47%

Table 3: Classification of cases according to WHO (MB and PB types)

Type	No. of patients	Percentage
Multibacillary	28	19.44%
Paucibacillary	116	80.56%

Table 4: Age wise distribution of disabilities in leprosy cases

Age Group	Grade 1	Grade 2
<20yrs	1	5
21 - 40yrs	10	10
41 - 59yrs	9	11
>60yrs	3	5

Table 5: Pattern of Nerve involvement

S. No	Nerves	No. of Patients	Percentage
1	Ulnar nerve	77	77%
2	Common Peroneal nerve	61	61%
3	Greater auricular nerve	13	13%
4	Median nerve	25	25%
5	Radial nerve	29	29%
6	Radial cutaneous nerve	13	13%
7	Sural nerve	6	6%



Figure 2: Case of Lepromatous Leprosy



Figure 3: Case of Borderline Lepromatous Leprosy



Figure 4: Case of Tuberculoid Leprosy



Figure 5: Case of Grade 2 deformity

4. Discussion

Leprosy has been successfully controlled and eradicated at the public health level (less than 1/10, 000 of the population) in India. Throughout spite of this goal, leprosy cases continued to be reported from various regions of India throughout the post - elimination era.

The most recent studies or reports also indicate that leprosy is still not eliminated in all districts. A retrospective study was done by Mehta et al (2009) to compare the number of new cases of leprosy detected in the pre - elimination phase (2004 - 05) and in the post elimination phase (2006 - 07) which showed an increased number of cases being detected in the post elimination phase. Leprosy itself is not difficult to treat but there are some unique characteristic associated with this disease, which makes a need for special attention.

Out of 144 patients in our study group, majority of patients 97 (67.36%) belonged to the age group of 20 - 49 yrs i.e. productive phase of life in both sexes. Similar observations were also made by other researchers (Veena 2008, Relhan et al 2016, Kulkarni 2016, Hazarika et al 2017). Increased incidence in this group indicates vulnerability because of greater mobility and increased opportunity for contact in big population. It is well known that disease occurrence in leprosy is often related to age at detection rather than age at the onset of disease.

Male preponderance as seen in our study also found in other studies (Rizvi et al 2015, Kadam et al 2016, Relhan et al 2016, Hazarika et al 2017). This can be explained as a fact that males go for outdoor work more as compared to female, thus more exposure and higher chance of getting the infection. There is also difference in health seeking behaviour of male and female. However, in a study by Suri et al (2014) almost equal incidence was observed in both sexes.

The percentage of childhood leprosy in the current study was 5.55%. The percentage reported in earlier studies were 7.59% by Relhan et al (2016) and 10.2% by Tiwary et al (2011). Thus, proportion of childhood leprosy was slightly on lower side; however, it is not certain if this is due to treatment seeking behaviour of people.

In the present study the disease was most common among the farmers 38 (26.38%) followed by labourers 25 (17.36%). Giridhar et al (2012) found maximum number of cases were labourers (34.6%) followed by service employee (29.6%). Swarnakumari et al (2015) found the disease was most common among the coolies (43.81%) followed by agricultural labourer (9.8%). This is again as observed earlier due to the factors like low economic status, which is associated with illiteracy, overcrowding, poor personal hygiene and malnutrition in agricultural workers and labours. In addition, there are more exposures in labours.

In addition, there are more exposures in labours. In our study, maximum numbers of patients are in borderline spectrum (BT+BB+BL) with major proportion of BT cases. This was similar to the observations made by Chhabra et al (2015), Swarnakumari et al (2015), Bajjaragi et al (2012), and Jindal et al (2009) found clinically maximum cases were LL.

In present study, number of lepromatous leprosy patients was not highest but still alarming because it is just followed by BT. Increased population of LL indicates either immunologically depressed population or delay in approach to treatment. The less number of patients in TT and IL may be due to misdiagnosis or spontaneous regression with good CMI. Late presentation of tuberculoid cases automatically leads to detection of more patients in BT and BB group thus increasing borderline spectrum.

Incidence of Histoid leprosy was slightly higher in our study 5 (3.47%) as compared to study done by Kaur et al (2003) (1.8%). Further, detection of Histoid leprosy cases requires expertise and also the bacilliary load being very high in these patients so, they become potential reservoir of infection in the community (Palitand Inamdar 2007).

A total of 34.02% patients reported signs of reactions compared with others such as 34.9% (Singal and Sonthalia 2013), 37.4% (Chhabra et al 2015) and 23.4% (Relhan et al 2016) have reported such high rates, Thakkar and Patel (2014) had a lower percentage (9.6%). In our study incidence of T2R were higher than T1R. Almost similar results were reported by Tiwary et al (2011), Jindal et al (2009), Singh et al (2013) and Increased incidence of T2R can be explained on the basis of increased proportion of lepromatous leprosy. With regard to the recurrences single episode was more common in type I reaction and multiple episodes in type II reaction. It is very essential to recognize reactional leprosy irrespective of the type of reaction. This is because the patients with type I reaction are more prone for deformities, whereas the patients with type II reaction are more prone for systemic complications.

In the present study, 54 (37.5%) patients were found to be suffering from various types of deformities / disabilities, as compared to other studies 54.47% by Jindal et al in (2009), 26.5% by Relhan et al (2016) and 8.10% by Kulkarni (2016). Another study by Kadam et al (2016) found that none of none of the patients had deformity. National figures also show overall grade 2 disability rates of lower than 5% (NLEP2016 - 17). Reasons behind these deformities might be late diagnosis, multibacillary disease due to high

bacilliary load, improper / inadequate treatment of reactions/ neuritis and lack of proper counselling. The prevalence of grade 2 deformity is one of the most widely used epidemiological indicators to measure the progress of the national leprosy eradication programme as it is visible and can be reliably measured.

However, in some studies proportion of type 1 deformities was higher than type 2 deformities (Jindal et al 2009). It is clear that these proportions will vary from area to area, also in different hospital settings and it will be important to focus on community based studies.

In our study, nerve involvement is seen in almost every patients. Multiple nerve thickening is seen in most of the cases. Ulnar nerve (77, 77%) was the most commonly affected nerve. Almost similar finding obtained by Relhan et al (2016) and Kadam et al (2016).

History of contact was present in 10.41% patients (including household contact and neighbourhood contact) but status of contact (PB/MB) was not available from record. Previous studies have reported percentage of household contact as 6.19% by Relhan et al (2016), 5.9% by Jindal et al (2009), 9.2% by Chhabra et al (2015) and 4.8% by Kadam et al (2016). The risk of transmission of leprosy increases upto 9 times in intrafamilial contact. This fact makes the screening of family members of leprosy patients essential.

In our study, the percentage of multibacillary cases was higher than paucibacillary cases. This is similar to the findings reported by several others (Mathan and Devan 2016, Mohite and Dugavale 2011, Relhan et al 2016), Tiwary et al 2011). The possible reasons for this could be, in contrast to active case, detection where in cases are detected early, voluntary reporting to health facility occurs late when the disease is relatively advanced and begins to bother individuals. Thus, proportion of multibacillary is an indicator of delayed diagnosis. So again, there is need for active case detection, improving health education and keeping high index of suspicion by the healthcare professional. The proportion of MB cases is an important epidemiological indicator of performance of programme, further MB leprosy cases are considered more infectious and more responsible for disease transmission.

In our study, cases from rural area were higher than cases from urban area. Similar results obtained by Giridhar et al (2012), Kulkarni et al (2016) and Kadam et al (2016). In rural residency patterns there is concept of living together along with social gathering which may promote transmission of disease also there is illiteracy, poor health services and communication gap. As such rural population is more than urban in Bihar and India, further larger number may be coming to our Tertiary Care Centre for seeking treatment due to complications like reactions/ disabilities.

5. Conclusion

Early diagnosis and complete treatment is the cornerstone of leprosy control because it prevents transmission of disease as well as deformities. However, this is happening, as the number of cases having deformities getting downfall but on

another side cases of lepromatous leprosy is getting rise. Our study points out to the fact that the proportion of multibacillary cases is still high and deserves attention as elimination of leprosy is highly aimed at the present juncture. Hence, it is imperative to have in depth knowledge and clarity regarding the diagnosis and classification of leprosy cases especially at the field level. After leprosy was no longer considered as a public health problem, its services has been integrated into the general health system. Still some high endemic pockets of leprosy may continue to persist in India. In such a scenario the main principles of leprosy control should be:

- 1) Locate these high endemic pockets, and upgradation of PHC for early diagnosis and complete treatment along with proper management of Reactions and Deformities.
- 2) Better health education for increasing the awareness about Leprosy. In addition, issues relating to stigma, discrimination and rehabilitation need to be tackled in a more integrated and inclusive manner.

6. Limitations

Main limitation of our present study is its being based the retrospective analysis of only 5years reporting to a Tertiary care Centre. So further studies are required to gain in depth knowledge regarding disease spectrum and profile as well as other determinants of leprosy in the community from where these cases came from. Such information will help in better planning for preventive measures, early diagnosis and management.

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