Original Article

Retrospective Analysis of Leprosy cases at Mayo Hospital Lahore: Demographic Trends and Clinical Profiles

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ABSTRACT

Background: Leprosy is a chronic granulomatous disease caused by Mycobacterium leprae. This debilitating disease mainly affects the skin, peripheral nerves, and eyes, which may lead to progressive damage if left untreated. We conducted this study to analyze the demographic trends and clinical profiles of leprosy patients registered at Mayo Hospital, Lahore.

Methods: A retrospective, observational study was conducted utilizing available medical records of all new leprosy cases diagnosed and registered in the leprosy clinic of the Dermatology Department, Mayo Hospital, over a five-year period. Data on demographic details (age, gender) and clinical presentations were collected and analyzed.

Results: From January 2019 to December 2023, a total of 122 new cases of leprosy were registered at Mayo Hospital's Leprosy Department, showing a decreasing trend over the years. Among these, 64 (52.5%) were male, and 58 (47.5%) were female. Three patients (2.5%) were children (<14 years). Borderline tuberculoid (BT) leprosy was the commonest type, comprising 69 (56.6%) cases, followed by 30 (24.6%) cases of tuberculoid (TT) leprosy, 16 (13.1%) cases of lepromatous leprosy (LL), and 7 (5.7%) cases of borderline lepromatous (BL). According to the WHO classification, 30 (24.6%) were paucibacillary (PB), and 92 (75.4%) were multibacillary (MB). Two patients (1.6%) presented with a type 1 reaction, and four patients (3.3%) with a type 2 reaction. Moreover, 7 patients (5.7%) presented with grade 1 deformity and 20 (16.4%) with grade 2 deformity.

Conclusion: Despite a decreasing trend in leprosy cases, leprosy remains a public health concern in Pakistan with a predominance of multibacillary disease and a considerable proportion of patients presenting with disabilities. The presence of childhood cases further shows continued transmission. Strengthening early case detection, timely initiation of multidrug therapy, and heightened public health surveillance are vital to minimise deformity and interrupt disease transmission.

Keywords: Leprosy; Multibacillary; Paucibacillary

INTRODUCTION

Leprosy, also known as Hansen's disease, is a chronic, curable, slowly progressive granulomatous disease caused by an acid- fast bacillus, Mycobacterium leprae, which does not cultivate in vitro. This debilitating disease primarily affects the skin, peripheral nerves, mucosa, and eyes, which may lead to progressive damage if left untreated.[1,2] It has plagued humans for centuries, with historical evidence dating back to ancient civilizations.[3] The disease was initially identified and described by a Norwegian physician, Gerhard- Henrik Armauer Hansen, in 1873.[4] It is commonly known as Juzam or Korrh in Pakistan.[5] It affects people of any age, but is rare in infants.[6,7] According to WHO, there are two main types of leprosy: Paucibacillary (PB) and Multibacillary (MB). Paucibacillary cases have 5 or fewer lesions, no nerve involvement, and a negative slit skin smear. Whereas they are classified as multibacillary if more than 5 lesions are present, or have any nerve involvement, or a positive slit skin smear.[8] Based on Ridley-Jopling classification, leprosy is categorised into five types: tuberculoid leprosy (TT), borderline tuberculoid leprosy (BT), borderline-borderline leprosy (BB), borderline lepromatous leprosy (BL), and lepromatous leprosy.[9,10] Lepra reactions are of two types, which are immunological complications of leprosy. Type 1 or reversal reactions are (type IV) delayed hypersensitivity reactions that occur mainly in borderline types, and type 2 erythema nodosum leprosum (ENL) is (type III) immune complex-mediated reactions seen in BL and LL types.[11] Deformities in leprosy patients are graded as Grade 0: no deformity, Grade 1: no visible deformities (only anesthesia), and Grade 2: visible deformity. Leprosy is not considered a lethal disease, but if not treated early and properly, it may result in many deformities.[9] People

ARTICLE INFO

Article History
Received: September 12, 2025 | Accepted: December 24, 2025
Conflict of Interest: The authors declare that no conflict of interest exists.
Funding: None.

Citation: Arshad A, Arooba Z, Asghar A, Syed AR, Ilyas S, Hayat J. Retrospective analysis of leprosy cases at Mayo Hospital Lahore: demographic trends and clinical profiles. J Fatima Jinnah Med Univ. 2025;19(3):140-144.

DOI: http://doi.org/10.37018/RHJP3507

affected by leprosy often face isolation, discrimination, and social exclusion due to misconceptions and fear. This stigma can lead to profound psychological distress, affecting an individual's mental well-being and overall quality of life.[12]

The leprosy elimination goal defined by WHO, i.e., a global prevalence of <1 patient per 10,000 population, was accomplished in the year 2000, yet more than 200,000 new cases are detected every year, mostly in India, Indonesia, and Brazil.[13,14] In 2020, a total of 127,396 new leprosy cases were found worldwide, with a new diagnosis rate of 16.4 per million. The above three countries contributed to 74% of global new cases.[15] With respect to leprosy prevalence, Pakistan is deemed a low-endemic country.[5] Over the period from 2011 to 2021, there has been a consistent decline in the identification of new cases in both adults and children, both in terms of quantity and proportion.[16] With this perspective, we carried out this retrospective study spanning a period of 5 years from 2019 to 2023 to determine the demographic and clinical profile of leprosy among patients attending Mayo Hospital Lahore.

PATIENTS AND METHODS

This retrospective, observational study analyzed medical records from the leprosy clinic of the Dermatology Outpatient Department at Mayo Hospital, Lahore. We retrieved records for all 122 new leprosy cases diagnosed and registered between January 1, 2019, and December 31, 2023.

Ethical approval was obtained from the Ethical Review Committee/Institutional Review Board of King Edward Medical University/Mayo Hospital Lahore. As this was a retrospective analysis of medical records with no patient identifiers, informed consent was waived.

As this was a retrospective observational study, no formal sample size calculation was performed. The sample size comprised all eligible leprosy cases registered during the study period. A total population sampling technique was employed.

Our inclusion criteria included a diagnosis confirmed by WHO criteria, new registration at our hospital within the study period, and complete demographic and clinical data. Exclusion criteria included incomplete or missing clinical and demographic data of the patients, diagnoses outside the specified period, previously treated leprosy patients, or uncertain diagnoses.

We collected data on demographic trends (age, gender), the annual temporal distribution of new cases, and clinical profiles. Clinical profiles included WHO operational classification, Ridley-Jopling classification (TT, BT, BB, BL, and LL based on clinical, bacteriological, and immunological features), presence and type of lepra reactions, and physical deformity grades (Grade 0, 1, or 2). Age was treated as a numerical variable, while gender, WHO classification, Ridley-Jopling subtypes, lepra reactions, deformity grades, and year-wise distribution were categorical variables.

Data were analyzed using SPSS version 23. Numerical variables were summarized as means and ranges, while categorical variables were expressed as frequencies and percentages. As this study was descriptive in nature, no inferential statistical tests were applied. Year-wise analysis was performed to assess temporal trends.

RESULTS

Between January 1, 2019, and December 31, 2023, 122 new leprosy cases were registered at Mayo Hospital. The annual number of new cases decreased over this period (Table 1). Demographically, 64 (52.5%) patients were male, and 58 (47.5%) were female, resulting in a male-to-female ratio of approximately 1.1:1. Three patients (2.5%) were children under 14 years old. Regarding clinical classification, Borderline Tuberculoid (BT) leprosy was the most common type, comprising 69 (56.6%) cases, followed by tuberculoid 30 (24.6%), lepromatous 16 (13.1%), and borderline lepromatous leprosy 7 (5.7%). No mid-borderline cases were observed. According to the WHO classification, 92 (75.4%) were multibacillary and 30 (24.6%) were paucibacillary.

Lepra reactions were present in 4.9% of patients. A small number of patients presented with lepra reactions: two (1.6%) had a Type 1 (reversal) reaction, and four (3.3%) had a Type 2 (Erythema Nodosum Leprosum - ENL) reaction. Among the 92 multibacillary patients, 7 (5.7%) had a Grade 1 deformity and 20 (16.4%) had a Grade 2 deformity (Table 1, Figure 1).

DISCUSSION

According to the WHO Leprosy report issued in 2018, the incidence of leprosy in Pakistan was 2 per million population, whereas prevalence was 0.02 per 10,000 population.[11] From January 2019 to December 2023, a total of 122 new cases of leprosy were registered at Mayo Hospital's Leprosy Department, with a decreasing trend in the number of cases every year.

The male-to-female ratio was 1.1:1 in this study, indicating there was a slight male preponderance. Many previous studies have reported high male preponderance.[5,17] This may be attributed to increased occupational exposure, outdoor activities, and better access to healthcare facilities as compared to females in most developing countries like Pakistan. However, the proportion of female leprosy cases increased significantly in all WHO regions from 2005 to 2019. During this period, the female fraction of new cases in India (a high-endemic

Table 1: Demographic and clinical characteristics of leprosy patients

Parameter	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)	2023 n (%)	Total n (%)
New cases	33	23	28	22	16	122
Gender						
Male	14 (42.4)	13 (56.5)	21 (75.0)	11 (50.0)	5 (31.3)	64 (52.5)
Female	19 (57.6)	10 (43.5)	7 (25.0)	11 (50.0)	11 (68.7)	58 (47.5)
Children (<14 years)	1 (3.0)	0 (0)	1 (3.6)	1 (4.5)	0 (0)	3 (2.5)
WHO classification						
Paucibacillary	14 (42.4)	8 (34.8)	3 (10.7)	2 (9.1)	3 (18.8)	30 (24.6)
Multibacillary	19 (57.6)	15 (65.2)	25 (89.3)	20 (90.9)	13 (81.2)	92 (75.4)
Ridley–Jopling classification						
Tuberculoid	14 (42.4)	8 (34.8)	3 (10.7)	2 (9.1)	3 (18.8)	30 (24.6)
Borderline tuberculoid	14 (42.4)	12 (52.2)	18 (64.3)	15 (68.2)	10 (62.5)	69 (56.6)
Mid-borderline	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Borderline lepromatous	3 (9.1)	1 (4.3)	2 (7.1)	1 (4.5)	0 (0)	7 (5.7)
Lepromatous leprosy	2 (6.1)	2 (8.7)	5 (17.9)	4 (18.2)	3 (18.8)	16 (13.1)
Complications						
Type 1 reaction	1 (3.0)	0 (0)	1 (3.6)	0 (0)	0 (0)	2 (1.6)
Type 2 reaction.	1 (3.0)	1 (4.3)	0 (0)	1 (4.5)	1 (6.3)	4 (3.3)
Grade 1 deformity	2 (6.1)	2 (8.7)	1 (3.6)	1 (4.5)	1 (6.3)	7 (5.7)
Grade 2 deformity	3 (9.1)	5 (21.7)	5 (17.9)	4 (18.2)	3 (18.8)	20 (16.4)

Figure 1: (A) Borderline tuberculoid leprosy, and (B) Grade 2 disability of hands in a patient of lepromatous leprosy.

country) increased from 32.9% to 39.2%, reflecting the global increase in female cases.[18] The minimal gender difference observed in the present study is due to increased health awareness among females, greater concern regarding cosmetic disfigurement and appearance, and social stigma associated with this disease. In the present study, 3 (2.5%) patients out of 122 were children. Similar findings were reported by Masatkar et al., 2023.[17]

Childhood leprosy indicates active circulation of Mycobacterium leprae, ongoing transmission of disease from active sources, and failure of disease control by the health system.[9] However, the proportion of childhood leprosy was less in this study compared to previous studies conducted in Pakistan and India. For instance, 4% was reported by Ghafoor et al., 2019[19], 5.9% by Devi et al., 2019[20], and 9.5% by Sanker et al., 2021.[9] Similar findings were observed by Reza et al. and Barua et al., in which Borderline Tuberculoid (BT) was the most common type.[21,4,] Arif et al., and Rather et al., also demonstrated that the majority of the patients belonged to the borderline category.[22,23] Borderline cases have become increasingly prevalent with the advent of multidrug treatment as compared to the lepromatous forms of the disease that were more commonly seen in the dapsone era.[22]

In the present study, 92 (75.4%) were of the multibacillary type, while 30 (24.6%) cases were of paucibacillary leprosy. These results are nearly comparable to a study conducted by Arif et al. (2019) in

which 73.2% patients had multibacillary disease.[22] Similarly, many other studies carried out in Pakistan and India also showed an increased frequency of multibacillary leprosy.[4,17] The high percentage of leprosy cases with multibacillary disease suggests that these patients are not only important sources of infection but are also prone to reactions and deformities. The prevalence of multibacillary leprosy cases further highlights the challenges faced by health services in detecting leprosy in its early stages.

In the present study, 2 (1.6%) patients presented with type 1 reaction, both patients were of Borderline lepromatous type, and 4 (3.3%) patients displayed type 2 reaction, and all of them belonged to the lepromatous pole in the spectrum. Type 2 reaction was more frequently observed than type 1. Similar findings were observed by Arif et al.[22] The current study results are also matched with a study conducted by Tabassum et al. (2021) in Karachi, in which most patients with type 1 reactions were of borderline type, and type 2 reactions were of lepromatous leprosy.[11] In the current study, out of 92 multibacillary patients, 7 (5.7%) presented with Grade 1 deformity and 20 (16.4%) presented with Grade 2 deformity. The results of this study correlate with the study carried out by Sanker et al., which showed that 11.9% patients had Grade 1 deformity; however, in this study, most patients had Grade 2 deformity.[9] Masatkar et al., Mowla et al., and Rather et al., also observed that grade 2 deformity was more frequent.[17,23-27] The present study was carried out as a retrospective analysis of biodata and medical records of leprosy patients. Therefore, the data obtained were limited and non-expandable.

CONCLUSION

This study demonstrated that leprosy is still prevalent in Pakistan, and childhood leprosy, although rare, is still reported, which shows continuing transmission of Mycobacterium leprae. The presence of disabilities and deformities in leprosy patients due to a delay in diagnosis and treatment is a significant concern. Awareness among the masses about the disease's transmission, symptoms, and available treatments can encourage them to seek help sooner, resulting in timely diagnosis and management, thus preventing disabilities and reducing the spread of the disease. Continued follow-up even after completing the Multi-Drug Therapy (MDT) is crucial to prevent physical deformities. Also, educating the healthcare workers in providing accurate diagnoses and delivering appropriate treatment plays a pivotal role in the fight against leprosy.

Author Contributions: AA: Conceptualization; Methodology; Formal analysis; Data inter-pretation; Writing: original draft; Writing: review & editing; Final approval of the manuscript. ZA: Conceptualization; Methodology; Formal analysis; Data interpretation. ARS: Data curation; Investigation; Conceptualization; Methodology; Formal analysis; Data interpretation. JH: Conceptualization; Methodology; Formal analysis; Data interpretation.

REFERENCES

1. Sharma M, Singh P. Leprosy reactions: Pathogenesis, clinical features and management. Indian J Med Res. 2022;156(2):218–227. https://doi.org/10.4103/ijmr.IJMR_1651_20
2. Bhukhan A, Dunn C, Nathoo R. Lucio phenomenon associated with untreated leprosy—United States. Emerg Infect Dis. 2023;29(8):1698–1700. https://doi.org/10.3201/eid2908.230021
3. Mi Z, Liu H, Zhang F. Advances in the immunology and immunotherapy of leprosy. Front Immunol. 2020;11:567. https://doi.org/10.3389/fimmu.2020.00567
4. Barua JK, Khan S, Chandra A, Dhabal A, Halder S. Clinical profile of leprosy patients attending a tertiary care dermatology clinic. J Pak Assoc Dermatol. 2021;31(2):158–164.
5. Ghafoor R, Zia M, Anwar MI, Ahmed M, Kumar KL, Iqbal M. Pattern of leprosy in patients presenting to a tertiary care hospital in Pakistan. J Pak Assoc Dermatol. 2017;27(4):324–329.
6. Zia M, Anwar MI, Iqbal M. Clinical spectrum of leprosy in dermatology practice. J Pak Assoc Dermatol. 2019;29(1):30–34.
7. Oliveira JSS, Reis ALMD, Margalho LP, Lopes GL, Silva ARD, Moraes NS, et al. Leprosy among children under 15 years of age in Brazil: Epidemiological trends and risk factors. PLoS Negl Trop Dis. 2019;13(9):e0007709. www.doi.org/10.1371/journal.pntd.0007709
8. Ulfat S, Bashir Khan MK, Saeed K, Shah F, Azam HM, Masud S, Bukhari SZ, Ullah A, Rehman HU. Frequency and clinical spectrum of leprosy in a tertiary care hospital. Pak J Med Health Sci. 2023;17(5):403.
9. Sanker A, George S, Bhaskaramenon SC. Clinico-epidemiological profile of leprosy patients attending a tertiary care hospital. Int J Res Dermatol. 2020;6(2):156–160. https://doi.org/10.18203/issn.2455-4529.IntJResDermatol20200611
10. Li X, Ma Y, Li G, Jin G, Xu L, Li Y, Wei P, Zhang L. Immune mechanisms and advances in immunotherapy of leprosy. Front Immunol. 2024;15:1298749. https://doi.org/10.3389/fimmu.2024.1298749
11. Tabassum S, Zia M, Khoja AA, David J, Iqbal M, Junaid M. Leprosy: Clinical spectrum and challenges in diagnosis in Pakistan. J Pak Med Assoc. 2021;71(10):2317–2320.
12. De Almeida MV, Ferreira EA, Da Rocha CB, Cortela DC, Silva PR, Len CA, Ferreira SM. Clinical manifestations and outcomes of leprosy reactions in pediatric patients. Lepr Rev. 2024;95(1):85–96.
13. Nugraheni R, Murti B, Irwanto ME, Sulaeman ES, Pamungkasari EP. Determinants of disability among patients with leprosy: A case-control study. Lepr Rev. 2023;94(4):332–340.
14. Darmi M, Johari A, Sahrial S, Guspianto G. Risk factors associated with leprosy transmission in endemic regions. Arch Razi Inst. 2024;79(1):1–12. https://doi.org/10.22034/ARI.2023.362352.2367
15. Bisherwal K, Singal A, Grover C. Leprosy reactions: Current understanding and management strategies. Lepr Rev. 2023;94(2): 135–147.
16. Saunderson P. Global progress towards elimination of leprosy: Current challenges. Lepr Rev. 2023;94(4):262–263.
17. Masatkar V, Meena M, Makhija R, Agarwal C, Balai M. Histoid leprosy: A clinical and histopathological study. Indian J Dermatol. 2023;68(6):723. https://doi.org/10.4103/ijd.ijd_705_22
18. Quilter EE, Lockwood DN, Butlin CR. Managing complications of leprosy reactions in clinical practice. Lepr Rev. 2022;93(4):364–369.
19. Ghafoor R, Anwar MI, Zia M. Leprosy in Pakistan: Clinical presentation and diagnostic challenges. J Pak Med Assoc. 2021;71(3):838–842.

20. Devi K, Renu V, Asokan N, Ambooken B. Profile of childhood leprosy in a tertiary care centre. Indian J Lepr. 2019;91(1):1–6.
21. Reza MS, Mondal AK, Shome K, Thangaraj R. Clinical and epidemiological features of leprosy patients attending a tertiary hospital. J Pak Assoc Dermatol. 2023;33(3):980–985.
22. Arif T, Amin SS, Adil M, Dorjay K, Raj D. Unusual clinical presentations of leprosy: A case series. Acta Dermatovenerol Alp Pannonica Adriat. 2019;28(1):7–10.
23. Rather SP. Leprosy: An overview of epidemiology, diagnosis and treatment. Int J Infect Dis Prev Med. 2022;1(1):1–9.
24. Mowla MR, Angkur DM, Hasan Z, Sultana MN, Afrin S, Akhter MS. Clinical profile and treatment outcomes of leprosy patients in Bangladesh. Skin Health Dis. 2021;1(1):e5. https://doi.org/10.1002/ski2.5
25. Shravani B, Ganguly S, Shukla AK, Chhabra N, Prabha N, Sachdev D, Khare S. Clinico-epidemiological study of leprosy patients in a tertiary care hospital. J Family Med Prim Care. 2022;11(4):1416–1420. https://doi.org/10.4103/jfmpc.jfmpc_1655_21
26. Yang J, Li X, Sun Y, Zhang L, Jin G, Li G, Zhang S, Hou K, Li Y. Epidemiological trends and control strategies for leprosy in endemic regions. Pathog Glob Health. 2022;116(8):467–476. https://doi.org/10.1080/20477724.2022.2039786
27. Zhang QP, Li G, Li C, Lin ZX, Chen P. Spatial distribution and epidemiological characteristics of leprosy in China. BMC Public Health. 2020;20(1):1790.