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# Clinico - Epidemiological Study of Leprosy in Tertiary Care Hospital Showing Surge towards Lepromatous Pole in Post Elimination Era

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## ABSTRACT

### Background

Leprosy is a chronic granulomatous infectious disease caused by Mycobacterium leprae. It is classified into 5 groups based on clinical, bacteriological, immunological and histopathological status of patients (Ridley - Jopling classification). Leprosy has varied clinical presentations making diagnosis a challenge. There is also a disparity between clinical and histopathological diagnosis in fitting the case exactly in the spectrum.

### Objectives

To determine the spectrum of M. leprae infections among suspected cases and study the clinico-epidemiological aspects of leprosy attending DVL OPD, AIMSR & DHH, Chittoor.

### Methods& Methodology

This is a prospective, hospital based, cross-sectional, observational study conducted in a tertiary care centre over a period of 18 months done from June 2022-December 2023. A total of 40 new patients attending DVL opd with features of Leprosy were included in the study

**Results**

A total of 40 patients were selected for the study . Positive family history was found in 5 patients 12.5%.Clinically MB [Multibacillary] cases outnumbered PB [Paucibacillary] cases by ratio of 5.6 :1.Borderline tuberculoid was the most common clinical spectrum reported [ 45%] .LL was the most common histopathological diagnosis (55%). In clinical and histopathlogical correlation, overall parity of 50% was achieved with maximum concordance seen in LL [90.9%].

**Conclusion**

Leprosy though reported to be eliminated still continues to be one of the common infectious diseases in Andhra Pradesh, India. Inspite of good health care system and availability of programmes for elimination of leprosy, there are many cases being reported at the later stages of leprosy. There is need to strengthen the existing medical and paramedical staff, creating awareness programmes among public, easy accessibility to diagnostic techniques and MDT drugs.

**Keywords**

Leprosy [Hansen's disease] , Mycobacterium leprae, Ridley-Jopling classification, Histopathology, Parity

**INTRODUCTION**

Leprosy, also recognized as Hansen's disease, is a chronic granulomatous infectious disease caused by *Mycobacterium leprae*. It is an ancient disease in India with its early description in 'Sushruta Samhita' written in 600 BC [1] . Mycobacterium leprae is an acid-fast, gram positive bacilli having special affinity for Schwann cell of nerve. A growing temperature of less than 37 'c is preferred for its growth. This is the primary cause of M.leprae's effects on peripheral nerves, epidermis and the nasal mucosa.It is classified into 5 groups based on clinical, bacteriological, immunological and histopathological status of patients (Ridley - Jopling classification). Despite discovery of the organism more than a century ago, the pathogenesis is not completely understood. After the infection disease takes longer time to manifest. The spectrum of disease depends on the individual's immunity and the intervention of therapy. Diagnosis of leprosy is many times clinical but in doubtful cases, histopathological studies are supportive and confirmatory. [2] There is also less correlation between clinical and histopathological diagnosis in fitting the case exactly in the spectrum.

**OBJECTIVES**

1. To determine the spectrum of M.leprae infections among suspected cases .
2. To study the clinico-epidemiological aspects of newly diagnosed leprosy cases attending DVL OPD, AIMSR & DHH, Chittoor.
3. To determine the clinico-histopathological correlation in diagnosing leprosy.

**STUDY DESIGN AND SAMPLE SIZE**

This is a prospective, hospital based , cross-sectional , observational study conducted in a tertiary care centre over a period of one year 6months from june 2022 to December 2023. A total of 40 patients attending DVL OPD with newly diagnosed leprosy were included in the study.

**Inclusion Criteria**

- All newly diagnosed leprosy patients of all age groups who had given consent for the study attending DVL opd, AIMSR & DHH, Chittoor.

**EXCLUSION CRITERIA**

- Patients who were not cooperative or not willing to participate in the study.

- All old diagnosed leprosy cases already on treatment.
- Patients with terminal illness.

**METHODS AND METHODOLOGY** ;

1. This is a hospital based observational study done on patients irrespective of their age and sex who attended the dermatology outpatient department with clinical features of leprosy.
2. Demographic profiles of all patients were recorded.
3. A complete history regarding the age of onset , duration of illness , any exacerbations/reactions were noted.
4. History of similar illness in the family is also recorded.
5. General and systemic examinations performed.
6. A thorough cutaneous and nerve examination was conducted in all the patients taking note of morphology, number and distribution of lesions.
7. Skin biopsy and Slit skin smear was performed in all the patients.

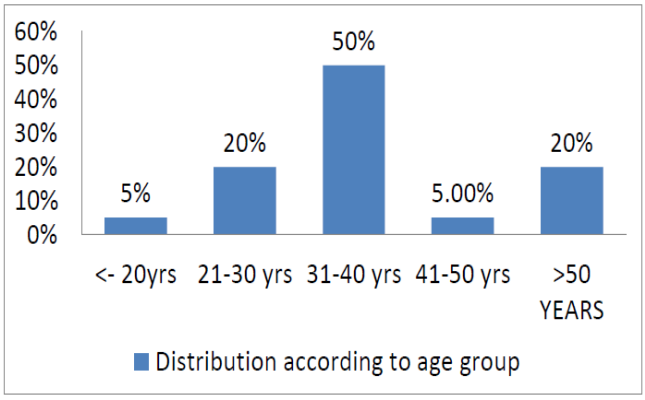
**Statistical Analysis**

Data collected from all the patients are tabulated and statistical analysis is done using the Chi-square test.

**RESULTS**

- A total of 40 patients were selected for the study
- Positive family history was found in 5 patients 12.5%.
- Clinically MB [Multibacillary] cases outnumbered PB [Paucibacillary] cases by ratio of 5.6 :1.
- Borderline tuberculoid was the most common clinical spectrum reported [ 45%] .
- Lepromatous leprosy was the most common histopathological diagnosis (55%)
- On neurological examination , Ulnar nerve was the commonest to be involved followed by lateral popliteal nerve.
- Only 6 patients developed Lepra reaction – All 6 were of type II reaction seen in LL patients.
- In clinical and histopathlogical correlation , overall parity of 50% was achieved with maximun concordance seen in LL [90.9%].

**Chart 1:**




Mean age = 39.5 years, S.D = 13.05 Median age = 37.5 years, IQR = 29.5 – 48.5

**Chart 2:**

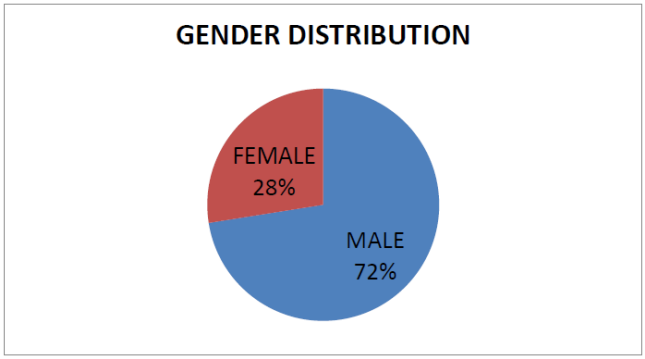



**Chart 3:**

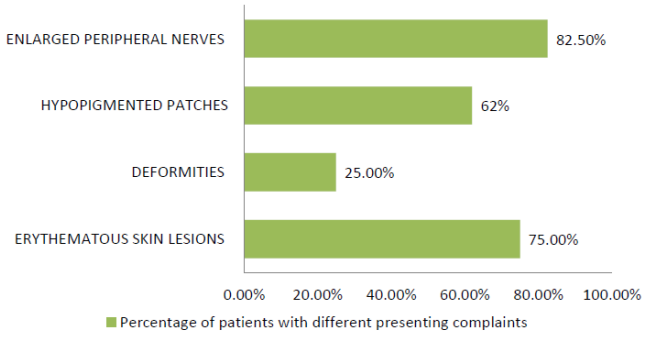



**Chart 4:**

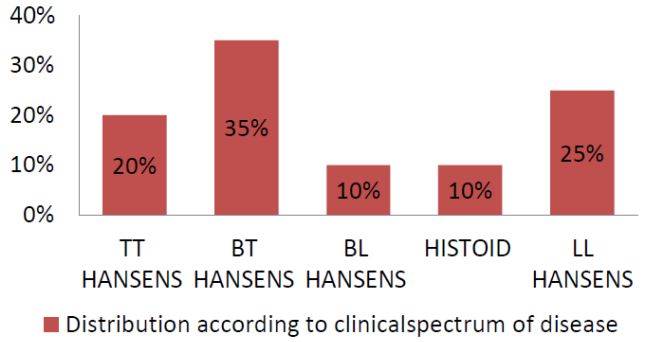



**Chart 5:** Distribution according to histopathological diagnosis

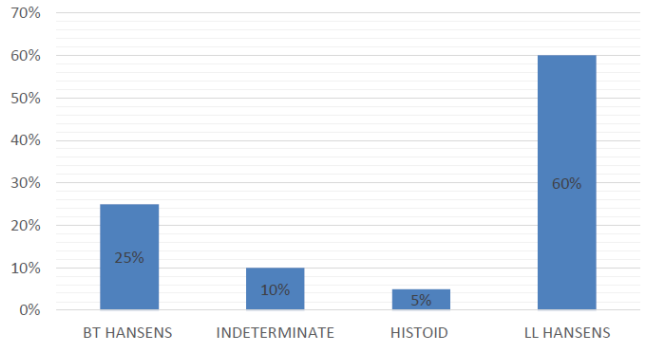


**Table 1:** Histopathological diagnosis by Age and Gender

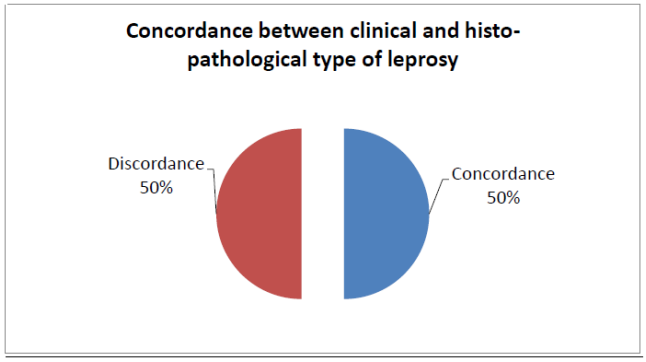
| Histopathological diagnosis | Number | Mean age | Male | Female |
|---|---|---|---|---|
| BT HANSEN | 10 (25%) | 45.6 | 7 (25%) | 3 (25%) |
| INDETERMINATE | 4 (10%) | 31.7 | 2 (7.1%) | 2 (16.7%) |
| HISTOID | 2 (5%) | 29.0 | 1 (3.6%) | 1 (8.3%) |
| Lepromatous Leprosy | 24 (60%) | 39.1 | 18 (64.3%) | 6 (50%) |
| TOTAL | 40 (100%) | 39.5 | 28 (100%) | 12 (100%) |

**Table 2:** Correlation between Clinical and histopathological diagnosis

| Clinical diagnosis | Histopathological diagnosis | | | | |
|---|---|---|---|---|---|
| | BT HANSEN | INTERMEDIATE | HISTOID | Lepromatous | Total |
| TT HANSEN | 2 (25%) | 4 (50%) | 0 | 2 (25%) | 8 (100%) |
| BT HANSEN | 8 (57.1%) | 0 | 0 | 6 (42.9%) | 14 (100%) |
| BL HANSEN | 0 | 0 | 0 | 4 (100%) | 4 (100%) |
| HISTOID | 0 | 0 | 2 (50%) | 2 (50%) | 4 (100%) |
| Lepromatous Leprosy | 0 | 0 | 0 | 10 (100%) | 10 (100%) |
| Total | 10 (25%) | 4 (10%) | 2 (5%) | 24 (60%) | 40 (100%) |

Chi-square = 50.405, p = 0.002

**Chart 5:**




## DISCUSSION

Leprosy, also recognized as Hansen's disease, is a chronic granulomatous infectious disease caused by *Mycobacterium leprae*. It is an ancient disease in India with its early description in 'Sushruta Samhita' written in 600 BC [1] . Mycobacterium leprae is an acid-fast, gram positive bacilli having special affinity for Schwann cell of nerve. A growing temperature of less than 37 'c is preffered for its growth. This is the primary cause of M.leprae's effects on peripheral nerves, epidermis and the nasal mucosa.It is classified

into 5 groups based on clinical, bacteriological, immunological and histopathological status of patients (Ridley - Jopling classification). Despite discovery of the organism more than a century ago, the pathogenesis is not completely understood. After the infection disease takes longer time to manifest. The spectrum of disease depends on the individual's immunity and the intervention of therapy. Diagnosis of leprosy is many times clinical but in doubtful cases, histopathological studies are supportive and confirmatory. [2] There is also less correlation between clinical and histopathological diagnosis in fitting the case exactly in the spectrum.

The study population included 40 patients with male to female ratio of 2.6 :1 . The higher incidence of males in our study might be attributed to increased accessibility to healthcare. [3,4]. Maximum number of patients (n=20) (50%) were in the 31 -40 years age group followed by 8(20%) patients were in 21-30years age group. These results were in accordance with other studies. [5,6,7] **Lepromatous leprosy** was the commonest form of leprosy noted in our study constituting 22(**55%)** patients followed by Borderline Tuberculoid (BT) in 10(25%) patients, This result differs from the study done by Kalita JM.[4] A total of 34(85%) patients out of 40 patients has multibacillary leprosy according to WHO classification. This finding corresponds to the other studies done by Kalita JM et al , Mukherjee PK et al and others .[4,8,9] Peripheral nerve involvement was noted in 82.5%(n=33) of study population the most common being **ulnar nerve** involvement in 86.6% (n=26) of patients . This result corresponds with the study done by Avinash et al at SDM hospital ,Dharwad 2016 [10] . Leprosy presents with different clinico-histopathological forms which depends on immune status of the host.One of the major aims of this study is to correlate clinical diagnosis of new leprosy cases with histopathological diagnosis of skin biopsies. In present present study maximum parity i.e..**90.9 %** was observed in **lepromatous leprosy** similar to the findings of study done by Ujjwal et al at Gardi medical college, Ujjain in 2020. [2]. Parity in the polar group is maximum because they are stable and show a fixed histopathology, while Borderline groups (BT+BB+BL) are in a continuously changing immunological spectrum and may have different histopathology in different site and lesion.

**CONCLUSION**

Leprosy though reported to be eliminated still continues to be one of the common infectious diseases in Andhra Pradesh, India. Inspite of good health care system and availability of programmes for elimination of leprosy, there are many cases being reported at the later stages of leprosy. Predominance of MB cases in this study emphasizes the need of spread of awareness about the disease. The current study highlights the importance of both clinical & histopathological examination and determining parity between their findings in fitting the case exactly into the spectrum.The difference in clinical and histopathological diagnosis may relate to size & site of the biopsy, age of the lesion and immunological status of the patient at the time of taking biopsy. Serial biopsies from the same lesion or from paired lesions is advisable for more accurate histo-pathological correlation. There is need to strengthen the existing medical and paramedical staff, creating awareness programmes among public , easy accessibility to diagnostic techniques and MDT drugs.

**Clinical Pictures**

**Figure1:** Infiltration of ears, saddle nose deformity

**Figure 2:** Multiple discrete shiny infiltrated nodules

**Figure 3**: Single well defined hypopigmented plaque with infiltrated border

**Figure 4:** Bilaterally symmetrical well defined erythematous plaques.

**Figure 5:** Bilaterally symmetrical hyperpigmented plaque.

**Figure 6:** Multiple hypopigmented patches

**Figure 8:** Partial claw hand with ulcers.

**Figure 9:** Complete claw hand with ulcers.

**ABBREVIATIONS**

**DVL:** Dermatology, Venereology, Leprosy

**OPD:** Out Patient department

**AIMSR-DHH:** Apollo Instite of Medical Sciences and Research – District Head Quarter Hospital

**MB:** Multi Bacillary

**PB:** Pauci Bacillary

**LL:** Lepromatous Leprosy

**BL:** Borderline Lepromatous

**BT:** Borderline Tuberculoid

**TT:** Tuberculoid

**MDT:** Multi Drug Therapy

**M.Leprae:** Mycobacterium leprae

**S.D:** Standard deviation

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