

## Clinico-epidemiological trends of leprosy in Himachal Pradesh : a five year study

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This retrospective study was done to determine the epidemiological and clinical profile of leprosy patients in a tertiary care centre, Indira Gandhi Medical College, Shimla, Himachal Pradesh, India. In this study, we included patients registered from January 2004 to December 2008 with the urban leprosy clinic of our tertiary care centre. Data regarding demographic details, clinical features, treatment and complications was extracted from the records of the leprosy clinic. 163 patients attended the clinic during this period with male to female ratio of 3:1. Majority of patients (47.8%) were in the middle age group (20-40 years) and 13.49% patients were < 20 years of age. In the clinical disease spectrum, 53.98% patients were in the borderline spectrum followed by lepromatous leprosy (33.12%) and polar tuberculoid leprosy (5.52%). Pure neuritic and indeterminate leprosy accounted for 3.06% each. Histoid lesions were present in 7.4% of lepromatous leprosy patients. 9.2% patients had definite history of contact in the family or neighborhood. 28.22 % patients were immigrants either from Nepal or adjoining states of Himachal Pradesh. Epidemiological studies and contact tracing can decrease the disease burden and morbidity associated with the disease. Multidrug therapy (MDT) helps preventing and reducing the disease progression, severity and disabilities.

**Keywords:** Leprosy, Epidemiology, Demography, Clinical profile

### Introduction

Knowledge and understanding of the epidemiological profile is an essential pre requisite to assess and address public health needs in the country and to enable efficient programme planning and management. Leprosy is a chronic infectious disease caused by *Mycobacterium leprae* which can express itself in different clinico-pathological forms.

An impressive decline in leprosy prevalence rate (PR) in all endemic districts of India is seen in the

post-MDT era. However, the new case detection rate, an important statistical indicator in leprosy control programmes, has not shown significant decline in spite of all efforts. India contributes about 80% of the global leprosy case load (Murthy 2004). A total of 1.34 lakh new cases were detected during the year 2008-09 which gives annual new case detection rate (ANCDR) of 11.19 per 100,000 population. This shows ANCDR reduction of 4.36% from 11.70 during 2007-2008 (NLEP 2009). A total of 0.86 lakh cases were on record as on 1st April 2009 giving a prevalence

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rate (PR) of 0.72 leprosy cases per 10,000 population which shows a significant decline as compared to PR of 0.95/10,000 on 31<sup>st</sup> December, 2005.

It is true that a full course of MDT makes leprosy cases non-infectious but it does not prevent occurrence of new cases. Thus, NCDR is a more significant parameter than PR. This retrospective study was carried out to find the epidemiological and clinical trends of leprosy in a tertiary care hospital, Indira Gandhi Medical College, Shimla, Himachal Pradesh.

### Materials and Methods

All the leprosy patients attending the Urban Leprosy Clinic (ULC) in the Department of Dermatology, Venereology and Leprosy at Indira Gandhi Medical College, Shimla, Himachal Pradesh, India from January 2004 to December 2008 were evaluated retrospectively. The centre has records of all the leprosy cases attending the clinic.

The ULC was functioning under the Department of Dermatology, Venereology and Leprosy, Indira Gandhi Medical College, Shimla. One paramedical worker posted in the clinic was working under the supervision and guidance of the consultant of the Department. Though only the urban population is supposed to attend this clinic, it being the only tertiary care centre, many patients are also referred to it from the entire state. MDT was introduced in this clinic in 1983.

Clinical spectrum of the patients was decided after recording detailed clinical history, clinical and slit-skin smear examination. Histopathological examination was done where needed. All the patients were given paucibacillary and multibacillary therapy depending upon the disease spectrum.

### Results

A total of 163 patients attended the clinic during January 2004 - Decemeber 2008, the patients included the immigrants from adjoining states and country (Nepal).

### Demographic characteristics

Among 163 patients who attended the clinic, there were 122 males and 41 females. Males outnumbered females with a ratio of 3:1. Majority of patients 58 (47.8%) were in the age group of 20-40 years (Table 1). Family history of Hansen's disease was present in 15(9.20%) patients. All the 15 patients had contact with lepromatous leprosy patients. The patients themselves presented with different clinical morphology. 9 (60%) among 15 patients had tuberculoid leprosy, 3 (20%) each had borderline lepromatous and lepromatous leprosy. Conjugal leprosy was present in one (0.613%) patient.

### Indigenous demographic data analysis

91.41% (149) patients were from various districts of Himachal Pradesh, including 32 immigrants from adjoining states or country where leprosy is endemic. Majority 92 (61.74%) of the patients were from Shimla district followed by Mandi district (Table 2). No cases were reported from Una and Lahaul Spiti districts.

### Outside project area (OPA) demographic data analysis

A total of 46 patients were immigrants from adjoining areas, 21(45.65%) among 46 patients were from Nepal. Majority 12(26.08%) of patients among adjoining states were from Bihar followed by Uttar Pradesh 11(23.91%) (Table 3).

**Table 1 : Age-wise distribution of cases**

S.No.	Age ( in years)	Number of cases
1	</= 10	4
2	11-20	18
3	21-30	48
4	31-40	30
5	41-50	34
6	51-60	15
7	>60	14

**Table 2: Prevalence among various districts of Himachal Pradesh**

S.No.	Districts of Himachal Pradesh	Number of cases
1	Shimla	92
2	Mandi	13
3	Solan	11
4	Sirmour	9
5	Kullu	7
6	Kinnaur	4
7	Chamba	4
8	Hamirpur	4
9	Bilaspur	3
10	Kangra(Dharamshala)	2
11	Lahaul spiti	0
12	Una	0

**Table 4 : Clinical disease spectrum among various patients**

S.No.	Spectrum	Number of cases	Percentage (%)
1	Polar tuberculoid (TT)	9	5.52
2	Borderline tuberculoid (BT)	46	28.22
3	Mid borderline (BB)	7	4.34
4	Borderline lepromatous (BL)	37	22.69
5	Polar lepromatous (LL)	54	33.12
6	Indeterminate leprosy (I)	5	3.06
7	Pure neuritic (PN)	5	3.06

**Table 3: Immigrant data analysis**

S.No.	Immigrants (other States/Country)	Number of cases
1	Nepal	21
2	Bihar	12
3	Uttar Pradesh	11
4	Delhi	1
5	Rajasthan	1

**Clinical disease spectrum data analysis**

Borderline leprosy was responsible for maximum disease load in our patients with 90 (55.25%) patients in various spectrums of borderline disease followed by lepromatous and tuberculoid leprosy. Four (7.4%) patients among 54 patients of lepromatous leprosy were of histoid Hansen. No patient had taken treatment for Hansen's disease or dapsone monotherapy before. Indeterminate (I) and pure neuritic (PN) leprosy was present in 3.06% patients each (Table 4).

Among out project area patient majority (11, 52.38%) of patients from Nepal were of lepromatous leprosy (LL) (Table 5).

**Reactions and deformities**

31.28% (51) of patients presented with either type 1 or type 2 reaction. The patients showing either type of reaction experiencing were in correlation with their disease spectrum (Table 6). 8 (28.57%) patients of type 2 reaction were suffering from recurrent erythema nodosum leprosum (ENL) and chronic ENL each. Different aggravating factors were present before clinical episodes of reactions among various patients. 23 (45.09%) patients had an episode of intercurrent infections before reaction. 21(41.176%) patients had mental or physical stress before an episode of reaction. In seven (13.72%) patients, no evident precipitating factor could be found.

67 (54.47%) patients suffered from various deformities. Prevalence of type 1 deformity was higher than type 2 deformities with 79.10% of patients suffering from type 1 deformity (Table 7 and 8). Eye involvement was present in nine

**Table 5 : Disease spectrum analysis among (OPA) patients**

S.No.	Country/ State	TT	BT	BB	BL	LL	I	PN
1	Nepal	0	5	0	3	11	1	1
2	Bihar	1	6	0	1	3	1	0
3	Uttar Pradesh	0	2	1	4	3	1	0
4	Delhi	0	1	0	0	0	0	0
5	Rajasthan	0	1	0	0	0	0	0

LL<sub>s</sub>: Subpolar lepromatous leprosy

**Table 6: Patterns of lepra reactions**

Reactions	Number of cases	Disease spectrum
Type 1 reaction	23	TT=0 BT=12 BB=1 BL=8 LL <sub>s</sub> =2
Type 2 reaction	28	BB=2 BL=10 LL <sub>s</sub> =0 LL=16

**Table 7 : Prevalence of deformities**

Type of deformities	Number of cases (n=67)	Percentage (54.47%)
Type 1 deformity	53	79.10
Type 2 deformity	29	20.90

**Table 8 : Prevalence of deformities in hands, feet and eyes**

Deformity	Number of cases
<b>Hands</b>	
Type 1	43
Type 2	18
<b>Feet</b>	
Type1	41
Type2	12
<b>Eye</b>	9

patients with lagophthalmos and chorioretinitis in one patient each, rest all were suffering from anterior uveitis.

#### Management

Diagnosis was made on the basis of clinical and slit-skin smear (SSS) examination of the patients (Table 9). Patients were given paucibacillary (PB) and multibacillary (MB) treatment according to WHO guidelines. Majority 133(81.59%) of our patients were started on MDT-MB treatment, MDT-PB was given in 30(18.41%) patients. Five (3.06%) patients defaulted and in two patients multidrug multibacillary therapy (MDT-MB) had to be extended to two years as MI was positive even at one year of starting therapy and patients were also compliant. One (0.61%) patient relapsed diagnosed on SSS positive after two years of completing treatment.

Management for deformities was done according to grade and type of deformity. Type 1 deformities of hand and feet were managed by giving proper education and demonstration about how home care can be done. Type 2 deformities were managed according to the disability present, thick calluses were removed, proper wound care and dressing of ulcers if present was done, physiotherapy for mobile flexion deformity was provided by physiotherapy department and patients were referred for fixed type of deformities for corrective surgery. In patients with ophthalmological involvement, all the patients were told about activities to prevent disability which can be performed by the person at home. Chorioretinitis and anterior uveitis were

**Table 9 : Clinico-pathological examination of cases**

Number of cases	BI	Number of cases	MI	6 months	12 months
40	0	65	0	0	0
15	1+	35	<15%	0	0
14	2+	20	16-30%	0	0
3	3+	20	31-45%	0	0
20	4+	10	46-60%	0	0
21	5+	3	61-75%	0	0
50	6+	2	>75%	20-25%	10-15%

treated according to the WHO guidelines for type 2 reactions. For patient suffering from lagophthalmos was referred to ophthalmology department of Indira Gandhi Medical College, Shimla, Himachal Pradesh for lateral tarsorrhaphy.

### Discussion

The world wide application of MDT has cured millions of leprosy patients. In India, a country with largest case load, MDT has brought down the prevalence of disease from 25.9 in 1991 to less than 1 (0.72) per 10,000 population in March 2009. The elimination of disease has been achieved at national and the state level in many states (Casabianca 2006, Lobo 2006).

Recent data analysis showed that 32 States/ UTs have achieved the level of elimination i.e. PR less than 1 case per 10,000 population (NLEP 2009). 3 States/ UTs viz. Bihar, Chhattisgarh and Dadra and Nagar Haveli have yet to attain the elimination with PR between 1 and 2.5 per 10,000 population. These 3 states/UTs with 10.4% of country's population, contribute 18.9% of country's recorded case load and 21% of the country's new cases detected during the year 2008-09.

Himachal Pradesh has been a low endemic area with a PR of 7.8/10,000 in 1991 achieved elimination in 2000 and PR has recently further reduced to 0.25/10,000 in 2008-09 (NLEP Himachal Pradesh 2009). This became largely possible due to the creation of a complete vertical

(specialized) infrastructure to provide MDT services for leprosy control. Similar trends were also seen in other parts of India in the post-MDT era. The implementation of MDT programme by itself has helped in updating of registers and improving case management in such a way that a substantial reduction in prevalence has been achieved in all leprosy endemic countries/states. Despite of noticeable decrease in PR, the annual new case detection rate has not declined so steeply. A part of this decrease in PR may be just a statistical feature. Once a leprosy patient completes a full course of treatment and is released from treatment, he/she is no longer registered as a leprosy patient even though there are residual disabilities. Thus, when only a shorter time period qualifies for the term "leprosy patient", the numbers of registered patients will automatically decrease (Harboe 2000).

Comparison of various NLEP parameters (NLEP 2009, NLEP Himachal Pradesh 2009) showed that Himachal Pradesh holds a better position as compared to overall trend in India except for in visible deformity and MB cases the ratio of which is significantly higher in Himachal Pradesh compared to India (Table 10).

At the national level also, MB ratio has increased from 25.9% in 1994 to 48.4% in 2008-2009 (NLEP 2009, Kumar and Girdhar 2006). Similar rising trends have been documented in a study from Uttar Pradesh (Casabianca 2006). The possible

**Table 10 : NLEP indicators in Himachal Pradesh 2008-2009 in comparison with national trends**

S.No.	Indicators	Himachal Pradesh in comparison to India	Number of cases in Himachal Pradesh (2008-2009)
1	Prevalence rate	0.25 vs 0.72	
2	ANCDR	2.99 vs 11.9	207
3	Proportion of children among ANC	3.38% vs 9.4%	7
4	Proportion of visible deformity among ANC	8.21% vs 2.5%	17
5	Proportion of MB among ANC	77.78% vs 47.2%	161
6	Proportion of PB among ANC	22.22% vs 52.8%	46
7	Proportion of females among ANC	20.77% vs 34.5%	43
8	Proportion of males among ANC	79.23% vs 65.5%	164

reasons for this could be: (i) In contrast to active search wherein cases are detected early, voluntary reporting to health facility occurs late when the disease is relatively advanced and begins to bother individuals unless he is well informed and knowledgeable about the disease. This is more likely to be in poorer communities where basic needs of life are still to be met. This can be the explanation for higher MB cases in Himachal Pradesh as such and our study where 133 (81.59%) patients were of MB type. A large number of places in Himachal Pradesh are far off and difficult to reach and people seek medical care only late in the disease process. (ii) Following integration, it is possible that early cases are not being confirmed or diagnosed resulting in the decline of total registered case load with consequently increasing ratio of MB cases. Since leprosy work has suddenly been shifted from trained, experienced workers of vertical programme to PHC personal where understanding of leprosy and diagnostic skills may not be as good. This could well have been the reason for sudden decline in PR observed since 1997 and, thus, sharper decline in PR from 10.9 in 1994 to less than 1 per 10,000 population in December 2005. (iii) Over zealous attempt to achieve elimination of leprosy at all levels and

pressure to eliminate disease by stipulated date could have resulted in non-registering of early cases, resulting in same effect. (iv) Increasing MB ratio indicates delay in diagnosis. Thus, if MB ratio is high, one does expect higher deformity rates (DR) too, as can be seen in comparison table 10 and in our study too where deformity is seen in 54.47% patients. Although there has been vertical integration of leprosy programme in Himachal Pradesh still most of the cases are being reported from district hospitals and medical colleges.

In our study, majority of patients were in the age group of 20-40 years with males outnumbering females with ratio of 3:1; this is the general pattern in India where males frequently self report for treatment. The type of leprosy commonly present was LL followed by BT this is in contrast to other studies which show BT, followed by TT to be commonest spectrum (Mahajan et al 2003, Singh et al 2009). Reasons for this have already being discussed earlier, another reason can be due to large load by immigrant population.

A large number of migrant labour especially from Nepal, Bihar and Uttar Pradesh, travel to Himachal Pradesh for employment in various developmental projects and horticultural activities. It is obvious that one of the reasons for the high number of new cases is due to migrant

population from high endemic areas. Such demographic changes have been seen in other parts of India as well (Dambalkar et al 1995, Bhattacharya and Sehgal 1999). The slums, adjoining major urban areas, with illiteracy, poverty, overcrowding and unhygienic conditions are particularly proving to be fresh foci for leprosy transmission (Dambalkar et al 1995). Himachal Pradesh, a low endemic area for leprosy, is too getting its share of migrant leprosy as is evident from the data from our study.

In our study, majority of patients with reactions of either type were in BL spectrum. Large numbers of new cases have been detected in recent years because of adoption of new strategy, modified leprosy elimination campaign (MLEC) and effective health education campaign (Mandal 2001). The most important factor that could have significant impact on prevalence is the coverage of the entire population with adequate MDT service (Murthy 2004). These changes indicate early detection of cases due to better awareness in the community about the disease (Mahajan et al 2003, Pardillo et al 2007). Also, disease severity and subsequent reactions and deformities have declined significantly with the advent of multi drug therapy.

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