

# Hansen's disease in the archipelago

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## ABSTRACT

**Background:** Leprosy or Hansen's disease is a chronic disease caused by bacterium *Mycobacterium leprae* presenting as hypopigmented patches and diminished sensation. It continues to remain a major public health problem due to the stigma attached to this disease. **Objectives:** The objectives of the study were as follows: (1) To study the incidence and type of leprosy cases in Andaman and Nicobar Islands and (2) to analyze patients who develop deformity due to leprosy. **Materials and Methods:** Retrospective data mining from the leprosy records maintained by Leprosy Department collected from 35 primary and community health centers existing across Andaman and Nicobar Islands from April 2014 to March 2018. **Results:** A total number of leprosy cases reported were 101, of which a total number of paucibacillary cases were 23 (22.77%) and multibacillary cases were 78 (77.23%). A total number of childhood cases were 6 (5.94%), female cases were 27 (26.73%) and male cases were 68 (67.32%). Deformity was seen among 11 patients (10.89%). **Conclusion:** Leprosy cases have been increasing in the islands affecting more of adult males. Multibacillary cases are being predominantly more than paucibacillary. The main challenge is to eliminate the social stigma through effective information, education, and communication and promote voluntary reporting.

**KEY WORDS:** Leprosy; Andaman and Nicobar Islands; Incidence


## INTRODUCTION

Leprosy or Hansen's disease is a chronic disease caused by bacterium *Mycobacterium leprae* which is a acid-fast, rod-shaped bacilli mainly affecting the peripheral nerves, skin, and certain body tissues presenting as hypopigmented patches and diminished sensation.<sup>[1]</sup> Transmission is assumed to be primarily by droplets from the nose and mouth which may occur through close contact with infected persons.<sup>[2]</sup> Incubation period for leprosy ranges from 3 to 7 years.<sup>[3]</sup> Leprosy is found to be endemic in underdeveloped and developing countries.<sup>[4]</sup> If left untreated, it can progress to

a severely debilitating disease with nerve damage and tissue destruction and can result in functional loss. It is considered a public health problem in India due to its visible deformities and stigma attached to it.<sup>[5]</sup>

Worldwide, new cases of leprosy reported in 2015 were 2,11,973 (2.9 new cases per 100,000 people), in 2014, new cases reported were 2,13,899, and in 2013, new cases reported were 2,15,656.<sup>[6]</sup> Prevalence of leprosy globally by the end of 2016 was 1,71,948 with a registered prevalence rate of 0.23/10,000 populations.<sup>[7]</sup>

By the closing stages of March 2016, of 669 districts, 551 districts (82.36%) had prevalence of leprosy <1/10,000 population which is the target of eliminating it as a public health problem, 76 districts had prevalence between 1 and 2/10000, 39 districts had prevalence between >2 and 5/10,000, and only two districts had prevalence between 5 and 10.<sup>[8]</sup>

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In spite of an accurate diagnostic techniques and effective multidrug therapy (MDT) available for leprosy and initiatives by the government, it continues to remain a major public health problem in India.

Studies on incidence and various forms of leprosy are scant. Therefore, with this background, we conducted the present study to know the incidence of leprosy in the Andaman and Nicobar Islands.

## Objectives

The objectives of the study were as follows:

1. To study the incidence and type of leprosy cases in the Andaman and Nicobar Islands.
2. To analyze patients who develop deformity due to leprosy.

## MATERIALS AND METHODS

In this retrospective data mining, the researchers collected leprosy data from the year April 2014 to March 2018 from 35 primary and community health centers existing across Andaman and Nicobar Islands.

Andaman and Nicobar Islands are divided into three districts - South Andaman, North and middle Andaman, and Nicobar district. The data were analyzed according to gender, type of leprosy, and presence of deformity.

Ethical clearance was obtained from the Institutional Ethics Committee. The data were cleaned and entered into MS-Excel spreadsheet and analyzed using IBM Statistical Package for the Social Sciences 20.0 software (Chicago).

## RESULTS

A total number of leprosy cases reported from Andaman and Nicobar Islands from April 2014 to March 2018 were 101, of which a total number of paucibacillary cases were 23 (22.77%) and multibacillary cases were 78 (77.23%). A total number of childhood cases were 6 (5.94%) (PB-2 and MB4). A total numbers of female cases were 27 (26.73%) (PB-9 and MB-18). A total numbers of male cases were 68 (67.32%) (PB-12 and MB-56). Deformity was seen among 11 patients (10.89%) (Grade-I deformity was seen in 6 patients and Grade II deformity was seen in 5 patients).

A total number of new cases reported from April 2014 to March 2015 were 22, of which paucibacillary leprosy was 6 and multibacillary leprosy was 16. In 2015–2016, a total number of leprosy cases were 30 (PB-7 and MB-23), in 2016–2017, it was 17 (PB-4 and MB -13), and in April 2017–March 2018, there were 32 cases (PB-6 and MB-26) [Table 1].

A total number of childhood cases were 0 in 2014–2015, 1 case in 2015–2016, 1 case in 2016–2017, and 4 cases in 2017–2018. A total number of new cases in 2014–2015 among females were 8 and males were 14 cases; in 2015–2016, female cases were 8 and male cases were 21; in 2016–2017, female cases were 3 and male cases were 13; in 2017–2018, female cases were 8 and male cases were 20 [Table 2].

In 2014–2015, Grade I deformity was seen in 1 patient and Grade II deformity in 1 case. In 2015–2016, Grade I deformity was seen in 2 patients and Grade II deformity in 1 patient. In 2016–2017, 2 patients suffered with Grade I deformity and 1 patient with Grade II deformity. There was no deformity case seen in 2016–2017. In 2017–2018, Grade I deformity was seen among 3 cases and Grade II deformity was seen in 3 cases [Table 3].

The incidence of leprosy per lakh population in 2014–2015 was 5.68; in 2015–2016, it was 7.69, 2016–2017 was 4.33, and in 2017–2018, it was 8.10 [Figure 1].

## DISCUSSION

In the present study, we observed that a total number of leprosy cases reported from Andaman and Nicobar Islands from April 2014 to March 2018 were 101, of which a total number of paucibacillary cases were 23 (22.77%) and multibacillary

**Table 1:** Year-wise distribution of cases leprosy

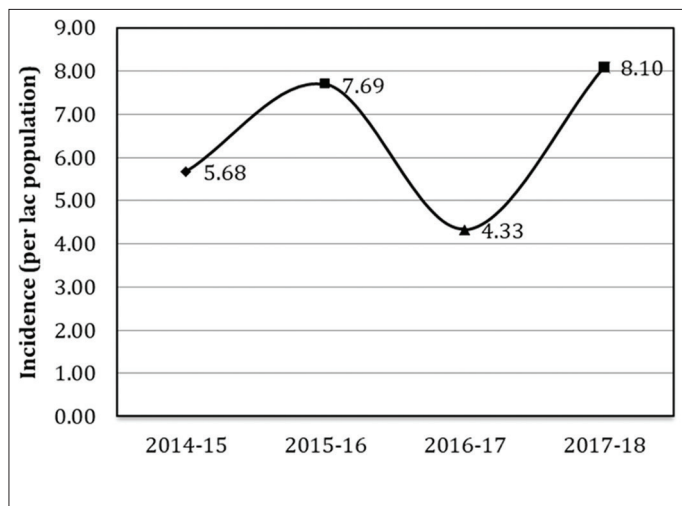
Year	Population	Total new cases recorded	Cases detected n (%)	
			PB	MB
2014–2015	387401	22	6 (27.3)	16 (72.7)
2015–2016	389919	30	7 (23.3)	23 (76.7)
2016–2017	392435	17	4 (23.5)	13 (76.5)
2017–2018	395004	32	6 (18.8)	26 (81.3)

**Table 2:** Gender-wise distribution of cases leprosy

Year	Child cases (%)	Male cases n (%)	Female cases n (%)
2014–2015	0 (0.0)	14 (63.6)	8 (36.4)
2015–2016	1 (3.3)	21 (70.0)	8 (26.7)
2016–2017	1 (5.9)	13 (76.5)	3 (17.6)
2017–2018	4 (12.5)	20 (62.5)	8 (25.0)

**Table 3:** Deformity-wise distribution of cases leprosy

Year	Deformity n (%)		
	Grade I	Grade II	Total
2014–2015	1 (4.5)	1 (4.5)	2 (9.3)
2015–2016	2 (6.7)	1 (3.3)	3 (10.2)
2016–2017	0 (0.0)	0 (0.0)	0 (0.0)
2017–2018	3 (9.4)	3 (9.4)	6 (19.0)



**Figure 1:** Incidence of leprosy (per lakh population)

cases were 78 (77.23%). A total number of childhood cases were 6 (5.94%) (PB-2 and MB4). A total number of female cases were 27 (26.73%) (PB-9 and MB-18). A total numbers of male cases were 68 (67.32%) (PB-12 and MB-56). Deformity was seen among 11 patients (10.89%) (Grade-I deformity was seen in 6 patients and Grade II deformity was seen in 5 patients).

As per our study, there has been an increase in a number of cases from 2014 to 2018 with a dip in number of cases in 2016–2017. There are a lot of migrants in Andaman and Nicobar Islands mainly from West Bengal, Tamil Nadu, and Andhra Pradesh mainly for jobs. Migration would have played a significant role, resulting in increase in population as well as for the persistent increase in a number of cases in these islands. The decrease in a number of cases in 2016–2017 could be either due to migration of workers to mainland or due to under reporting. There is a sudden increase in number of cases in 2017–2018, the reasons could be either duplication of cases, or it can be due to multiple registrations inflating the statistics. In our study, we found that a total number of leprosy cases reported from Andaman and Nicobar Islands from April 2014 to March 2018 were 101. Multibacillary cases (77.23%) were more than paucibacillary leprosy (22.77%). Similar finding was seen in a retrospective study done by Rathod and Mistry<sup>[9]</sup> and by few other studies also.<sup>[10,11]</sup> Contrary to our study, Murthy observed paucibacillary cases to be more.<sup>[12]</sup> The presence of multibacillary cases in our study suggests active transmission of leprosy as multibacillary cases are considered to be infectious. The number of new cases detected in Andaman and Nicobar Islands in 2014–2015 was 22; in 2015–2016, it was 30; in 2016–2017, it was 17; and in 2017–2018, it was 32. Of the total new cases which are reported globally, India accounts for 60% of these. New cases detected in India, in 2007, were 137,685, and in 2016, it was 135,485; this was due to latest innovative strategy of leprosy detection campaign which detected new cases from highly endemic regions.<sup>[7,13]</sup> In a survey done in

selected districts of Uttar Pradesh and Haryana from 2009 to 2010, new cases in Uttar Pradesh were 276 and new case detection rate (NCDR) was observed to be 6.91/10,000 population which is comparatively higher than our study due to more population in that area compared to population of Andaman and Nicobar Islands. In Haryana, new cases detected were 79 and NCDR was 1.95/10,000 populations.<sup>[14]</sup> Total new case reported in 2017 in Bangladesh was 801<sup>[15]</sup> which are more than our study the reason could be due to poor economic status and health-care in Bangladesh causing the spread of disease. In the United States, the Department of Health and Human Services reported 175 new cases of leprosy in 2014,<sup>[16]</sup> the reason could be due to exhaustive detection of cases in United States. This high proportion of undetected cases can be interpreted as a limitation of the impact of Information, Education and Communication (IEC) activities.<sup>[17]</sup> Detection of new cases suggests transmission of leprosy in the population. Therefore, the program should be designed in such a way that the information regarding diagnosis and free treatment and emphasis about the place where these facilities are available should be provided so that suspected cases can avail these facilities. For filtering out large groups of leprosy cases from the community, leprosy elimination campaign surveys is an important tool.<sup>[14]</sup> In our study, incidence of leprosy per lakh population in 2014–2015 was 5.68; in 2015–2016, it was 7.69, 2016–2017 was 4.33, and in 2017–2018, it was 8.10. It was noticed that the global incidence of leprosy declined from 2001 to 2006 and this was mainly due to the reduction of new cases from India.<sup>[18]</sup> Survey study done among the US population from 1994 to 2011, found about 2323 new cases of leprosy disease with an average annual incidence rate of leprosy to be 0.45 cases per 1 million persons.<sup>[19]</sup> Another survey done in Bangladesh for period of 6 years observed incidence rate to be 3.7/10,000 population.<sup>[20]</sup> The incidence rate of leprosy in US is found to be less as compared to other countries the reason being remarkable health care system in the country. Prevalence of Leprosy cases increases with poor socioeconomic status and poor living conditions.<sup>[21]</sup> As per the latest global leprosy update 2016 from the World Health Organization, there has been reduction in the prevalence of leprosy globally ever since mid-1980's due to the implementation of MDT. It was observed that, in the islands, a total number of female cases from 2014 to 2018 were 27 (26.73%) and a total number of male cases were 68 (67.32%). Males were affected more than females. A study done in rural Central India also found similar results.<sup>[22]</sup> Male preponderance was observed in other studies also.<sup>[11,23]</sup> There was no difference observed among males and females in a survey done in few districts of the UP and Haryana.<sup>[14]</sup> As per the WHO report, leprosy is more common among males than in females and male-to-female ratio to be 2:1.<sup>[24]</sup> This is the universal pattern seen in India where male leprosy cases outnumber the females and the reason could be that, very often, males personally come forward for the treatment to a health center while women may not report for treatment due to the stigma attached against

the disease in society. It was observed from 2014 to 2018 in Andaman and Nicobar Islands that, of the total of 101 cases, childhood cases were less 6 (5.94%). As per the report of national leprosy eradication program (NLEP) data for the period 2005–2014, the statistics shows a rationally constant proportion of children among new cases which were 9–10%.<sup>[25-33]</sup> The statistics shows a rationally constant proportion of children among new cases which were 9–10%.<sup>[25-27,29-33]</sup> Studies from states such as Delhi, Maharashtra, Karnataka, and Andhra Pradesh too reported a lesser incidence among children <5 years.<sup>[17,34-36]</sup> Similar results were obtained from a study done in Nepal also.<sup>[37]</sup> These results show that there is active circulation of bacilli and continued transmission of disease. On analysis, it was found that, in the islands, deformity was seen among 11 patients (10.89%). Grade I deformity was seen more than Grade II deformity. Globally, it was observed that there was a reduction in Grade 2 deformity from 2015 to 2016.<sup>[7]</sup> Few researchers found that similar results were prevalence of Type 1 deformity which was more than Type 2 deformities.<sup>[38,39]</sup> Detection of Grade 2 deformity signifies that there is a delay in the diagnosis of leprosy which results in persistent neuritis eventually leading to disability and also that there may be the presence of hidden cases in the population.<sup>[40]</sup> It has been observed that a leprosy patient with any disability suffers from stigma and this prevents him from going for work and thus discourages him from being productive and contributing to the economic growth of the country. Thus, there is a need to increase awareness about the signs and symptoms of leprosy among general health-care staff mainly the grass root level of health workers and also the community to encourage self-reporting for early diagnosis and appropriate management of the disease and its complications. The newer initiatives to make reporting and data management of leprosy cases easier and user-friendly, NLEP has launched web-based reporting system in India known as “Nikusth.” It will help in tracking all activities which are being implemented by NLEP, and it will also help in the avoidance of duplication of cases. In future, NLEP is planning to set up online training software to train leprosy workers.<sup>[41,42]</sup>

### Strengths and Limitations of this Study

This is the first study to analyze and interpret the data of leprosy in Andaman and Nicobar Islands. It was a retrospective data analysis based on records; therefore, bias in reporting cannot be ruled out. There is a higher number of migrant population in these islands; therefore, we should be careful in the generalization of results.

### CONCLUSION

The main challenge is to eliminate the social stigma through effective IEC and promote voluntary reporting. There is a need to strengthen health system, build, and sustain leprosy expertise by conducting frequent and regular

training programs, development of more effective tools and procedures for early detection, and management of leprosy to prevent nerve damage and disability. There is a requirement for intensification of referral systems and rehabilitation of those who have developed disability. For effective and sustainable elimination of leprosy from all regions of a country, political will and development of partnership among various departments along with implementation of integrated disease surveillance program is a must. There will be major boon in the field of leprosy if an effective vaccine is developed or else leprosy will continue to remain a public health problem in future decades.

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