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Original Research Article

# A Retrospective Study of the Clinical and Epidemiological Profile of Admitted Leprosy Patients Over a Seven-Month Period

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**Conflict of interest: Nil**

**Abstract:**

**Background:** Leprosy remains a public health concern in India, with a high proportion of multibacillary (MB) cases indicating ongoing transmission and delayed diagnosis.

**Aim:** To evaluate the clinical and epidemiological profile of admitted leprosy patients and assess disease patterns over seven months.

**Methodology:** This retrospective, descriptive study included 90 admitted leprosy patients at a Department of Skin & VD, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India from July 2025–January 2026. Data on demographics, clinical spectrum, smear status, disabilities, and treatment were collected from medical records and analyzed using descriptive statistics.

**Results:** Most patients were males (62.2%) and belonged to 21–60 years (66.6%). MB forms predominated, with borderline lepromatous (33.3%) being most common. Smear positivity was high (64.4%). Type I reaction (31.1%) and disabilities (27.8%) were frequent. Although 68.9% had no disability, claw hand was the most common deformity. Over half (53.3%) were newly diagnosed. Most patients presented within 6–12 months (31.1%), but 18.9% had delays >2 years.

**Conclusion:** The predominance of MB cases, reactions, and delayed presentation highlights the need for early diagnosis, improved surveillance, and timely treatment to reduce transmission and disability.

**Keywords:** Leprosy, Multibacillary, Epidemiology, Retrospective study, Disabilities, Smear positivity.

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## Introduction

Leprosy has still been a major health issue of concern to many developing nations, such as India, despite the long-term interventions by national and international control programs. Despite significant advances in lowering the total disease burden, the continued occurrence of new cases, especially the multibacillary (MB) ones, has been a significant barrier to the eradication efforts. Epidemiological data 2010-2011 showed that the Annual New Case Detection Rate (ANCDR) decreased to 4.12 percent in 2010-2011 (compared to 10.93 percent in 2009-2010); 48.6 percent of newly detected cases were multibacillary [1]. Such an unequal percentage of MB cases shows how much the infection is still being spread and the dire necessity of better tactics with emphasis on early diagnosis, proper classification and treatment.

The most important aspect of leprosy control is to decrease the infectious reservoir in the community. As soon as it is identified, the timely introduction of multidrug therapy (MDT) is essential in the process of transmission interruption, complications prevention, and reduction of long-term deformities [2]. Clinical examinations and the use of the slit-skin smear are the main methods of diagnosis and classification in the majority of clinical settings. Classical clinical signs like hypopigmented or erythematous areas of anesthesia, thickening of peripheral nerves, and the identification of acid-fast bacilli in slit-skin smears help the clinician make the diagnosis. Nonetheless, the unusual manifestations and marginal forms tend to make clinical examination difficult, which may result in the possibility of diagnostic ambiguity.

Proper diagnosis and classification cannot be over-emphasized as the treatment plans and duration would vary depending on whether the disease is classified as paucibacillary (PB) or multibacillary (MB). Misclassification can be very dangerous: under-treatment can lead to chronic infection, relapses and further transmission, and over-treatment may lead to patients being exposed to unnecessary drug toxicity and adverse effects. Also, improper classification exposes one to the danger of developing drug resistance, which is a developing issue in endemic areas. In these cases, histopathological analysis is a very useful complement to clinical analysis. It offers objective details on tissue level alteration, granuloma development, nerve involvement and bacillary load, and thus, it improves the accuracy of diagnosis [3].

Clinicopathological concordance is an important aspect in management of leprosy, and it means the agreement between clinical and histopathological findings. Leprosy is found over a wide immunological range between tuberculoid and lepromatous forms, and in between, there are several border forms. These types tend to be overlapping or transitional and thus classification is hard to do purely on clinical basis [4]. Histopathology does not only validate the diagnosis; it also helps to distinguish subtle differences between subtypes of the borderline. Hence, clinicopathological correlation has a significant role to play in accurate diagnosis, correct classification and prompt initiation of therapy.

The fact that ever since 2010 epidemiological data indicates high proportion of MB cases indicates that there is still transmission and that there might be delays in diagnosis. Later presentation is normally related to increased bacterial load, the risk of nerve involvement, and irreversible deformities, which greatly deteriorate the quality of life of the affected individuals. One of the most disabling aspects of leprosy is nerve damage which causes most of the disabilities related to leprosy [5]. It is thus important to identify nerve thickening and sensory impairment early on during clinical examinations. Nevertheless, mild or early nerve involvement might not be evident clinically, and it is necessary to consider thorough diagnostic methods. WHO has suggested standardized multidrug treatment options that are specific to PB and MB cases to overcome the issue of relapse, bacterial persistence, and drug resistance [6]. These regimens must be adhered to fully during the treatment period to have a successful treatment. The prevalence in the world has dramatically dropped with the extensive use of MDT but regular observation of the treatment progress is paramount. The main measures of success in treatment are clinical improvement, the decrease of lesion size, the restoration of nerve function, and bacteriological clearance.

Considering the ongoing negative impact of multibacillary disease and the difficulties in the correct diagnosis and classification, there is an urgent need to study the clinical and epidemiological peculiarities of patients with leprosy in a systematized manner. This type of evaluation is especially useful in retrospective studies where patient data can be evaluated over a predetermined span to determine disease trends, diagnostic precision, and treatment results. The retrospective analyses are valuable in terms of the actual clinical practice which helps identify the gaps in diagnosing and treating.

The current retrospective study is a seven-month study in Bihar, India, which aimed at examining the clinical profile of admitted patients with leprosy, measuring the agreement between clinical and histopathological diagnosis, and determining the efficacy of antileprosy treatment. Through a systematic study of these parameters, the research will contribute to the knowledge base regarding reliability of diagnosis and treatment of leprosy. The results are likely to bring substantial evidence on the quality of the current methods of diagnosis and support the significance of clinicopathology correlation to achieve the best patient care and disease management strategies.

## Methodology

**Study Design:** This study was a descriptive, observational, and retrospective study conducted to evaluate the clinical and epidemiological profile of admitted leprosy patients. The retrospective nature of the study involved reviewing previously recorded patient data without any direct patient interaction.

**Study Area:** The study was carried out in the Department of Skin & VD at Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India.

**Study Duration:** The study was conducted over a period of seven months from July 2025 to January 2026.

**Sample Size:** A total of 90 admitted leprosy patients were included in the study. The sample size was based on the total number of eligible cases available during the study period.

**Study Population:** The study population comprised all patients diagnosed with Hansen's disease (leprosy) who were admitted to the Department of Skin & VD during the study duration. This included patients of all age groups and both sexes.

**Data Collection:** Data were collected retrospectively from the Medical Records Department (MRD) of the hospital using a pre-designed and structured proforma. The case sheets of all admitted leprosy patients were reviewed, and relevant information was extracted. To prevent duplication of data, only the first admission record of each patient was included, while subsequent admissions, if any,

were noted separately. The collected data included demographic details such as age, sex, and residence, as well as clinical details including type of leprosy, presenting complaints, duration of illness, nerve involvement, disabilities, slit-skin smear status, and treatment details.

**Inclusion Criteria**

- All admitted patients diagnosed with leprosy (new, relapse, or under treatment)
- Patients admitted in the Department of Skin & VD during the study period
- Patients with complete and accessible medical records

**Exclusion Criteria**

- Patients with incomplete or missing medical records
- Patients admitted for conditions other than leprosy
- Duplicate records due to repeated admissions.

**Procedure:** All relevant patient records were retrieved from the Medical Records Department and reviewed systematically. Diagnosis of leprosy was based on clinical findings and classified according to the Ridley–Jopling classification. Patients were further categorized into paucibacillary (PB) and multibacillary (MB) types as per World Health Organization guidelines. Slit-skin smear examination findings were recorded wherever available, and clinical diagnoses were correlated with laboratory findings, including biopsy reports when present. All data were carefully entered into the study proforma for further analysis.

**Statistical Analysis:** The collected data were entered into Microsoft Excel and analyzed using appropriate statistical software such as SPSS. Descriptive statistics were applied, with continuous variables expressed as mean and standard deviation, and categorical variables presented as frequencies and percentages. The results were displayed using tables and charts. Where applicable, associations between variables were assessed using the chi-square test, and a p-value of less than 0.05 was considered statistically significant."

**Result**

Table 1 presents the demographic profile of patients based on age and sex distribution (N=90). The majority of patients were in the 21–40 years and 41–60 years age groups, each accounting for 30 cases (33.3%). Patients aged >60 years constituted 20 cases (22.2%), while the least number were in the 0–20 years group (10, 11.1%). Males predominated across all age groups, with a total of 56 (62.2%) compared to 34 females (37.8%). The highest male representation was seen in the 21–40 years group (20, 22.2%), while female distribution was relatively lower across all age categories. Overall, the study population showed a male predominance with most patients belonging to the economically productive age groups (21–60 years).

**Table 1: Demographic Profile of Patients (Age and Sex Distribution) (N = 90)**

| Age Group (Years) | Male n (%) | Female n (%) | Total n (%) |
|---|---|---|---|
| 0–20 | 6 (6.7%) | 4 (4.4%) | 10 (11.1%) |
| 21–40 | 20 (22.2%) | 10 (11.1%) | 30 (33.3%) |
| 41–60 | 18 (20.0%) | 12 (13.3%) | 30 (33.3%) |
| >60 | 12 (13.3%) | 8 (8.9%) | 20 (22.2%) |
| **Total** | 56 (62.2%) | 34 (37.8%) | 90 (100%) |

Table 2 shows the clinical spectrum and WHO classification of leprosy among the study subjects (N=90). Borderline lepromatous (BL) was the most common type, observed in 30 cases (33.3%), followed by borderline tuberculoid (BT) in 20 cases (22.2%) and lepromatous leprosy (LL) in 18 cases (20.0%). Borderline borderline (BB) accounted for 12 cases (13.3%), while pure neuritic leprosy (PNL) was seen in 9 cases (10.0%) and histoid leprosy was rare with only 1 case (1.1%). According to WHO classification, the majority of cases belonged to the multibacillary (MB) category (BB, BL, LL, and histoid), while BT and PNL were classified as paucibacillary (PB). Overall, multibacillary forms predominated in the study population.

**Table 2: Clinical Spectrum and WHO Classification of Leprosy (N = 90)**

| Clinical Spectrum | Number (%) | WHO Category |
|---|---|---|
| BT | 20 (22.2%) | PB |
| BB | 12 (13.3%) | MB |
| BL | 30 (33.3%) | MB |
| LL | 18 (20.0%) | MB |
| PNL | 9 (10.0%) | PB |
| Histoid | 1 (1.1%) | MB |
| **Total** | **90 (100%)** | — |

Table 3 presents the clinical profile, presenting complaints, and smear status of the study subjects (N=90). Among presenting complaints, Type I reaction was the most common (28, 31.1%), followed by disabilities (25, 27.8%), skin lesions (20, 22.2%), and trophic ulcers (18, 20.0%). Type II reaction was seen in 12 patients (13.3%), while nerve abscess was the least common complaint (5, 5.6%). Regarding slit-skin smear status, a majority of patients were smear positive (58, 64.4%), while 32 (35.6%) were smear negative. Overall, immunological reactions and disabilities were prominent clinical features, with a higher proportion of patients showing bacteriological positivity.

| Table 3: Clinical Profile, Presenting Complaints and Smear Status (N = 90) | |
|---|---|
| **Parameter** | **Number of Patients (%)** |
| **Presenting Complaints*** | |
| Type I Reaction | 28 (31.1%) |
| Type II Reaction | 12 (13.3%) |
| Trophic Ulcer | 18 (20.0%) |
| Disabilities | 25 (27.8%) |
| Skin Lesions | 20 (22.2%) |
| Nerve Abscess | 5 (5.6%) |
| **Slit-Skin Smear Status** | |
| Positive | 58 (64.4%) |
| Negative | 32 (35.6%) |

Table 4 shows the distribution of disabilities and treatment status among the study subjects (N=90). The majority of patients had no disability, accounting for 62 (68.9%), while among those with disabilities, claw hand was the most common (15, 16.7%), followed by foot drop (6, 6.7%), lagophthalmos (4, 4.4%), and multiple disabilities (3, 3.3%). Regarding treatment status, more than half of the patients were newly diagnosed (48, 53.3%), while 28 (31.1%) were on MDT and 14 (15.6%) had completed treatment. This indicates that most patients were in the early stage of management with relatively fewer presenting with disabilities.

| Table 4: Disabilities and Treatment Status of Patients (N = 90) | |
|---|---|
| **Parameter** | **Number of Patients (%)** |
| **Disabilities** | |
| Claw Hand | 15 (16.7%) |
| Foot Drop | 6 (6.7%) |
| Lagophthalmos | 4 (4.4%) |
| Multiple Disabilities | 3 (3.3%) |
| No Disability | 62 (68.9%) |
| **Treatment Status** | |
| Newly Diagnosed | 48 (53.3%) |
| On MDT | 28 (31.1%) |
| Completed Treatment | 14 (15.6%) |

Table 5 shows the duration of disease at presentation among the study subjects (N=90). The most common duration was 6–12 months, reported in 28 patients (31.1%), followed by 1–2 years in 25 patients (27.8%). A shorter duration of less than 6 months was seen in 20 patients (22.2%), while 17 patients (18.9%) presented after more than 2 years. This indicates that most patients sought medical attention within the first year of disease onset.

| Table 5: Duration of Disease at Presentation (N = 90) | |
|---|---|
| **Duration** | **Number of Patients (%)** |
| <6 Months | 20 (22.2%) |
| 6–12 Months | 28 (31.1%) |
| 1–2 Years | 25 (27.8%) |
| >2 Years | 17 (18.9%) |
| **Total** | **90 100%)** |

## Discussion

The results of the current research are mostly in line with the already published works, but they also

present some significant differences. Most of the patients in our study were in the economically productive age groups of 21-40 and 41-60 years (66.6% combined), which is quite similar to previous findings that leprosy is more common in young and middle-aged adults. Bhat and Chaitra (2013) [7] and Sousa et al. (2012) [8] reported similar trends with the largest percentage of cases being reported in individuals who were 30-50 years, representing about 40-50 percent of cases. Our study also has a relatively low percentage of pediatric cases (11.1) which is also similar to the results of Palit and Inamadar (2014) [9] who reported childhood leprosy rates between 8-15. This smaller percentage can be explained by either a decreased transmission or, more probably, underrepresentation because of the hospital-based nature of the study as also implied in previous study".

In our study, there was a distinct male dominance (62.2), as concurs with several previous studies. As an example, Thakkar and Patel (2014) [10] have found higher proportions of males of about 60-70 percent and Bhat and Chaitra (2013) [7] have also reported higher proportions of males. This gender disparity has often been attributed to increased occupational exposure, migration, and better healthcare-seeking behavior among males. Nevertheless, recent reports show slow progress in the detection of cases among females since they have better access to health care services, which means that the epidemiological pattern is shifting.

In terms of the clinical spectrum, our research established that there was a preponderance of borderline lepromatous (33.3) and multibacillary (MB) forms with 64.4% smear positivity. This can be likened to the study by Quyum et al. (2015) [11] in which multibacillary cases were almost 65-70 percent of patients. This is however different to what was observed by Thakkar and Patel (2014) [10], who observed a relatively high percentage of paucibacillary cases. The increased incidence of MB cases in our study may be because of late presentation, which is also indicated by the percentage of 18.9 of patients presenting over two years since the onset of the disease. Similar results were found by Tiwary et al. (2011) [12] who indicated that multibacillary disease was on the rise in urban centers which highlighted its contribution to the continued transmission.

A notable characteristic in our study was reactional states, Type I reactions (31.1) were more prevalent than Type II reactions (13.3). This is in line with the results of Bhat and Chaitra (2013) [7], who also observed a higher prevalence of Type I reactions. Conversely, Salodkar and Kalla (1995) [13] found a greater prevalence of Type II reactions suggesting a regional and population-based heterogeneity. The fact that borderline forms dominated our cohort and the relatively high percentage of reactions in our study suggest that there is a certain degree of immunological instability in borderline cases.

The percentage of patients with disabilities (27.8) and trophic ulcers (20.0) in our study highlights the problem of late diagnosis and ineffective early treatment. Similar rates of disability of 20-30 percent have been documented in previous research (Quyum et al., 2015) [11]. The most prevalent deformity in our study was clawing hand (16.7%), then foot drop (6.7%) and lagophthalmos (4.4%), which is consistent with Scollard et al. (2015) [14], who highlighted that nerve damage that results in such deformities is a sign of advanced disease. Though our rates of disability are slightly lower than those found in older studies (there they found rates of up to 40 percent), this could be due to increased awareness and accessibility to multidrug therapy (MDT).

Our results of slit-skin smear positivity (64.4) also support the prevalence of multibacillary disease and correspond to previous studies which report high bacteriological indices of hospitalized patients. Kar and Gupta (2015) [15] pointed out the significance of the bacteriological confirmation in the classification and management of leprosy particularly in the endemic environments where MB cases play a major role in the spread of the disease.

The length of morbidity before presentation in our study as well exhibited trends with previous findings. Although 31.1% of the cases fell in the 6-12 months, a significant percentage (18.9) had a disease of over two years, indicating delays in diagnosis. Delays in presentation have been observed in other studies by Tiwary et al. (2011) [12], in which delayed presentation was linked with greater complications and disability. These results support the importance of early case detection strategies and community education.

Overall, our research results are generally consistent with prior research to establish male dominance, greater use of economically productive age groups, and multibacillary disease predominance. A relatively higher percentage of borderline lepromatous cases and high percentages of reactional states and disabilities were observed by us compared with some previous work and probably due to late healthcare access and selection bias in the hospitals. These comparisons outline the trends of epidemiology that persist and also show the areas where there is need to improve public health interventions, especially in early diagnosis and prevention of complications.

## Conclusion

The current retrospective study emphasizes the fact that leprosy still remains a disease that has a wide age range with most of the sufferers being adults and more males. The clinical spectrum was somewhat biased towards multibacillary forms, which

suggested that there was a high rate of advanced disease. The number of patients who came with complications, including lepra reactions, disabilities, and trophic, was quite significant and showed a lack of early health-seeking behavior and continuous transmission. The large percentage of smearing positive cases also justify the infectivity remaining in the community. Even though more than half of the patients were new cases, a significant proportion of the patients were undergoing or had undergone treatment, indicating case detection as well as maintenance of the disease. The difference in the length of sickness at presentation shows that a large number of patients present late, which is a factor in disability and the advancement of the disease. In general, the findings highlight the importance of early diagnosis, enhanced surveillance, timely treatment and enhanced awareness to minimize the transmission and disability due to leprosy.

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