

A Clinicodemographic Study of Leprosy in Elderly: 8-Year Data from a Tertiary Care Centre in North India

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Received : 26.09.2021

Accepted : 25.06.2022

The changing demographics of India due to better life expectancy has led to significant increase in the geriatric population. Physiological changes due to aging lead to altered biological response to disease as well as coping with it. There are very few published studies that have addressed the issue of geriatric leprosy. This was a retrospective record review of 8-year data from a tertiary care centre in North India of leprosy patients aged 60 years or more. Clinical and demographic details were noted. Data was compared with 154 other leprosy patients aged 18-59 years. Out of 1083 leprosy cases, 80 (7.4%) were elderly and 67.5% of these were males. Majority (92.5%) were in the multibacillary (MB) spectrum. Type 2 reactions were more commonly seen than type 1 reactions in this age group. Pre-existing co-morbidities were present in 52.5% of patients. Grade 2 disability (G2D) was noted in 13.8% of cases, all of whom were in MB spectrum. Comorbidities were significantly higher amongst the elders whereas nerve involvement and G2D rates were higher amongst other leprosy patients (18-59 years). The prevalence of geriatric leprosy is on the rise due to better life expectancy. The high MB rate and G2D rate in geriatric population is a cause of concern for ongoing disease transmission and leprosy control programs. Due to a higher proportion of patients having pre-existing co-morbid conditions and polypharmacy, this sub-group needs special attention and care after release from treatment.

Keywords : Leprosy, Elderly, North India, Multibacillary, G2D Rate, Comorbidities

Introduction

Globally 80.2% of all leprosy cases are contributed by three countries - India, Brazil and Indonesia. Of this 60% is from India alone (WHO 2020). In India, 1,14,451 new cases were recorded in the year 2019-2020, and the high proportion of multibacillary cases (MB) amongst the new cases detected (54.28%) along with a child leprosy rate of 6.83% indicate the continued ongoing

transmission of leprosy in the community (NLEP 2019-20).

The changing demographics of India have resulted in an increase in the proportion of senior citizens (those above 60 years) over the years. It increased from 5.6% in 1961 to 8.7% in 2011. It is projected that by 2026 there will be 173 million senior citizens in India. This is largely due to better life expectancy (69.4 years at present)

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and overall development in terms of healthcare (Population Projection Report 2011).

The process of aging brings with it changes in biological response to disease, reduced functional capacity and psychosocial transformations. Besides the loss of social role and recognition and increase in nuclear families, the senior citizens also face problems due to absence of assured and sufficient income to support themselves for their healthcare and other social securities. The objective of this study was to assess the prevalence and clinico- epidemiological profile of leprosy among the elderly population of North India.

Methodology

This was a retrospective record review of all patients aged 60 years or more, diagnosed with leprosy who were enrolled in the leprosy clinic of Post graduate Institute of Medical Education and Research Chandigarh, India from June 2012 to June 2020. The following data was entered in a structured performa: demographic data like age, gender, area of residence, duration of disease, clinical classification at diagnosis as per Ridley Jopling, new case or relapse, operational classification as per WHO, skin smear positivity at baseline, presence of lepra reactions, presence of disabilities, and pre-existing comorbidities. For internal comparison, records of 154 randomly selected patients aged 18-59 years, registered during the same time period were also compiled. A simple descriptive analysis of these variables was carried out. Means were compared using student t test and variables in the two groups were compared using chi square test.

Results

As per hospital records, a total of 1083 leprosy cases were registered at leprosy clinic between June 2012 and June 2020. Of these, 80 (7.4%) were elderly i.e were aged 60 years or more.

Males were more frequently affected (67.5%) and the mean age was 64.9 ± 5.15 years. The spectrum of leprosy as per Ridley Jopling classification at diagnosis was borderline tuberculoid (BT) (Fig. 1a) in 27 (33.8%), borderline lepromatous (BL) in 25 (31.3%), lepromatous leprosy (LL) (Fig. 1b) in 18 (22.5%), pure neuritic leprosy in 8 (10%), histoid leprosy (Fig. 1c) in 1 (1.3%) and indeterminate leprosy in 1 (1.3%). Reactions were seen in 35 (43.7%) patients and type 2 reactions were more common than type 1 reactions. Severe reactions (Figs. 2a, 2b) were seen in 8 (10%) patients. Nerve involvement was noted in 45 (56.3%) patients with ulnar nerve being most frequently involved (38.8%) followed by popliteal nerve (22.5%). Smear positivity was



Fig. 1a : Case of borderline tuberculoid leprosy in an elderly woman with an erythematous hypoesthetic patch in the perioral area and chin with type 1 lepra reaction.



Fig. 1b : Case of lepromatous leprosy in an elderly male with diffuse infiltration and nodular lesions on the face and forehead along with lateral madarosis.



Fig. 1c : Case of histoid Hansen in an elderly male with multiple well defined shiny nodules over the forehead.



Fig. 2a : Severe Type 1 reaction in an elderly male with borderline tuberculoid leprosy who presented with pain, oedema and redness over all the pre-existing patches.



Fig. 2b : Severe type 2 reaction presenting as pustular erythema nosodum leprosum in an elderly male with lepromatous leprosy.



Fig. 3a : Guttate psoriasis in an elderly male on completion of MBR MDT.



Fig. 3b : Co-existing vitiligo vulgaris in a patient with BT leprosy

Table 1 : Clinico-demographic details of the elderly patients with leprosy

Clinical parameters	Elderly (age > 60 years)	Adults (18-60 years)	P value
Total leprosy patients	80	154	
Age in years (Mean±SD)	64.9±5.15	34.9±10.3	
Males	54 (67.5%)	101 (65.5%)	0.769
M:F ratio	2.1 : 1	1.8:1	
Spectrum (Ridley Jopling)			
Tuberculoid leprosy	0	3 (1.9%)	
Borderline Tuberculoid	27 (33.8 %)	31 (20.1%)	
Borderline lepromatous	25 (31.3%)	43 (27.9%)	
Lepromatous leprosy	18 (22.5%)	66 (42.8%)	
Pure neuritic leprosy	8 (10%)	9 (5.8%)	
Histoid leprosy	1 (1.3%)	0	
Indeterminate leprosy	1 (1.3%)	2(1.2%)	
Nerve involvement	45 (56.3%)	132 (85.7%)	0.00
Ulnar nerve	31 (38.8%)	120 (77.9%)	0.00
Lateral popliteal nerve	18 (22.5%)	82 (53.2%)	0.00
Smear positivity rate	49 (61.2%)	82 (53.2%)	0.13
Treatment			
MB MDT	74 (92.5%)	139 (90.2%)	0.570
PB MDT	6 (7.5%)	15 (9.7%)	

Reactions			
Type 1 reaction	11 (13.8)	11 (7.1%)	0.1
Type 2 reaction	24 (30%)	53 (34.4%)	0.495
Relapse	5 (6.25%)	6 (3.8%)	0.420
Grade 1 disability	15 (18.75%)	6 (3.8%)	0.802
Grade 2 disability	11 (13.8%)	45 (29.2%)	0.009
Co-morbidities	42 (52.5%)	22 (14.2%)	0.00

present in 49 (61.2%) cases, BI ranging from 1+ to 6+. Majority (92.5%) of the patients received WHO MBR (multibacillary) MDT. Relapse was noted in 5 (6.25%) patients with MB leprosy (LL-2, BL-2, BT-1), after a median of 2 years. Analysis of adult leprosy patients (18-59 years) also revealed similar distribution of the various spectrums of disease, lepra reaction and relapse. Amongst adults also, majority (90.2%) of patients were classified as MB leprosy. Adult leprosy patients had significantly larger proportion of patients with nerve involvement ($P<0.05$)-both ulnar and lateral popliteal and higher grade 2 disability (G2D) rate ($P<0.05$).

Pre-existing comorbidities were seen in 42 (52.5%) of geriatric patients compared to 22 (14.2%) adults ($P<0.05$). Amongst the elderly, 11 (13.7 %) had multiple comorbid conditions. Majority (30, 37.5%) of these patients were men. These included hypertension in 15 (18.7%), diabetes in 12 (15%), tuberculosis in 2 (2.5%) and coronary artery disease in 3 (3.75%) patients. Coexisting dermatological conditions were seen in 5 patients. Three patients developed psoriasis on completion of MDT (Fig. 3a). In two patients coexistence of vitiligo (Fig. 3b) led to delay in the diagnosis of leprosy. Disability was seen in 26 (32.5%) of cases and G2D was seen in 11 (13.8%) cases. All 11 patients with G2D were in the MB spectrum and 9 patients were males (Table 1).

Discussion

Elderly age group as a subpopulation is unique in terms of their special needs and it is therefore essential to study leprosy in this group. While geriatric leprosy rate is not a usual indicator for disease burden or transmission, this group requires special care as most destitute leprosy patients are elderly.

In our study, 7.4% of leprosy cases registered in the 8-year study period represented the elderly population of above 60 years. In a study from South India, 21.6% of cases seen during a 3-year study period were above the age of 45 years. This included both new cases and well as follow ups (Arunraghav & Herakal 2021). In an epidemiological study by Nobre et al (2017) in Brazil, it was found that 17.5 % of cases of MB leprosy were more than 60 years of age. In studies conducted in different states of Brazil, proportion of patients more than 60 years ranged from 12% - 19.4 % (Nobre et al 2017, Dinitz & Maciel 2018, Anguiar et al 2020). In a study from Malaysia, 18.2% of leprosy patients were older than 60 years of age (NNinh 2014).

In a study from Brazil, the temporal trends of leprosy amongst the elderly showed a downward trend for new case detection rates; however, the proportion of patients with MB leprosy showed an upward trend (Rocha et al 2020). Another recent geo-epidemiological study over 10 years from the endemic state of Pará in Brazil showed

a steady decline in the new case detection rate amongst the elderly which paralleled the findings of the general population (Oliveira et al 2021). The increasing prevalence of leprosy amongst elderly is directly related to the life expectancy. The life expectancy in India has drastically improved from 41.2 years in 1960 to the current 69.4 years (Population Projection Report 2011). Therefore, we can expect a gradual increase in prevalence of geriatric leprosy in India in the coming years as well.

Regarding the gender distribution, majority of the elders were males (67.5%). This is like that observed our adult population and globally as well (Rao & Suneetha 2018). This finding has also been corroborated in other studies from Brazil and South India (Dinitz & Maciel 2018, Arunraghav & Herakal 2021). One might have expected women to represent a higher percentage given the increased life expectancy compared to men; however, this was not seen.

In our study, majority (92.5%) of cases were classified as MB leprosy and received MBR MDT. This observation was also seen amongst the adults or the comparator group from our institute. In contrast, a study from South India found that majority of the elders were classified as paucibacillary (18 out of 34) (Arunraghav & Herakal 2021) In the literature, association between MB leprosy and elderly age has been described in areas of low endemicity with the hypothesis that due to the long incubation period of MB leprosy, more cases are seen as age advances (Irgens et al 1990, Nobre et al 2017). In a 2017 study from a hyperendemic area (Morosso, Brazil), mean new case detection rate peaked amongst 60–79-year-old people (Nobre et al 2017)). Further the percentage of MB cases also showed a direct association with increasing age with the highest amongst those who were older than 80 years old. The authors

suggest that high prevalence of MB leprosy may be a characteristic of the disease itself rather than being related to the endemicity of that area (Nobre et al 2017). The overall reduction in host defence mechanisms with increasing age like reduced cell mediated immune mechanisms, decreased vaccine efficacy and shift of the cytokine balance from Th1 to Th2 could be possible reasons for this observation (Nobre et al 2017, da Silva et al 2021).

We found that majority of the elders had type 2 reaction (30%) whereas 13.8% had type 1 reaction. This is also in contrast to studies by Oliveira et al (2019) and Arunraghav & Herakal (2021) which found that type 1 reaction was more common amongst the elderly. The study from South India found that none of the 34 elderly patients had type 2 reaction whereas type 1 reaction was seen in 5 (Arunraghav & Herakal 2021). Some authors have suggested that since the elderly are exposed to various infectious pathogens throughout life, they have increased number of memory T cells leading to a pro inflammatory state which leads to more number of type 1 reactions (Souza et al 2020). The increased number of type 2 reactions may be due to very high proportion of MB cases in our study and high smear positivity, mean BI at baseline was found to be 2.1.

Pre-existing comorbidities were seen in 52.5% of cases with hypertension and type 2 diabetes mellitus being the most frequent. Similar findings were noted by Oliveira et al (2019) in a study of geriatric leprosy from Brazil. It is expected that at least 80% of people above the age of 60 years would be suffering from some chronic illness and be on long term medications (CDC 2020). Leprosy associated with its complications of reactions and physical disability adds to this pre-existing burden.

The G2D rate amongst the elders was found to be 13.8% in this study. This is very high compared to the national G2D rate of 4.46% (Rao & Suneetha 2018). The high prevalence of MB leprosy in this age group, presence of comorbidities like diabetes and diabetic neuropathy and reduced functional capacity for self-care contribute to the increased G2D rate. In a study from Brazil, it was seen that 30% of new geriatric leprosy cases had some disability at diagnosis and 8.3% had G2D (Souza et al 2020). In a study from South India, 4 out of 34 elderly patients had G2D (Arunraghav & Herakal 2021). In our study, proportion of elderly males with G2D was 4.5 times higher than in females. Other studies from Brazil also corroborates with our findings where this ratio was found to be in the range of 2.04 to 2.6 (Matos et al 2019, Souza et al 2020).

Conclusion

Although the prevalence of leprosy has decreased in India, but it continues to remain a public health concern. With better life expectancy, the geriatric leprosy rate can be expected to increase. Higher proportion of MB cases amongst the elderly could be because of altered immune mechanisms and disease susceptibility. This also explains the high proportion of patients with G2D amongst the elders. Due to pre-existing comorbidities and lower functional capacity, this subgroup deserves special attention.

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How to cite this article : Narang T, Kamat D, Kumar S et al (2022). A Clinicodemographic Study of Leprosy in Elderly: 8-Year Data from a Tertiary Care Centre in North India. *Indian J Lepr.* **94**: 237-244.