Indian J Lepr 2016, 88 : 217-225

http://www.ijl.org.in

Original Article

Trends in Profile of Leprosy Cases Reporting to a Tertiary Care Centre in Delhi during 2006-2015

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Received : 20.07.2016 Accepted : 30.09.2016

Leprosy has been declared to have been eliminated as a public health problem in India in 2005 and in Delhi in the year 2008. However, due to variety of problems the reported prevalence continues to be high in the national capital. This study has been carried out to understand the profile of leprosy cases reporting to a Tertiary Care Centre in Delhi. A retrospective analysis of 1487 registered cases from the leprosy clinic of Lok Nayak Hospital, New Delhi from the year 2005-06 to 2015-16 was carried out. Among these 66.71% cases had multibacillary disease, while 33.29% were found to have paucibacillary disease as per WHO classification being used for treatment purposes. This ratio has remained nearly same during this 10 year period. 10.96% had pure neurtitic leprosy. The mean age at presentation was found to be 31.72 years. Male to female ratio was found to be 2.9:1. Childhood leprosy was present in 7.59% of the total patients. Migrant population constituted 89.51% of the total patient load, 80% of them belonging to two endemic states of Uttar Pradesh and Bihar. A total of 22.1% patient developed signs of reaction, while 26.5% (7.5% grade 1 and 19% grade 2) had deformities. Overall Delhi govt data and our hospital data are similar, can be considered to be representative of National Capital Region (NCR). As such the conclusions drawn from this study are meaningful and can be considered important in planning strategies to strengthen the National Leprosy Eradication Programme (NLEP) in NCR by proper planning, expertise building of care providers for improving the access to services required by these people.

Key words : Post MDT leprosy status in Delhi, Retrospective analysis leprosy cases, leprosy in Delhi during 2005-06 to 2015-16

Introduction

India had achieved 'elimination' of leprosy defined by WHO as prevalence of <1/10.000 at country level in the year 2005 (Dhillon 2006). However there are certain states and Union Territories which continue to report a prevalence of >1/10,000. These states also have pockets of active disease transmission and hence are a cause

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for concern. Elimination status was achieved in Delhi in the year 2008. However, due to continued migration of people to Delhi and may be due to some others reasons, areas of endemicity still prevail. Better health care system, job opportunities, and urban development are few factors which lure the neighbouring population from endemic areas, which may be contributing to high new case detection rates. For devising better strategies for disease control and access to appropriate services, the current study was undertaken to analyse the trends in the disease over a 11 years (2005-6 to 2015-16) in a tertiary care hospital in Delhi in post MDT era.

Patients and Methods

A retrospective analysis was carried out of all leprosy case registered at Lok Nayak Hospital, New Delhi in the past 11 years (April 2005 to March 2016). The case detection was voluntary and no active case finding was carried out. The hospital has stringent record keeping of all patients attending the leprosy clinic. The clinic caters to the entire population of central Delhi, and is also is the only tertiary referral centre in the district. MDT has been introduced in the clinic since 1985.

The data from the record sheets was analysed for age at presentation, sex, domicile, history of contact, type of leprosy, reactions, deformities, co morbid conditions etc. Thorough clinical examination and slit smear was carried out in all patients. Detailed note of number and distribution of lesions, number of nerves affected, sensory loss, motor weakness, lepra reaction, presence of neuritis, disability etc was made. Histopathology was done where ever necessary.

Ridley Jopling classification was used to classify the disease (Ridley and Jopling 1966). The cases were divided into multi/paucibacillary according to WHO criteria (WHO 1988). Type 1 lepra reaction was diagnosed if the patient had redness, swelling or tenderness of pre-existing lesions, with or without the appearance of new lesions, presence of oedema of hands, feet or face or tenderness of one or more nerves, with or without nerve function impairment (NFI). Type 2 lepra reaction was diagnosed if the patient had multiple, small, tender, evanescent nodules or plaques, with or without constitutional symptoms such as fever, malaise, lymphadenitis and myalgia (Becx-Bleumink and Berhe 1992)..

Grade 1 disability included glove and stocking anaesthesia and Grade 2 disability included claw hand, foot drop, trophic ulcers, resorption of digits, guttering of interosseous spaces, redness in eyes, inability to close eyes and visual impairment. (WHO 1988)

Treatment was given according to the WHO recommendation. The findings were compared with national averages.

Results

A total of 1487 new leprosy cases were registered in the past ten years from 2005-2015. The year wise distribution of the cases is shown in Table 1. Out of the total cases registered 992(66.71%) were multibacillary, while 495 (33.29%) were paucibacillary according to the WHO criteria. The ratio of MB:PB noted was 2.0. MB percentage has remained between 55-78% (61-66% for 7/10 years analysed) during these years.

Demographic profile

Among the total patients analysed, 113 (7.59%) were children below 15 years of age. Majority of the patients 486 (32.7%) belonged to 20-29 years of age, followed by 329 (22.1%) in 30-39 year age group, 313 (21%) in 10-19 years. The rest of the age wise distribution of patients is shown in table 2. The mean age of onset was 31.72 years. A male preponderance was noticed with 1106

Table 1 : Year wise distribution of new leprosy cases registered between 2005-06 to 2015-16

Year	Total cases reported	MB cases		PB cases	
		N	%	N	%
2005-06	224	144	66	75	34
2006-07	152	83	55	68	45
2007-08	125	81	65	43	34
2008-09	119	78	67	38	33
2009-10	183	111	61	72	39
2010-11	111	66	61	42	39
2011-12	85	54	68	26	33
2012-13	123	81	66	42	24
2013-14	107	88	75	27	25
2014-15	143	111	78	32	22
2015-16	135	103	77	30	23
Total	1487	992	66.71%	495	33.29%

Table 2 : Age wise distribution of patients analysed

Age group	Number of patients	Percentage
<10	17	1.1%
10-19	313	21%
20-29	486	32.7%
30-39	329	22.1%
40-49	187	12.5%
50-59	86	5.7%
60-69	49	3.2%
>70	20	1.3%
Total	1487	

(74.38%) male patients and 381 (25.62%) patients belonging to the female sex. The M:F ratio being 2.9:1.

The majority of the patients were migrants 1331 (89.51%), while only 156 (10.49%) had their domicile in Delhi. Among the migrant population, majority belonged to Uttar Pradesh 739 (49.63%), followed by Bihar 454 (30.53%), Uttarakhand 20 (13.4%), Jharkhand 28 (1.88%), Madhya Pradesh 23 (1.54%), Rajasthan 12 (0.806%), Haryana 40 (2.6%), West Bengal 10 (0.67%), Orissa 2 (0.13%), Gujarat 1 (0.07%), Punjab 1 (0.07%) and Jammu and Kashmir 1 (0.07%).

Clinical disease profile /spectrum

History of contact was elicit able in 92 (6.19%) of the total patients recorded. The contact included were only household contacts. The status of contact (multibacillary/paucibacillary), was not available from the records. According to Ridley Jopling classification the most common type noted was Borderline tuberculoid amounting to 896 (60.25%) cases, followed by borderline lepromatous in 201 (13.52%) cases, Lepromatous leprosy in 180 (12.1%) cases. Borderline borderline spectrum was noted among 43(2.8%) patients. Pure neuritic in 163 (10.96%), while indeterminate lesions were present in 4 (0.26%) among the total 1487 patients examined.

Among the examined 360 (27.1%) presented with a single lesion, while 332(25%) presented with 2-5 lesions and 342 (25.8%) presented with >5 skin lesions. A total of 268 (18.1%) patients had enlargement of single peripheral nerve trunk,

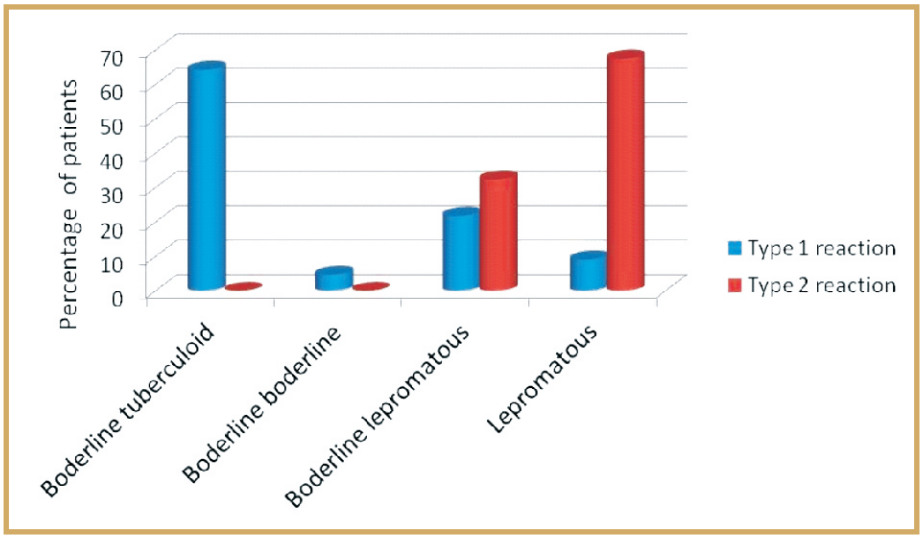

Fig 1 : Profile of leprosy cases according to spectrum of disease and occurrence of reactions (10.97% were pure neuritic cases)

while 1211 (81.1%) had more than single nerve trunk enlargement. Three patients had lesions with morphology of Histoid Hansen. These patients had disease in the lepromatous spectrum (Table 3).

A total of 209 (14.06%) presented with signs of reaction on the first visit, while 33 (2.22%) had taken previous treatment and presented with signs of relapse. Out of these 33 patients, 30 had multibacillary disease, while 3 had paucibacillary disease previously. All patients relapsed as multibacillary disease.

Reactions and deformities

Among the total patients 329 (22.1%) developed signs of reaction. A total of 252 (72.4%) patients had lesions suggestive of type 1 reaction, while 77 (22.1%) had lesions suggestive of type 2 reaction. Among these 21 (75%) patients with type 1 reaction, while 7 (25%) patients with type 2 reaction had neuritis. Neuritis was reported in 28 (1.88%) of the patients with reaction. Ulnar was the most common peripheral nerve involved, followed by common peroneal and radial cutaneous. The spectrum wise distribution of the reaction is shown in Fig 1.

Table 3 : Clinical spectrum of disease

Spectrum of disease	Number	Percentage
BT	896	60.25
BB	43	2.8
BL	201	13.52
LL	180	12.1
PN	163	10.96
Indeterminate	4	0.26
Skin lesions		
1	360	24.2
2-5	432	29.05
>5	332	35.7
Nerve thickening		
1	268	18.02
>1	1219	81.9

Table 4 : Distribution of deformities across the spectrum of disease

Spectrum	Grade 1		Grade 2	
	Number	%	Number	%
BT	25	22.3	120	42.4
BB	1	0.89	10	3.5
BL	23	20.5	38	13.4
LL	50	44.6	35	12.3
PN	13	11.6	80	28.2
Total	112		283	

Table 5 : Histopathological findings according to disease spectrum

Spectrum	Consistent features	Non specific	Total
BT	368	177	545
BB	18	7	25
BL	61	44	105
LL	102	17	119
Indeterminate	0	3	3
Total	549	248	797

A total of 395 (26.5%) patients were found to have deformities. Among these 282 (71.3%) patients had multibacillary disease, while 64 (16.2%) had paucibacillary disease. Patients with multibacillary disease due to the high bacillary load tend to present with deformities more frequently. Grade 1 deformity was noted among 112 (7.53%) of the patients, while grade 2 was recorded among 283 (19.03%) of the patients. The distribution of the deformity according to the spectrum is shown in Table 4.

Smear positivity and histopathology

Skin slit smears were positive in 242 (16.27%) of the patients examined. Among these 138 (57%)belonged to lepromatous leprosy spectrum, 74 (30.5%) in borderline lepromatous, 16 (6.6%) in borderline tuberculoid spectrum, 9 (3.7%) in borderline borderline spectrum, and one patient with indeterminant Hansen.

Histopathology was consistent with the diagnosis in 549/797 cases analysed (68.9%) cases, while in rest a non specific histology was reported. The histopathological findings are summarised in Table 5.

Management

Diagnosis was made based on the clinical features. Split skin smear examination and histopathology was done to aid in the diagnosis. Patients were divided into multi and pauci-bacillary based on WHO criteria. They were given MB-MDT and PB-MDT respectively for 12 and 6 months. Among the multibacillary patients, 90.12% completed the 12 months treatment, while in 76.76% paucibacillary patients treatment was given for 6 months, it had to be extended in remaining cases. Eight patients in the multi-bacillary group received treatment for more than 12 months due to high MI, while 56 patients in

Table 6 : Comparison of national, Delhi and hospital data for year 2014-15

	National data (%)	Delhi data(%)	Hospital data(%)
Multibacillary	52.82	76.14	77
Female cases	36.81	22.98	25.62
Childhood cases	9.04	5.22	7.59
Grade 2 deformity	4.61	16.10	24

paucibacillary group received treatment for more than 6 months. Others could not complete treatment and dropped out.

The reactions were managed according to the severity. Milder episodes with only cutaneous involvement were managed on non steroidal anti-inflammatory agents. Episodes with systemic involvement were managed with oral corti-costeroids with/without immunosuppressive agents. Neuritis was treated with course of corticosteroids along with supportive care such as slings, anti inflammatory agents etc. (Tiwary et al 2011)

Deformities were classified as grade 1/2 according to the WHO criteria. Management comprised of patient education, physiotherapy of hands and feet, along with home care training. Specific management included tendon transfer surgery for claw hand, joint reconstruction, ulcer management etc. All patients with ophthal-mological complications were referred to the ophthalmological department for tarrsoraphy and other corrective surgeries. Patients with deformity of <6 months duration were managed with oral corticosteroids starting at a dose of 1 mg/kg.

Discussion

Annual new case detection rate as per the recent leprosy data by NLEP in 2014-15 was 9.73 per 100,000 populations. The prevalence rate reported was 0.69 per 10,000 population. A total of 34 states/UT have achieved the level of elimination, i.e. PR less than 1 case per 10,000 population. One state and one UT, i.e. Chhattisgarh and Dadra and Nagar Haveli respectively have PR of 2 and 5 per 10,000 population. Four other states/UT viz Odisha, Chandigarh, Delhi and Lakshadweep reported a prevalence rate of 1-2 (NLEP 2015).

According to the report published by National Leprosy Eradication Programme for the year 2014-15, the population of Delhi was estimated to be 18077415 (1.4% of the national population). Total 2280 new cases were detected (PB=544, MB=1736), which constitute 2.52% of the national case load. Delhi reported a prevalence rate of 1.26. A total of 76.14% were multibacillary, 22.98% patients were female while 5.22% patients were of childhood leprosy. Total of 8.68% patients reported with grade 1 deformity and 16.10% with grade 2 deformity (NLEP 2015). Interestingly overall Delhi govt data and our hospital data are similar meaning thereby that conclusions drawn from the data analysis of our Tertiary care Centre are applicable to Delhi and are thus representative.

From the above data it can be inferred that despite the efforts, the goal of eradication of leprosy still remains elusive for National Capital Region. The proportion of multibacillary is an indicator of delayed diagnosis due to access to services, which could be due to acquiring the disease long back in their original states, delayed access locally as well depending upon location of services or ignorance of people. There is clear need to study these possible factors before

drawing any conclusions. This is a pointer towards the need for active case detection, improving health education and keeping high index of suspicion by the healthcare professional.

The majority of the patient in our study belonged to 20-29 years of age followed by 30-39 years of age. The percentage of childhood leprosy in the current study was 7.59%. The findings reported in earlier studies (9.6% by Singhal et al 2011 and 10.2% by Tiwary et al 2011). This high childhood leprosy percentage is an indicator of active disease transmission in the community and should be tackled by active detection and treatment as well as also focusing on schools for preventing deformities in this young population.

The male to female ratio of 2.9:1 was noted in the present study. This high male to female ratio was consistent with observations in previous such studies. This could be due to the lack of perspective towards female health care in the Indian system. Other factors responsible may include increased proportion of immigrant population in Delhi in search for employment, and these mostly comprise of males. Similar observation have been noted by other authors in previous studies (Bhattacharya et al 1999, Dambalkar et al 1995).

History of household contact could be elicited in 6.19% of patients in the present study. Previous studies have reported percentage of household contacts as 5.9% (Jindal et al 2009) and 9.2% (Chhabra et al 2015). The risk of transmission of leprosy increases upto nine times in intra familial contact. This fact makes the screening of family members of leprosy patient essential.

The total 66.71% of patients has multibacillary disease, while 33.29% were found to have paucibacillary disease. Other studies have also noted increased percentage of MB cases compared to PB (Mohite and Durgawale 2011, Rodriguez et al 2016). High proportion of multibacillary cases contribute to increased grade 2 disability rate due to high bacillary load. Another reason for the rise in the MB cases could be due to the shift from active to passive case detection. The proportion of MB cases is an important epidemiological indicator of performance of programme, further MB leprosy cases are considered more infectious and more responsible for disease transmission.

The most common type clinical spectrum according to Ridley Jopling classification in our study was found to be BT Hansen (60.25%). Similar findings have been observed in other studies as well (Mohite and Durgawale 2011, Rodriguez et al 2016). However, as histopathology was not done for all cases, this figure is not only indicative. Observations of non specific histology in nearly 30% of cases indicates the need of use of additional methods like *in-situ* hybridization, in situ-PCR and immunohistochemistry for definitive diagnosis.

Slit skin smear (SSS) was found to be positive in 16.27% of patients. SSS positivity points towards multibacillary nature of the disease and hence the need for MB-MDT in the treatment. It is also important to monitor the treatment efficacy and in cases of suspected replase. Histopathological correlation was found in 39% of the patients examined. Other studies have reported concordance in 52% (Sehgal et al 1989) and 60.6% (Kumar et al 2000). The low concordance rate in our study may be due to improper selection of site/ lesion for biopsy. Selection of site of biopsy plays important role in the histopathological finding, and dissimilar lesions from the same patient show different histopathology (Nadkarni and Rege 1999),

A total of 23.4% patients reported signs of reaction. Among these type 1 reaction was the most common reported in 72.4% of the patients, while 22.1% patients reported signs of type 2

reaction. Type 1 reaction was reported in 64.2% of BT Hansen cases. This finding was consistent with findings from previous studies (Chhabra et al 2015).

A total of 26.5% patients reported with deformity. Grade 1 deformity was noted in 7.53% patients compared to type 2 in 19.03% of the patients. The higher rate of grade 2 deformity could be correlated with higher prevalence of multi-bacillary cases, multiple nerve thickening, and possible delay in seeking treatment due to lack of awareness, and high rate of lepra reaction. Another reason for high rate of detection of grade 2 deformity could be due to diminishing awareness and poor skill among health workers for diagnosing cases early, when leprosy cases becomes less frequent. The prevalence of grade 2 deformity is one of the most widely used epidemiological indicators to measure the progress of The national leprosy eradication programme as it is visible and can be reliably measured. The Enhanced Global Strategy for further reducing the disease burden due to leprosy aims at reducing the rate of new cases with Grade 2 disabilities worldwide by 35% by the end of 2015 compared with the baseline at the end of 2010 (Pannikar 2009).

The Leprosy elimination programme is facing multiple challenges in India. One of the major challenges is sustainability. As leprosy ceases to be a public health problem, there has been reduction in the focus and funds for leprosy control and it has been integrated into the general health system (Singhal and Sonthalia 2013). Continued high rate of childhood leprosy, multibacillary cases and cases with grade 2 deformity are causes of worry. These parameters point towards delayed diagnosis and an ongoing active transmission of disease in the population. Leprosy is also challenged by many other factors such as long incubation period, persistence of lepra bacilli in soil (Prasad and Kaviarasan 2010).

Delhi faces the problem of migration from states of Bihar and Uttar Pradesh, states with high endemcity, in search of better socio economic and health facilities. They dwell in subhuman conditions of water, sanitation and overcrowding – the situation known to be associated with the of problem of “urban leprosy”. There is thus an urgent need to understand the causes of persisting leprosy problem in NCR and attempt evidence based solutions.

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How to cite this article : Relhan V, Ghunawat S, Tenani A et al (2016). Trends in Profile of Leprosy Cases Reporting to a Tertiary Care Centre in Delhi during 2006-2015. *Indian J Lepr.* **88** : 217-225.