



LEPROSY IN NORTHERN INDIA DURING POST ELIMINATION ERA (2005-2015): A RETROSPECTIVE DATA ANALYSIS

Jyotika kalsy	MD., District Leprosy Officer Upgraded urban leprosy centre (UULC), Civil hospital, Amritsar, Punjab, India
*Tejinder Kaur	MD., Associate Professor Department of Dermatology, Venereology and Leprosy Government Medical College, Amritsar, Punjab, India *Corresponding Author
Jasleen Kaur	MD., Assistant Professor Department of Social and Preventive Medicine, Government Medical College, Amritsar, Punjab, India
Suresh Kumar Malhotra	MD., Professor and Head Department of Dermatology, Venereology and Leprosy Government Medical College, Amritsar, Punjab, India
Riya Kaur Kalra	MBBS., Intern Government Medical College, Amritsar, Punjab, India

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Introduction

Leprosy is the oldest infection known to mankind caused by Mycobacterium leprae manifesting as development of specific granulomatous or neurotrophic lesions in the skin, mucous membrane, eyes, nerves, bones and viscera. Leprosy has been a feared illness since antiquity, due to the havoc it wreaks upon the body. If left untreated, it has a potential to cause significant disability in a small proportion of cases along with social stigma and economic loss.^{1,2}

The prevalence of leprosy in world was about 0.33 at the end of the first quarter of 2013. Although, India attained the goal of leprosy elimination in December 2005; it still contributed 48.54% of total leprosy cases detected worldwide in the year 2012-2013³.

India announced elimination of leprosy as a public health problem at the national level on January 30, 2006. After that, leprosy services were decentralized and integrated into the general health system. A total of 0.86 lakh cases were on record as on 1st April 2014, giving a Prevalence rate (PR) of 0.68 per 10,000 population. Detailed information on new leprosy cases detected during 2013-14 revealed data as: Multibacillary (MB) cases (51.48%), Female (36.91%), Child (9.49%), Grade II Deformity (4.14%), Scheduled Tribes(ST) cases (17.88%) and Scheduled Caste (SC) cases (18.03%). A total of 5256 persons Grade II disability cases was detected amongst the new leprosy cases during 2013-14, indicating the Gr. II Disability Rate of 4.13/million population. A total of 12043 child cases were recorded, indicating the child case rate of 0.95/100,000 population.

Prevalence of leprosy during 2014-15 in Punjab was 0.18/10000 whereas of Amritsar district was 0.22/10000. Amritsar district (under Punjab state) is already under elimination goal of Govt. of India i.e. less than 1 case/10000 population. Immigration of persons from endemic areas as seasonal laborers is contributing their share of bringing the disease to Punjab thereby contributing to uneven prevalence of disease within the country, state or tehsil.^{4, 5}

India contributed maximum number of new leprosy cases in the world in 2014. Despite recent progress in monitoring and treatment of the disease, newer outbreaks are still occurring. As the bacterium that causes leprosy, in fact, only attacks the peripheral nerves so non-reversible damage affecting hands and feet leads to deformity and paralysis⁶. Existing treatments are crucial, but the damage already done is not reversible. So, recognizing the disease early in the course could be a critical step in reducing the prevalence of disease as well as the associated deformities.

As per the records available in this district headquarters it was observed that about half of the patients were Punjabis i.e. the local population reporting at various leprosy clinics. So, a retrospective study was planned for better understanding of disease transmission in Punjabi population from the data available at the district leprosy office records at Upgraded Urban Leprosy Centre(UULC)Amritsar.

Aims and Objectives:

- To study the period prevalence of leprosy in District Amritsar in Punjab, India
- To study Annual new case detection rate in Amritsar.
- To study the distribution of leprosy and deformities in Amritsar district for the last ten years.
- To compare the clinical presentation of leprosy in migrant and resident population in last ten years.

Materials and Methods

Study Period: 1st April 2005 to 31st March 2015(Post elimination era).

The study was conducted after approval from Institutional ethics committee of Government Medical College, Amritsar.

Regarding the functioning of district health center, since leprosy services were decentralized and integrated into the general health system after during the second phase of World bank funding which started on April 2001, leprosy patients report at any of the health centres in the district like Primary health centre/Community health centre/Civil hospital and two Tertiary Care centres. From all these centres, the data is collected and compiled at Upgraded Urban Leprosy Centre in civil hospital Amritsar. Contact survey of the families of affected patients is done by the Non-medical workers(NMS) and Accredited Social Health Activists(ASHA)of the respective areas so that any additional person having the disease is also put on timely treatment. For early detection of cases skin camps, orientation camps, rallies, community meetings, nukkar natak, magic shows and other Information Education and Communication (IEC) activities are being organized from time to time to create public awareness.

A retrospective data analysis of all the clinical records of registered patients at the district hospital was carried out. Demographic and disease characteristics including age, sex, socio economic status, history of contact, duration and type of disease, treatment completion rate, clinical pattern, bacteriological parameters, reactions and disabilities were noted on a pretested and predesigned format. After filling the proforma, the data collected was compiled and statistically analyzed for valid conclusion.

Observation & Results

Total of 975 cases were registered between 1st April 2005 to 31st March 2015. The data collected was analyzed using Chi square and Student T test.

TABLE 1 Showing demographic profile of cases

Age (years)	<15	16-30	31-45	46-60	>60	Total
	67	459	263	121	65	975
	11.90±2.91	23.49±4.22	37.71±4.20	54.02±4.93	68.52±5.77	
	P=0.001					

Sex	Male	Female	Total		
	756	219	975		
Marital status	Married	Unmarried	Not known	Total	
	281	74	620	975	
Area	Rural	Urban	Outer	Total	
	235	554	186	975	
Caste	Scheduled Caste	Scheduled Tribe	General	Not known	Total
	220	15	641	99	975

TABLE 2 Showing Clinical diagnosis of cases

Clinical diagnosis	Punjabi	Non Punjabi	No.	%AGE
BB	25	20	45	11.81
BL	14	9	23	6.03
BT	57	124	181	47.50
ENL	5	1	6	1.57
Histoid	3	1	4	1.04
Intermediate	0	2	2	0.52
LL	21	20	41	10.76
Polynural	15	37	52	13.64
LL trophic ulcer	1	0	1	0.26
LL with ENL	4	3	7	1.83
LL with HIV	1	0	1	0.26
LL with TB	1	0	1	0.26
LL with histoid	0	1	1	0.26
TT	6	10	16	4.19
Total	153	258	381	100.00

TABLE 3 Showing no. of biopsied cases

Biopsy	No.	%age
Done	110	11.28
Not done	865	88.72
Total	975	100

TABLE 4 Showing BCG vaccination in the Cases

BCG	No.	%age
Positive	143	14.66
Negative	832	85.34
Total	975	100

Fig 1 Showing distribution of Punjabi and Non-Punjabi Population

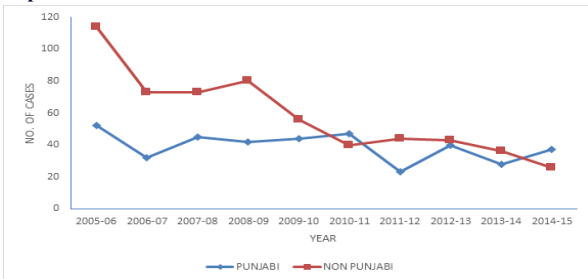


Fig 2 Showing number of PB and MB cases

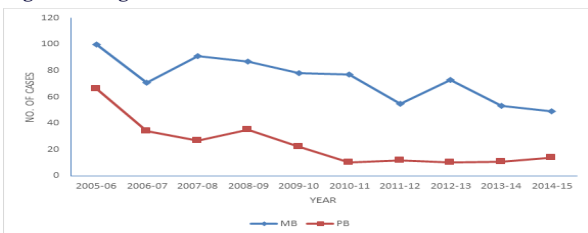


Fig 3 Showing Urban distribution of cases

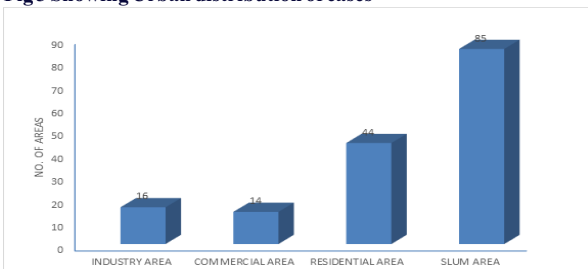


Fig 4 Showing Rural distribution of cases

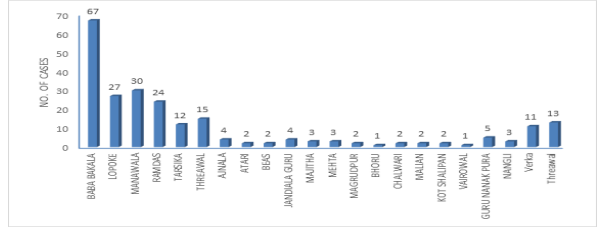


Fig 5 Showing Migrants from various States into Amritsar District.

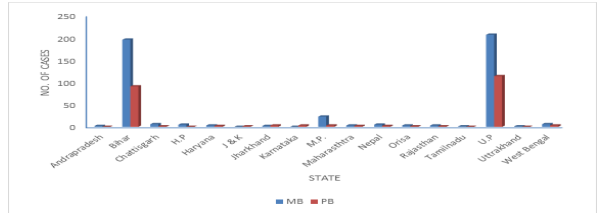


Fig 6 Showing cases from other districts of Punjab into Amritsar

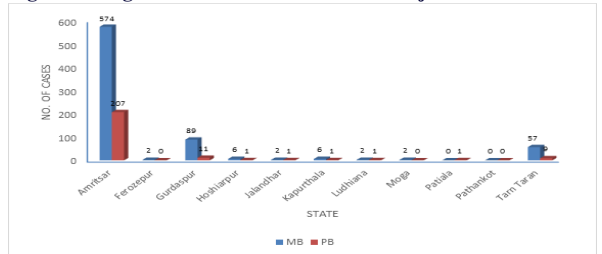


Fig 7 Shows Disease indicators

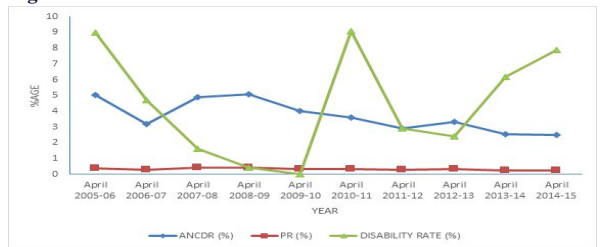


Fig 8 Treatment completion rate of Paucibacillary Leprosy

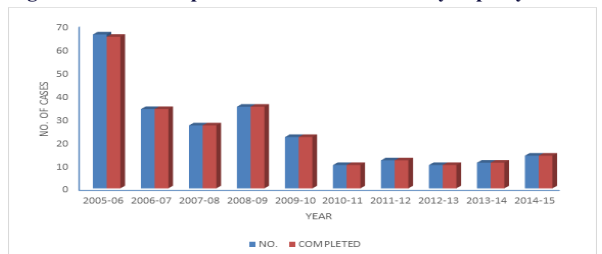


Fig 9 Treatment completion rate of Multibacillary cases

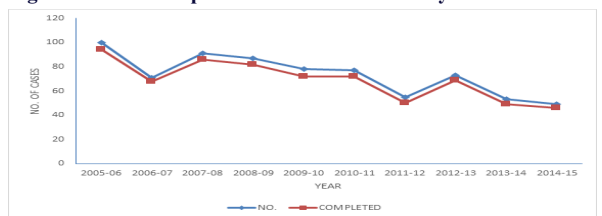
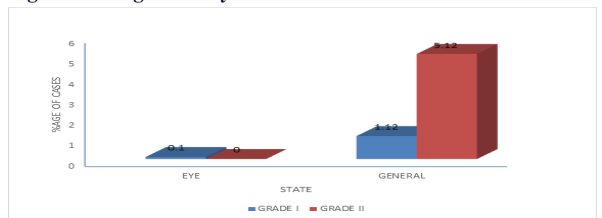


Fig 10 Showing disability cases



Discussion

Leprosy had been a major public health problem of India in the last century. Leprosy control programs were initiated in 1955 followed by multidrug therapy in 1982'. In 1993, the National Leprosy Elimination Programme (NLEP) was initiated with the goal to decrease the prevalence rate of leprosy below 1 case/10,000 population. India has achieved elimination of leprosy as a public health problem in December 2005 by recording a prevalence rate of 0.95/10,000 population⁸ and subsequently, it has further declined to 0.84/10,000 population as in March 2006⁹. Leprosy was supposed to be eliminated by World Health Organization at the global level by the end of the year 2000; however, it still remains a significant public health problem at a national level in these six countries: India, Brazil, Madagascar, Mozambique, Nepal, and Tanzania. Amongst these, India alone accounts for 64 per cent of prevalence and 78 per cent of new case detection, worldwide. The global registered prevalence of leprosy at the beginning of 2006 was 219,826 cases.¹⁰ Though global leprosy programs made substantial progress in reducing the disease burden, new case detection had plateau in the range of 215000-245000 worldwide between 2009 and 2015¹¹.

There are reports that the number of leprosy patients presenting to dermatologists in both private and teaching hospitals are increasing as peripheral surveillance activities are discontinued¹². This would require a specialized focus on early diagnosis, complete treatment and detection and management of disabilities.

Early detection of the disease is important, since physical and neurological damage may be irreversible even if cured. Hence, early intervention in the form of medications like multidrug therapy (MDT) will help avoid serious complications thereby making it a less important public health problem.¹³ In this study, out of the total 975 cases, there were 756(77.53%) males and 219(22.46%) females and the difference was statistically significant (Table 1). More number of males indicates their more vulnerability because of greater mobility and increased opportunities for contact in big population. This may also explain the increased number in migrant population. Majority of the cases were between 16 to 45 years of age (74.05%) and 67 were children under 15 years of age. Age of the youngest case was 5 years and oldest 85 yrs of age. Similar age variation was seen in a study done by Sejal and Sangeeta.¹⁴

Marital history could be extracted in 281 cases only due to non-availability of records. So, no comment on conjugal leprosy could be given the reason may be that this data was available in tertiary care centre records only as there is no column of marital status in WHO master register where final data is being recorded. Area wise distribution in our study showed 554(56.82%) cases in urban localities mainly in the slums and residential sites which is similar to a study in 2008, showing 5 times increase in the number of cases in certain rural areas (Figure 3,4).¹⁵ This again supports the theory of migration as well as poor nutritional status in this population. India recorded more than 1.22% increase in the cases of leprosy in 2015-16. New cases continue to be detected in pockets in rural and urban areas. The reason for this could be the discrimination being suffered by these lepers that they are confined to some areas.¹⁶

In rural area, 28.51% cases were from Baba bakala block of Amritsar which has its border with district Gurdaspur and 17.02%(outside cases) from neighbouring districts mainly Gurdaspur and Tarantaran (Figure 6). Amritsar district has two tertiary care centers catering to this area. So, many out of district cases also come to these centers for want of better medical care.

Out of the total 975 cases, Indigenous (Punjabi) population was 390 cases (40%) and non-Punjabis were 585 cases (60%) (Figure 1). Although increasing trend in indigenous population in the last few years. The data showed that main migrants were from Uttar Pradesh and Bihar i.e. 513 cases (52.61%), these states are already known for being endemic for the disease (Figure 5). The reason for migrant influx in Amritsar district could be either due to better job prospects or being a tourist destination.

According to socio-economic category, 641(65.74%) of the cases in the study belonged to general category followed by 22.56% Scheduled caste, 1.53% Scheduled tribe and 10.15% status was unknown.(Table 1)

The study detected only 14.66% of the cases with BCG vaccination although it is reported that single dose of BCG vaccine offers only 26 to 41% efficacy and with two doses the protection level increases to 60%(Table 4). The age at vaccination did not predict the protective effect of BCG. An additional dose of BCG was more protective in the prevention of leprosy compared with a single dose hence, an additional dose of vaccination may be warranted for contacts of leprosy patients in areas where leprosy continues to be a public-health problem.¹⁷

Annual new case detection rate in our study decreased from 5.03% in year 2005/6 to 2.5% in the year 2014/15 which shows similar decreasing trend of new cases for the year 2013-14 nationally.¹⁸ It is well realized that even after elimination target has been achieved, new leprosy cases will keep coming for at least some years as some level of disease transmission is still continuing or subclinical cases will manifest disease(Figure 7).¹⁹ Cases with high bacillary load such as histoid leprosy or the ones with varied presentation are often misdiagnosed at Primary health centers and subclinical infection in the community could be another reason that new cases are still coming up.

Prevalence rate was well under control i.e. less than 1 per 10,000 population making it a low endemic district in Punjab (Figure 7). The number of new leprosy cases occurring each year is important as a measure of transmission but difficult due to leprosy's long incubation period, delays in diagnosis after the onset of the disease, and the lack of laboratory tools to detect it in the very early stages. Hence, it is suggested that the registered prevalence is a useful proxy indicator of the disease burden, as it reflects the number of active leprosy cases diagnosed with the disease and receiving treatment with MDT at a given point in time.²⁰

The most common cause of permanent disability in patients with communicable diseases is leprosy. Approximately three million people live with leprosy associated deformity and in the next few decades it's estimated that about a million people will continue to suffer from this disability²¹. Delay in leprosy diagnosis and treatment causes disabilities due to nerve damage, immunological reactions and bacillary infiltration. Leprosy disability leads not only to physical dysfunction and activity limitation but also disrupts social interaction of affected individuals by creating stigma and discrimination.

Varied peaks of disability rates were seen in this ten years study. From 9% in 2005/6 it decreased to 0.02% in 2009/10 but once again the graph showed peak of 9.1% in 2010/11 and finally decreased to 7.9% in 2014/15. Total of fifty Grade II disability of limbs were recorded and none in eyes (Figure 7,10). This again emphasizes the need for better record keeping.

According to Ridley Jopling classification 47.5% cases of medical college showed Boderline tuberculoid type to be the most common type of leprosy followed by ENL in 6cases (1.57%), Histoid leprosy in 4(1.04%), one case each of lepromatous leprosy with tuberculosis (0.26%) and HIV (0.26%) was present (Table 2). Whereas according to WHO classification, 734 cases (75.28%) were Multibacillary type and 241 cases (24.71%) Paucibacillary type (Figure 2).

Histopathology correlation record could be found in 10.02% of the cases only as it was being practised at higher centres only (Table 3). As WHO has simplified the diagnosis by clinical suspicion only so biopsy is not done in all cases so biopsy and smear correlation was found in tertiary care cases only.

Treatment completion for Paucibacillary(PB) cases was 99.84% and 93.38% for Multibacillary cases(MB) and timely RFT was done in these cases (Figure 8,9). Over-all more number of PB cases were present and the difference was statistically significant. Over the years Punjabi patients showed increased incidence of the disease along with more PB cases and almost equal number of MB cases which is a matter of concern.

In the present study, a total of 19 cases (1.95%) showed relapse. Similar relapse rate of 1.84% in MB cases is shown in study in 2008 which highlighted that although relapse rate after MDT is low but it is the bacterial load before initiation of therapy which is an important factor that determines relapse.²²

Conclusion & Remarks:

Although Leprosy is showing a declining trend in the post elimination era but still there are large number of case which are being detected. As we compiled the data it was found that Amritsar district was low endemic district but still there were many issues which needed attention for further improvement in scenario like:

- Proper record keeping with minute details.
- Regular capacity building of health workers, specialist doctors dealing with complications of leprosy.
- Additional supportive staff needed e.g. lab tech, driver, field work.
- More recruitment of staff for active community surveys esp. slums, school, factories.
- More awareness programs for community for early detection and stigma reduction.
- Special programs for long term follow up of Released from Treatment (RFT) cases is required to prevent relapse.
- Vaccine and chemoprophylaxis for household contacts.
- More involvement of skin specialist in the program to deal with difficult cases.
- Special focus on cases needing treatment for more than one year.
- Screening for TB and HIV should be mandatory in all cases.
- Overall shift from non-Punjabi to Punjabi population is occurring.
- And last but not the least, the stigma attached with disease should be ended.

Ethical Considerations

- 1) No invasive procedure was performed.
- 2) All information was kept confidential.

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