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Original Article

A Comparative Analysis of the Clinical Profile and Treatment Outcomes Among Migrant and Domestic Leprosy Patients

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Leprosy continues to be a persistent public health concern in India, with internal migration becoming a significant factor affecting disease epidemiology. Migrant populations often face obstacles in obtaining timely diagnoses and receiving continuous treatment, which may significantly affect the severity of diseases and their outcomes. This study has been carried out to compare the clinical profiles and treatment outcomes between migrant and resident leprosy patients attending a tertiary care centre in Bengaluru. This retrospective study analysed data from 97 leprosy patients (34 migrants, 63 residents) registered between January 2015 and December 2023. Demographic variables, clinical subtypes (Ridley-Jopling classification), reaction patterns, deformity grades, Fite-Faracco and slit skin smear positivity, and treatment adherence were evaluated. Statistical analysis included Chi-squared tests and independent t-tests, with significance set at $p<0.05$. Migrant patients were significantly younger (mean age 30.44 ± 9.58 years) and predominantly male (91.2%) compared to resident patients (mean age 40.67 ± 15.80 years; 68.3% male). Lepromatous leprosy was more prevalent among migrants (44.1%), who also showed higher bacterial indices on Fite-Faracco stain (52.9%) and slit skin smears (61.8%) ($p=0.011$). Type 1 lepra reactions were significantly more common in migrants (29.4% vs. 6.3%, $p=0.007$), and a more significant proportion presented with deformities. Treatment defaults were notably higher among migrants (26.5%, $p=0.006675$). It appears that migration significantly impacts the clinical severity, bacterial burden, and treatment adherence in leprosy. The high acid-fast-bacilli (AFB) positivity among migrants highlights increased transmission risk. Targeted, evidence-based migrant-focused strategies under NLEP are essential to improve outcomes and support India's goal of leprosy eradication by 2027.

Keywords : Leprosy, Migrants, Multi Drug Therapy (MDT), Deformity, AFB, South India

Introduction

Migration among individuals affected by leprosy was suggested as early as 1929 by Bhaskar Rao (1930). Migration from rural to urban areas in India is primarily driven by the pursuit of better employment opportunities, higher wages, and improved living standards. With their diverse economies and infrastructure, metropolitan cities attract individuals seeking jobs in various sectors. This influx contributes to urbanisation and economic development, as cities benefit from the labour and skills of migrants (Jha 2024).

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Migration has a significant impact on the epidemiology, clinical presentation, and treatment outcomes of leprosy. Individuals moving from leprosy-endemic regions may carry the disease to urban areas, potentially leading to new cases among susceptible populations. Additionally, migrants often face challenges in accessing healthcare services due to unfamiliarity with the system, economic constraints, or stigma, which can delay diagnosis and treatment. This delay not only affects the individual's clinical condition but also increases the risk of ongoing transmission within densely populated urban settings (Samuel et al 2012).

There are only a handful of studies about internal migrants in India affected by leprosy. A systematic analysis by Samuel et al (2012) examined the differences in the clinical characteristics of leprosy among migrants. In a retrospective study conducted at a tertiary care regional centre in Western India, Rathod and Mistry reported that migrants accounted for 85.2% of the caseload in 2014 (Rathod & Mistry 2017). Similarly, in a study from North Kerala, Thyvalappil et al (2019) found that 69% of migrants were multibacillary cases. A 10-year retrospective analysis of leprosy data from Northern India by Mushtaq et al (2020). indicated that immigrants comprised 52.4% of the leprosy caseload at their centre. Our centre also presented an intriguing data analysis, highlighting the disparity in the clinical features of leprosy between migrants and residents, which is featured in this retrospective study. Understanding these factors can inform targeted interventions, ensuring that migration dynamics are integrated into leprosy control strategies to effectively address and mitigate the spread of the disease.

This study was conceptualised in our department with the following objectives: (i) To comprehensively analyse the clinical profile and therapeutic outcomes in migrant leprosy patients, and (ii) To draw comparisons with domestic counterparts.

Materials and Methods

This retrospective study was carried out after due approval of Institutional Ethics Committee. This involved analysis of patients' records from the leprosy database from January 2015 to December 2023. Leprosy cases were investigated, diagnosed and managed as per guidelines of National Leprosy Eradication Programme (2019a). Classification was as per the criteria of Ridley & Jopling (1966). Data pertaining to variables like age, gender, address, occupation, histopathological diagnosis, deformities, reactions, positivity for acid-fast bacilli (AFB), and treatment default were tabulated in Microsoft Excel and analysed. Records with missing data were excluded from the study.

The following case definitions were considered to categorise the patients into various subgroups:

- Migrants were defined as patients from outside Karnataka who had resided at the place of registration/detection for less than 15 years (Samuel et al 2012).
- Relapse was defined as the recurrence of the disease at any time after completing a full course of treatment. An MB relapse is characterised by evidence of an increase in BI of 2 or more units on a skin smear, supplemented by the proviso that "signs and symptoms are not deemed to be due to reaction." For PB relapse, it is more likely to indicate a relapse rather than a reaction if more than three years have passed since treatment ended. (National Leprosy Eradication Programme 2019b)
- Patients who have interrupted therapy for three or more months (if PB) or six months (if

MB) were previously defined as Defaulters. (National Leprosy Eradication Programme 2019).

- Deformity was defined as a visible impairment or consequence of an impairment inside the body. Disabilities were graded as per criteria of Brandsma & van Brakel (2003).

Data Management and Statistical Analysis:

The data, tabulated in a spreadsheet, were analysed using SPSS software version 20. (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL, USA) Categorical variables were presented as frequencies and percentages. Continuous variables were presented as mean ± SD. The chi-squared test was used to assess the statistical significance of the cross-tabulation between categorical variables. An Independent t-test was used to compare the mean ± SD of continuous variables between the two groups. A p-value < 0.05 was considered statistically significant.

Results

Ninety-seven patients with complete records within the study period were included. A male preponderance with 74 (76.288%) males and 23 (23.711%) females, and a male-to-female ratio of 3:1 was observed. Of these, migrants constituted 35.1% (34 individuals) of the study population, with the majority from Bihar (47.05%;16 individuals). Five migrants, accounting for 14.7% of the migrant population, were from outside India, namely Nepal (Table 1). Most of the migrants (73.529%; n=25) were manual labourers, and the remainder (26.47%; n=9) were security guards.

Resident domestic patients constituted 64.9% (63 individuals) of the study population, with the majority from Bangalore Urban (87.3%; 55 individuals). The remaining 5 (7.93%) individuals were from Bangalore Rural, including 2 from Hoskote (3.17%), 2 from Devanahalli (3.17%), and 1 from Doddaballapur (1.58%), while 3 (4.76%) were from neighbouring district Tumkur.

Demographic contrasts: age and gender composition

Migration patterns revealed a clear gender imbalance, with males comprising 91.2% of the migrant population and females 8.8%, resulting in a male-to-female ratio of 10:1. In contrast, the resident patients had a male-to-female ratio of 2:1, with 68.3% males and 31.7% females. This difference was statistically significant (p = 0.011; Chi-squared test).

Age distribution also varied significantly between

Table 1 : Overview of migrant cases.

LOCATION	NUMBER /PERCENTAGE CASES (%)
Bihar	16 / 47.05
West Bengal	6 / 17.64
Nepal	5 / 14.70
Jharkhand	3 / 8.82
Uttar Pradesh	2 / 5.88
Orissa	1 / 2.94
Tamil Nadu	1 / 2.94
TOTAL	**34 / 100**

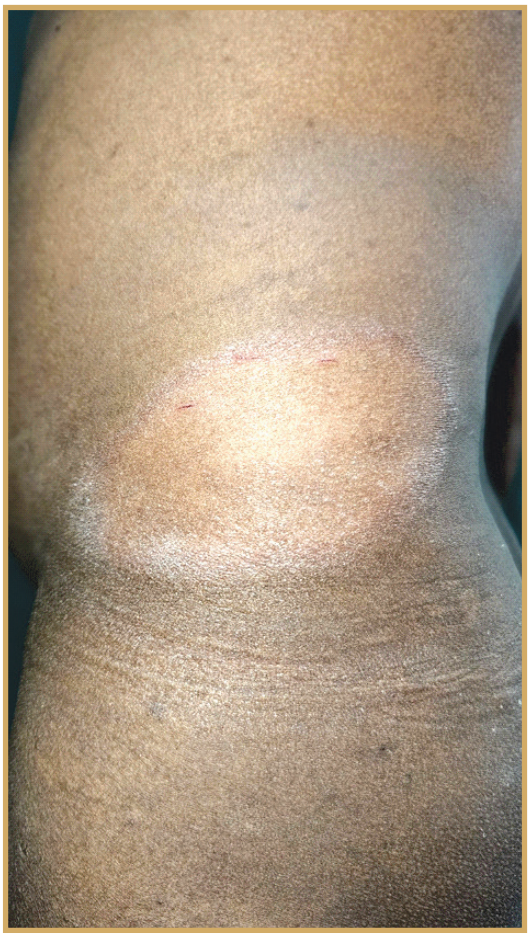

Fig. 1 : A large annular plaque over the left flank in a resident patient with borderline tuberculoid leprosy.

the groups (p = 0.002; Chi-squared test). More than half (55.9%) of migrants were aged 16–30 years, compared to just 22.2% among domestic patients. Meanwhile, the resident patients were more concentrated in the 31–50 years range (46% vs. 38.2%) and the >50 years category (25.4% vs. 5.9%). The data, summarised in Table 2, underscores the demographic patterns shaping migration trends.

Comparative analysis of the diagnosis made at the time of initial presentation

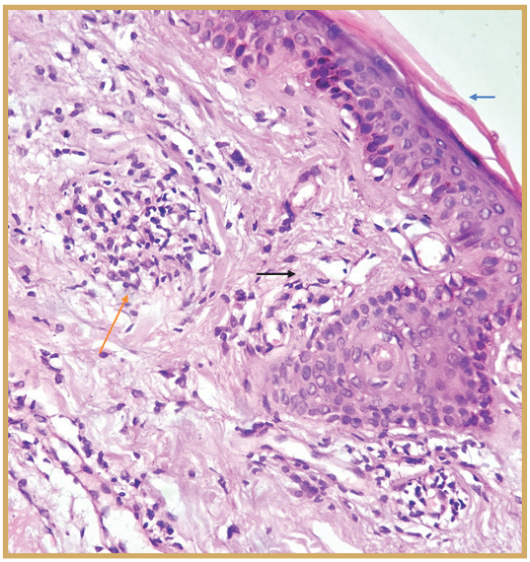

Fig. 2 : Histopathology section from a resident patient with BT Hansen's disease, demonstrating thinned epidermis (green arrow), perivascular and perineural lymphocytic infiltrates (black arrow), and a well-formed epithelioid cell granuloma in the superficial dermis (orange arrow). (H & E stain, 40x).

After histopathological confirmation of diagnosis, as per Ridley-Jopling classification, a higher prevalence of borderline tuberculoid (BT) leprosy (Figs. 1, 2) was observed among domestic patients (49.20%) compared to migrants (32.40%). Conversely, lepromatous (LL) leprosy (Figs. 3, 4) was more prevalent among migrants (44.10%) than the resident patients (27.00%). Additionally, borderline lepromatous (BL) leprosy was more common in migrants (20.60%) compared to non-migrants (11.00%), while tuberculoid leprosy was more frequent in the resident patients (9.60%) than in migrants (2.90%). Notably, borderline borderline (BB) leprosy was absent among migrants but accounted for 3.20% of cases in the resident patients.

Table 2 : Comparison of age and gender composition of migrant and resident patient population.

Variables	Migrants (n=34)	Resident Patients (n=63)	P-value (Chi-squared test)
Gender, n (%)			
Male	**31 (91.2%)**	43 (68.3%)	**0.011 (Significant)**
Female	3 (8.8%)	20 (31.7%)	
Age, Mean ± SD	30.44 ± 9.58	40.67 ± 15.80	**<0.001**
Age group, n (%)			
<=15 years	0 (0%)	4 (6.3%)	**0.002 (Significant)**
16 to 30 years	**19 (55.9%)**	14 (22.2%)	
31 to 50 years	13 (38.2%)	29 (46%)	
>50 years	2 (5.9%)	16 (25.4%)	

Table 3: Comparison of reaction patterns and deformity during presentation.

	Migrants (n=34)	Resident Patients (n=63)	P-value (Independent t-test)
Reaction			
Type 1	10 (29.4%)	4 (6.3%)	**0.007 (Significant)**
Type 2	1 (2.9%)	5 (7.9%)	
Nil	23 (67.6%)	54 (85.7%)	
Deformity			
Grade 1	13 (38.2%)	19 (30.2%)	0.544 (Not significant)
Grade 2	5 (14.7%)	7 (11.1%)	
Nil	16 (47.1%)	37 (58.7%)	

Table 4 : Comparison of Fite Faracco stain and AFB positivity between the two study populations.

Variables	Migrants (n=34)	Resident Patients (n=63)	P –value (Chi-squared test)
Fite Faracco stain			
Positive for AFB	18 (52.9%)	17 (27%)	**0.011 (Significant)**
Negative for AFB	16 (47.1%)	46 (73%)	
Slit Skin Smear Examination			
Positive for AFB	21 (61.8%)	22 (34.9%)	**0.011 (Significant)**
Negative for AFB	13 (38.2%)	41 (65.1%)	

Table 5 : Comparison of rates of default among migrants and resident patients.

	Migrants (n = 34)	Resident Patients (n = 63)	P – Value (Chi-squared test)
Defaulters	9 (26.47%)	14 (22.22%)	**0.006675 (Significant)**

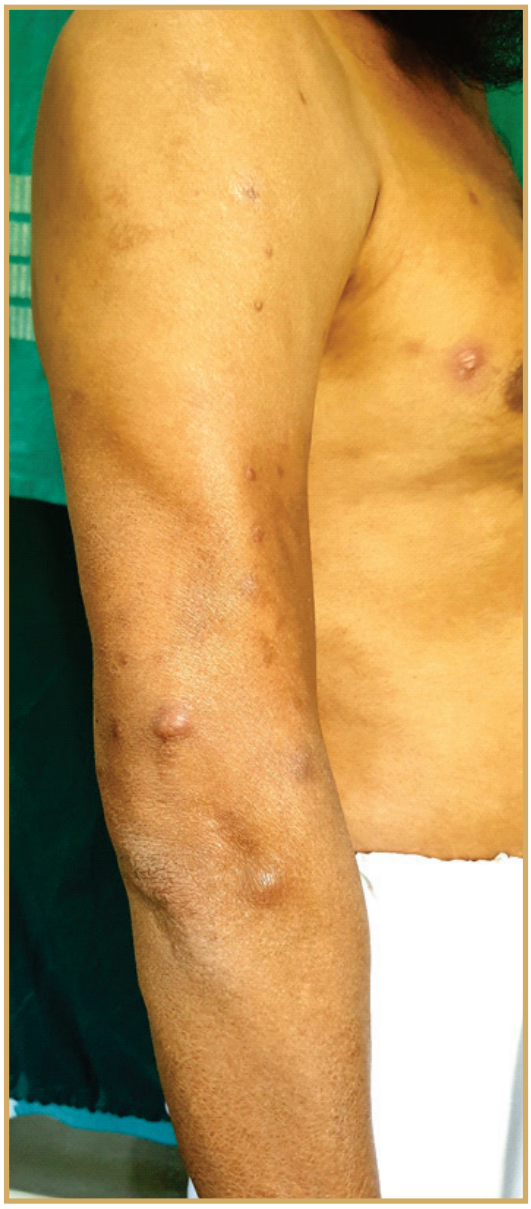

Fig. 3 : Multiple nodules over the upper arm in a migrant with lepromatous leprosy.

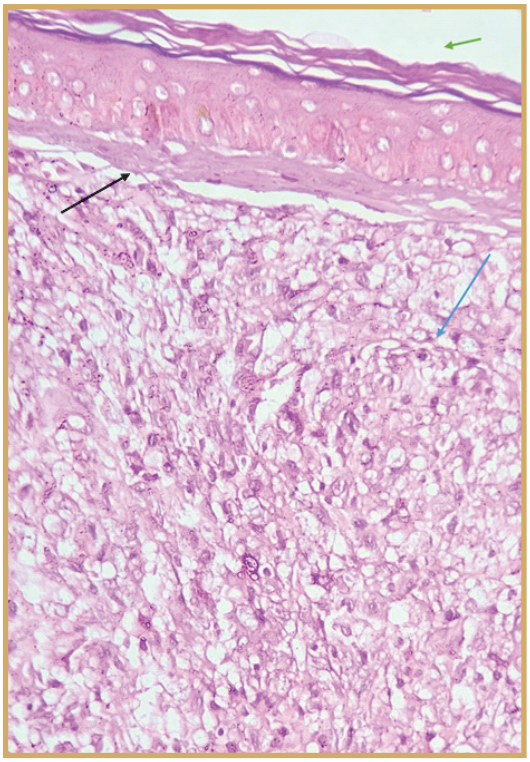

Fig. 4 : Histopathology section of a migrant patient diagnosed with lepromatous leprosy, demonstrating an atrophic epidermis (green arrow) with a prominent subepidermal Grenz zone (black arrow). The dermis shows diffuse sheets of foamy macrophages and sparse lymphocytic infiltrate (blue arrow). (H&E, 40x).

This difference in diagnosis between migrants and resident patients was statistically significant (p = 0.0017, Chi-squared test), indicating a substantial variation in the distribution across the leprosy spectrum, with a major proportion

Table 6 : Comparison of the present study with previous studies.

Parameter	Samuel et al (2012)	George et al (2022)	Present Study (2025)
Type of Study	Prospective study on migration and new case detection among 222 leprosy patients.	A retrospective study analysed 705 leprosy patients (73 migrants, 632 non-migrants).	A retrospective study analysed 97 leprosy patients (34 migrants, 63 non-migrants).
Age and Gender Distribution	**Migrants:** Mean age = 32.3 ± 15.6 years, M:F = 10:13 **Resident Patients:** Mean age = 35.8 ± 18.3 years, M:F = 1.5:1 *(p = 0.200, Not significant)*	**Migrants:** Mean age = 28.3 ± 1 years, M:F ratio = 17:3. **Resident Patients:** Mean age = 39.9 ± 16.7 years, M:F ratio = 1.9:1. *(p < 0.001, Significant)*	**Migrants:** Mean age = 30.44 ± 9.58 years, M:F ratio=10:1 **Resident Patients:** Mean age = 40.67 ± 15.80 years, M:F ratio =2:1*(p < 0.002, Significant)*
AFB Positivity Amongst Migrants	Not reported.	Not reported.	**Migrants:** 61.8% **Resident Patients:** 34.9% *(p = 0.011, Significant)*
Fite Faracco Stain Positivity	Not reported.	Not reported.	**Migrants:** 52.9% **Resident Patients:** 27% *(p = 0.011, Significant)*
Treatment Outcomes – Defaulters	Not reported.	**Migrants:** 4.1% **Resident Patients:** 1.7% *(p < 0.005, Significant)*	**Migrants:** 26.47% **Resident Patients:** 22.22% *(p = 0.006675, Significant)*
Patients presenting with Deformity	**Migrants:** 30.4% **Resident Patients:** 12.1% *(p = 0.036, Significant)*	**Migrants:** 43.8% **Resident Patients:** 25.9% *(p = 0.002, Significant)*	**Migrants:** 14.7% **Resident Patients:** 11.1% *(p = 0.554, Not significant)*
Patients presenting in Reaction	Not reported.	**Migrants:** 27.9% in Type 1 and 15.8% in Type 2 reactions. **Resident Patients:** 26.3% in Type 1 and 21.4% in Type 2 reactions. *(p > 0.005, Not significant)*	**Migrants:** 29.4% had Type 1 reaction, and 2.9% had Type 2 reaction. **Resident Patients:** 6.3% in Type 1 reaction, 7.9% in Type 2 reaction. *(p < 0.005, Significant)*

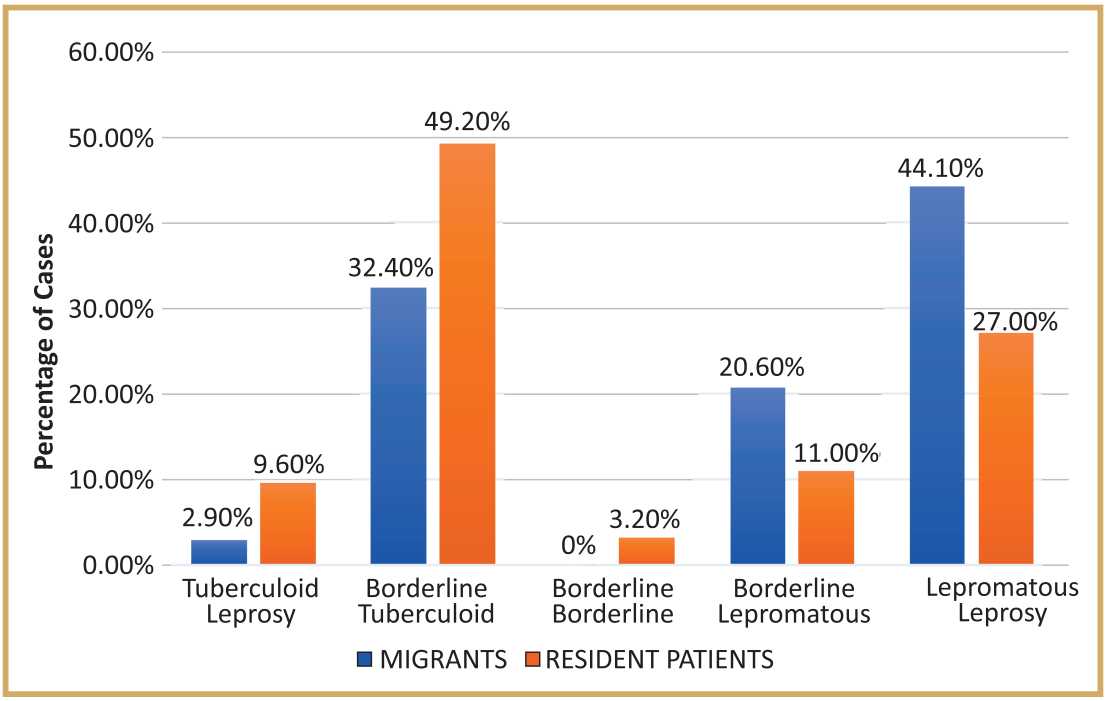

Fig. 5 : Comparative analysis of Ridley Jopling's classification of leprosy between migrants and residents.

of migrants falling towards the lepromatous pole (Fig. 5).

Comparison of reaction patterns and deformity

A higher number of migrants presented to the outpatient department (OPD) with Type 1 reaction on their first visit itself (n=10, 29.4%) compared to resident patients (n=4, 6.3%). In contrast, Type 2 reaction at initial presentation was less frequent among migrants (n=1, 2.9%) than among resident patients (n=5, 7.9%), a statistically significant difference (p = 0.007; Independent t-test). During the course of treatment and follow-up, Type 1 reaction was noted in an additional 5 migrant patients, resulting in a cumulative incidence of 15 out of 34 patients (44.1%), as compared to 14 out of 63 resident patients (22.2%) (p = 0.044; Chi-squared test). Similarly, a Type 2 reaction occurred in 4 additional migrant patients, yielding a total incidence of 5 out of 34 (14.7%). Among resident patients, 10 additional cases of type 2 reaction were observed, resulting in a total of 15 out of 63 affected (23.8%) (p = 0.427; Chi-squared test). As summarised in Table 3, although the difference in deformity grades was not statistically significant (p = 0.544; Independent t-test), a concerning trend was noted. At the time of the first OPD presentation, 13 migrants (38.2%) already had Grade 1 deformity, compared to 19 resident patients (30.2%). Similarly, a higher proportion of migrants (n=5, 14.7%) had Grade 2 deformity (Figs. 6, 7) at presentation than resident patients (n=7, 11.1%).

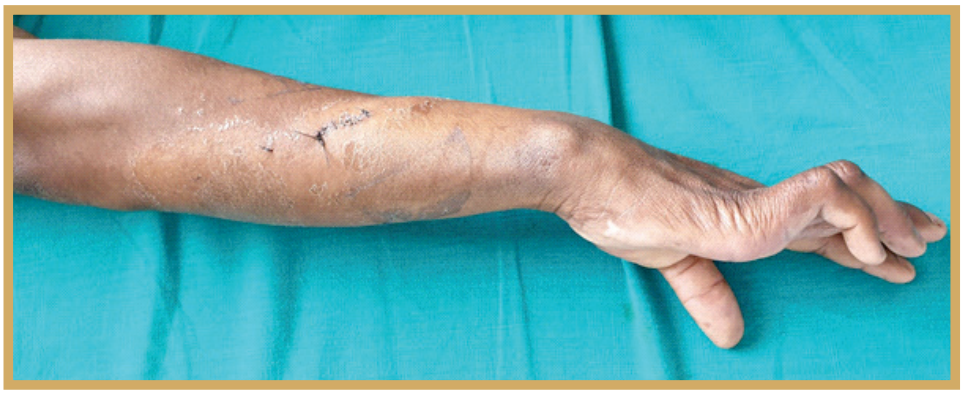

Fig. 6 : Ulnar claw hand in a migrant patient with borderline tuberculoid leprosy.

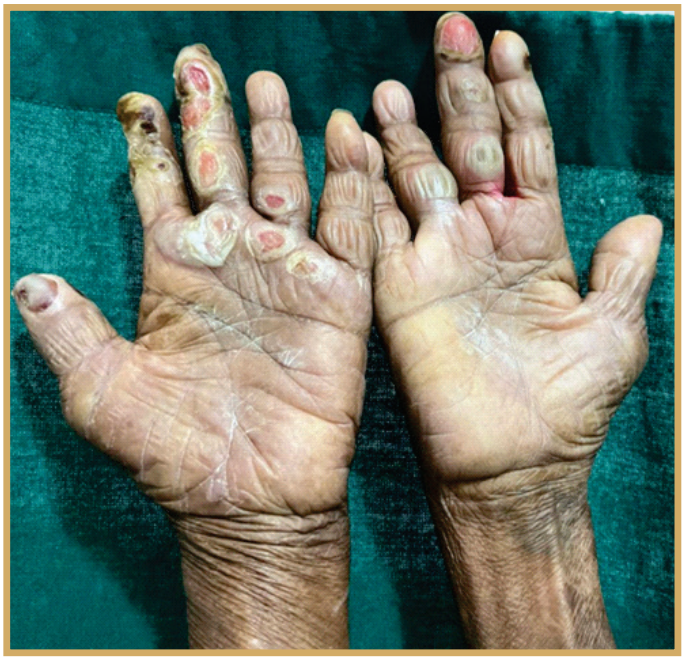

Fig. 7 : Trophic ulcers in a resident patient with borderline tuberculoid leprosy resultant from sensory deficit.

Comparison of Fite – Faracco stain and AFB positivity between migrants and residents

In liaison with the clinical diagnosis, a higher proportion of migrants tested positive for acid-fast bacilli (AFB) using the Fite-Faracco stain on histological sections (52.9%; n = 18) compared to domestic patients (27%; n = 17). Similarly, the slit skin smear examination also showed a higher proportion of AFB positivity among migrants (61.8%; n=21) compared to the resident patients

(34.9%; n=22). This difference, tabulated in Table 4, was found to be statistically significant (p = 0.011; Chi-squared test), indicating a higher bacterial load among migrants.

Treatment outcomes

As depicted in Table 5, the proportion of defaulters was greater among migrants (26.47%; n=9) than the resident patients (22.22%; n=14), and this was statistically significant (p = 0.006675; Chi-squared test).

Discussion

With the theme of "Unite, Act, and Eliminate", World Leprosy Day was celebrated in India on January 30, 2025. The focus was on proactive measures such as early diagnosis and prompt treatment to interrupt transmission and ultimately eliminate leprosy, as outlined in the National Strategic Plan (NSP) and Roadmap for Leprosy (2023-27), which aims for zero transmission by 2027 (Perappadan 2025). Although Karnataka is considered low endemic, with an overall state prevalence of 0.33 per 10000 in 2023-24, compared to the national average of 0.6/10000, certain zones in Bengaluru have recorded a high prevalence rate, with 80% of these cases classified as multibacillary. One obvious factor contributing to this is migration (Yasmeen 2025).

The data summarised in the present study were contrasted with the available literature and are depicted in Table 6. In the present study, migrants were predominantly younger (mean age: 30.44 ± 9.58 years) and male-dominated (91.2%; n=31), compared to the resident patients, who were older (mean age: 40.67 ± 15.80 years) and had a lower male predominance (68.3%; n=43), with a statistically significant difference (p < 0.002). This trend aligns with findings from a previous study by George et al (2022), in which migrants had a mean age of 28.3 ± 1 years and a male-to-female ratio of 17:3, compared to resident patients with a mean age of 39.9 ± 16.7 years and a male-to-female ratio of 1.9:1 (p < 0.001). This may be attributed to the influx of young, male individuals with limited skills into metropolitan cities from endemic areas such as Chhattisgarh, Bihar, Jharkhand, and Odisha seeking employment opportunities. (George et al 2022) In contrast, Samuel et al. found no statistically significant difference in age or gender distribution (p = 0.200). Although the migrants in their study tended to be younger, this difference was not statistically significant. Samuel et al. suggested that migration did not disrupt the demographic structure of the local leprosy population in the Gudiyatham Taluk region of Tamil Nadu, particularly among new cases. Social integration, healthcare accessibility, and long-term settlement patterns may have contributed to this stability.

The clinical profile of migrant leprosy patients in the present study, stratified according to the Ridley-Jopling classification (Ridley & Jopling 1966), demonstrated a significantly higher burden of multibacillary disease among migrants, with lepromatous leprosy (44.1%) and borderline lepromatous leprosy (20.6%) being the predominant subtypes. In contrast, resident patients had a more significant proportion of paucibacillary cases, with borderline tuberculoid (49.2%) and tuberculoid leprosy (9.6%) being more frequent (p = 0.0017, Chi-squared test). These findings are in close agreement with the study by George et al., which reported a significantly higher prevalence of lepromatous leprosy among migrants (45.9%) compared to resident patients (26.8%, p = 0.002). In comparison, borderline tuberculoid was more common in residents (40.6% vs. 24.3%, p = 0.011). Similarly, Samuel et al. documented a predominance of lepromatous leprosy (48%) and

borderline lepromatous leprosy (18%) among migrants, reinforcing the association between migration and advanced disease at presentation and a delayed diagnosis.

The bacterial burden indicators in our study were significantly higher in migrants, with acid-fast bacilli (AFB) positivity on slit skin smear reported in 61.8%(n=21) compared to 34.9%(n=22) of the domestic patients ($p = 0.011$). Similarly, Fite-Faracco stain positivity was observed in 52.9%(n=18) of migrants, significantly exceeding the 27%(n=17) seen in the domestic patients ($p = 0.011$).

The predominant leprous profile, presentation in reaction, Fite-Faracco, and AFB positivity observed amongst migrants in the present study may be elucidated by several factors common amongst migrant labourers. Firstly, migrants often endure cramped living conditions as a means to reduce expenses, which may facilitate the transmission of infectious diseases such as leprosy (George et al 2022). Secondly, there may be a lack of awareness about the condition among migrant populations, leading to delayed diagnosis and treatment initiation. Additionally, there is often reluctance among migrant workers to seek medical help in unfamiliar areas, possibly due to the potential loss of a day's salary or other economic considerations (Bharti et al 2019). Furthermore, the associated stigma surrounding leprosy may contribute to delayed diagnosis and treatment-seeking behaviours among migrant populations. The incessant mobility characterising migrant labourers' pursuit of employment opportunities disrupts treatment continuity and undermines the establishment of consistent healthcare engagement.

Treatment adherence was also significantly lower among migrants, with default rates of 26.47% (n=9) in migrants compared to 22.22% (n=14) among resident patients ($p = 0.006675$). These findings are consistent with the study of George et al (2022), where migrant defaulter rates (4.1%) exceeded those of non-migrants (1.7%) ($p < 0.005$). High default rates among migrants are likely attributable to a perception of non-improvement of the condition, as well as economic constraints such as the inability to afford diagnostic investigations, additional medications, physiotherapy, splints, and corrective surgeries for deformities. Frequent relocation and limited awareness of the importance of treatment completion also led to default.

Deformities were significantly higher among migrants, with grade 1 deformities observed in 38.2% and grade 2 in 14.7%, compared to 30.2% and 11.1% of residents, respectively ($p = 0.544$). This aligns with George et al.'s study, where Grade 2 disability was more prevalent in migrants (43.8%) than residents (25.9%) ($p = 0.002$). Samuel et al. also observed 30.4% of migrants in their study with Grade 2 deformities compared to 12.1% of non-migrants ($p = 0.036$). An observation, thus, is that migrants, being predominantly in the lepromatous leprosy (LL) spectrum, consequently developed deformities. The LL form, with its high bacillary load and extensive neural involvement, makes nerve damage and subsequent deformities almost inevitable, especially when diagnosis and treatment are delayed.

Leprosy reactions were also more frequent in migrants, with Type 1 reactions being documented in 29.4% of migrants versus 6.3% of residents at the time of initial presentation to the OPD. The overall difference was statistically significant ($p < 0.005$), suggesting that migrants, possibly due to delayed presentation and prolonged antigenic stimulation, have an increased propensity for type 1 reactions and immune-mediated inflammatory responses. In contrast, the predominance of borderline cases

among resident patients (borderline tuberculoid and borderline borderline) suggests a higher likelihood of type 1 lepra reactions, as these forms are immunologically unstable and prone to inflammatory episodes. These findings contrast with George et al., where no significant difference was noted in reaction patterns ($p > 0.005$).

Overall, these findings underscore migration as a key determinant in leprosy epidemiology, with migrants exhibiting more severe disease manifestations, higher bacterial loads, increased treatment non-adherence, and a greater tendency for immune reactions. Given these disparities, targeted interventions under the National Leprosy Eradication Programme (NLEP) are warranted, including active case detection, early diagnosis, improved healthcare access, and treatment adherence programs specifically tailored for migrant populations. Addressing these challenges is crucial for reducing disease transmission, preventing disability, and ensuring successful treatment outcomes in this vulnerable group.

Advancements in leprosy management have shown remarkable progress throughout the years. The implementation of MDT has brought the national prevalence down to less than 1/10,000 in December 2005 and even further down to 0.4/10,000 in 2022 (Government of India, Press Information Bureau, 2023). The continued detection of new cases, however, suggests an ongoing spread of the illness (Rao & Suneetha 2018). The newer strategies under NLEP are designed to disrupt the transmission chain of the infection.

Major initiatives under NLEP (Directorate of Leprosy Operations 2024) include:

- A three-pronged strategy:
    - Leprosy case detection campaign (LCDC) in high endemic districts.
    - Focused leprosy campaign (FLC) in low-endemic districts for case detection.
    - Special plans for hard-to-reach areas for early case detection and treatment.
- ASHA based surveillance for leprosy suspects (ABSULS).
- The eligible contacts of index cases received contact tracing and post-exposure prophylaxis (PEP) with a single dose of rifampicin (SDR).
- Active case detection and surveillance both in rural and urban areas.
- Decentralized integrated leprosy services through the General Health Care system.
- Capacity building of all general health services functionaries.
- Strengthening of disability prevention and medical rehabilitation (DPMR) services.
- IEC activities in the community to improve self-reporting to PHC and reduction of stigma.

On the 30th of January, 2023, the Government of India launched the National Strategic Plan (NSP) and Roadmap for Leprosy (2023-27) (Government of India, Press Information Bureau, 2023). This aims to achieve zero transmission of leprosy by 2027. Implementation strategies, year-wise targets, public health approaches, and overall technical guidance are included in the program. Highlights of this roadmap are the prevention of disease transmission by prophylaxis (Leprosy Post Exposure Prophylaxis) and the rollout of a web-based information portal (Nikusth 2.0) for reporting leprosy cases.

To enhance patient management, developing patient cards embedded with QR codes linked to Aadhaar numbers or phone numbers is proposed, allowing real-time tracking of treatment completion and enabling patients to access

multi-drug therapy (MDT) from any treatment centre in the country. Introducing A-MDT and providing free thalidomide in cases of reaction, as well as alternative regimens in resistant cases, would promote adherence by ensuring that patients have uninterrupted access to costly but essential medications, thereby reducing the risk of defaulting on treatment and, consequently, preventing deformities. Furthermore, compulsory vaccination for patients and their close contacts should be considered, alongside efforts to ensure the *Mycobacterium indicus pranii* (MIP) vaccine is made affordable, widely available, and integrated into leprosy prevention programs. These comprehensive strategies, if implemented, would mark a significant step in addressing the influence of migration on leprosy epidemiology.

Limitations of the present study include a single centre study from a tertiary care hospital, retrospective study design, sample size, lack of information about living conditions of patients, whether the patient migrated alone or with family, information about knowledge awareness practice (KAP) of patients and the rural-urban shift. There is need to focus on all these aspects in properly designed studies in future.

Conclusion

The present study highlights the significant impact of migration on the clinical spectrum, bacterial burden, and treatment adherence of leprosy patients. Migrants were predominantly younger males, presenting with more severe multibacillary forms of the disease, particularly lepromatous leprosy, and exhibiting higher bacterial indices than resident patients, suggesting that migration facilitates disease transmission, likely due to overcrowded living conditions, delayed healthcare-seeking behaviour, and economic constraints. Furthermore, migrants demonstrated higher rates of treatment default, underscoring challenges in continuity of care. These findings aligned with prior studies, reinforcing that migration is a key determinant in leprosy epidemiology. A significant finding of the current study, which has not been documented in previous research, is the notably elevated AFB positivity observed among migrants in both histological and slit skin smear examinations. This indicates an increased bacterial load that may affect transmission dynamics and clinical manifestations.

Given these disparities, targeted interventions under the National Leprosy Eradication Programme (NLEP) are crucial. Strategies such as active case detection, early diagnosis, and improved treatment adherence programs tailored for migrant populations are essential. Addressing these challenges will be pivotal in reducing disease burden, preventing disability, and achieving India's goal of leprosy eradication by 2027.

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