

Current Trends of Leprosy in a Tertiary Care Centre in North Kerala: A 10 Year Observational Retrospective Study

A Thyvalappil¹, Pretty M², B Anumod³, S Ajayakumar⁴, S Rajiv⁴,
B Joy⁵, K Radhakrishnan⁶

Received : 21.11.2018

Accepted : 25.05.2019

After the declaration of elimination of leprosy as a public health problem, leprosy services in India have been integrated with General Health-Care System, possibly resulting in reduced focus. This study was conducted to analyze the trends in the disease over a 10-year period in a tertiary care hospital in North Kerala in post elimination era. Of the 133 Hansen's disease (HD) cases, HD-BT (borderline tuberculoid) was the most common type, followed by, HD-LL (lepromatous lepromatous). Leprosy reactions were seen in 37.59% cases, and deformities were noticed in 19 (13.53%) cases, of which 13 (66.67%) had grade 2 disability. While analyzing slit skin smear results, 25.56% were AFB (Acid Fast Bacilli) positive. On histopathological evaluation of 129 biopsied cases, 115 (89.13%) cases were consistent with clinical diagnosis. The presence of a significant number of smear-positive cases in a post elimination era, particularly lepromatous spectrum, is a matter of serious concern. Community based studies will be necessary to understand the reality at population level and for devising appropriate strategy to break the chain in transmission.

Keywords : Leprosy, Elimination, Deformity, Reaction, Histopathology

Introduction

Leprosy is a chronic infectious disease chiefly involving skin and peripheral nerves. Elimination of leprosy as a public health problem attained at the global level in the year 2000 and in India on 31st December, 2005 has been an important achievement. On January 30, 2006, the Government of India officially announced the 'elimination of leprosy' as a public health

problem at the national level (Dhillon 2006). After that, leprosy services in India have been integrated with General Health-Care System, resulting in reduced focus and funds. India still accounts for 58.8% of leprosy burden of the world (Global leprosy update 2014). Recent statement from Supreme Court of India, questioning the "leprosy-free" tag of India, stating that India underestimated leprosy and diverted the funds

Academy of Medical Science (ACME) Medical College, Pariyaram, Kannur, Kerala- 670503, India

¹ Dr A Thyvalappil

² Dr Pretty Mathew

³ Dr B Anumod

⁴ Dr S Ajayakumar

⁵ Dr Bifi Joy

⁶ Dr K Radhakrishnan

Corresponding Author : Dr Pretty Mathew **Email :** drprettymathew@yahoo.com

meant to eliminate the disease, should be taken up seriously.

Certain countries such as India, Brazil, Nepal, Myanmar, Indonesia, and Bangladesh have higher prevalence of the disease (Singal & Sonthalia 2013). In India also, there are States and Union Territories which continue to report a prevalence of >1/10,000. There was initially a steep fall in prevalence from 25.9/10,000 in 1991 to 5.9/10,000 in 1996, but thereafter, it gradually declined and showed a plateau from 2007 until 2016, even after attaining elimination level (Relhan et al 2016). At the same time, annual new case detection rate showed a gradual fall from 5.9/10,000 of 1991 to 2.3/10,000 in 2005, with peaks in 1999 and 2000. However, between the years 2005 to 2015, both prevalence rate and annual new case detection rate remained in a plateau phase and the latter always exceeded the values of the former. This shows that although the number of cases has drastically gone down, the active transmission of infection has remained unchanged, as shown by a steady level of annual new case detection rate. In order to understand the situation in this part of North Kerala, this study was conducted to analyse the trends in the disease over a 10-year periods in a tertiary care hospital in post elimination era.

Materials and Methods

A 10-year retrospective observational study from January 2008 to December 2017 was done. The data was analysed from registered records of patients attending the leprosy clinic in a Tertiary-care teaching hospital in North Kerala. All patients who fulfil the case definition of leprosy, that is one of the three cardinal features of leprosy, were included in the study to analyse current clinical trends of leprosy in post elimination era.

Age, sex, clinical spectrum of the disease, histopathological spectrum, paucibacillary or multi bacillary, presence or absence of reactions and disabilities were noted in the study. Clinical

spectrums of the patients were decided after recording detailed clinical history, clinical and slit-skin smear examination (IAL 1982, WHO 1988). Treatment was given according to the WHO recommendation. Statistical analysis was done using SPSS version 24.

The cases were divided into multi/paucibacillary according to WHO criteria (WHO 1988). Type 1 Leprea 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 leprae reaction was diagnosed if the patient had multiple, small, tender, evanescent nodules or plaques suggestive of ENL, with or without constitutional symptoms such as fever, malaise, lymphadenitis and myalgia.

For disabilities of hands and feet WHO Grading scale was used (Brandsma & van Brakel 2003) :

Grade 0 : No anaesthesia / no visible deformity

Grade 1 : Anaesthesia present but no visible deformity

Grade 2 : Visible deformity/damage.

Results

In this 10-year observational retrospective study, we analysed 133 cases of leprosy belonging to various clinical spectrums. We noticed a gradual decline in new cases from 2010 to 2016, but in 2017 there was sudden increase in number of cases (Fig. 1). Maximum number of new cases were 18, in 2010.

Out of these 133 cases, 94 (70.68%) were males and 39(29.32%) were females with a M:F ratio of 2.4:1. Age of the patients ranged from 4 to 85. Majority of cases were of the age group of 21-40 years (48.87%), followed by 41-60 years (27.07%), 0-20 years (14.3%), >60 years (9.78%) in descending order. 57.9% of cases were multibacillary as per WHO definition. Over these

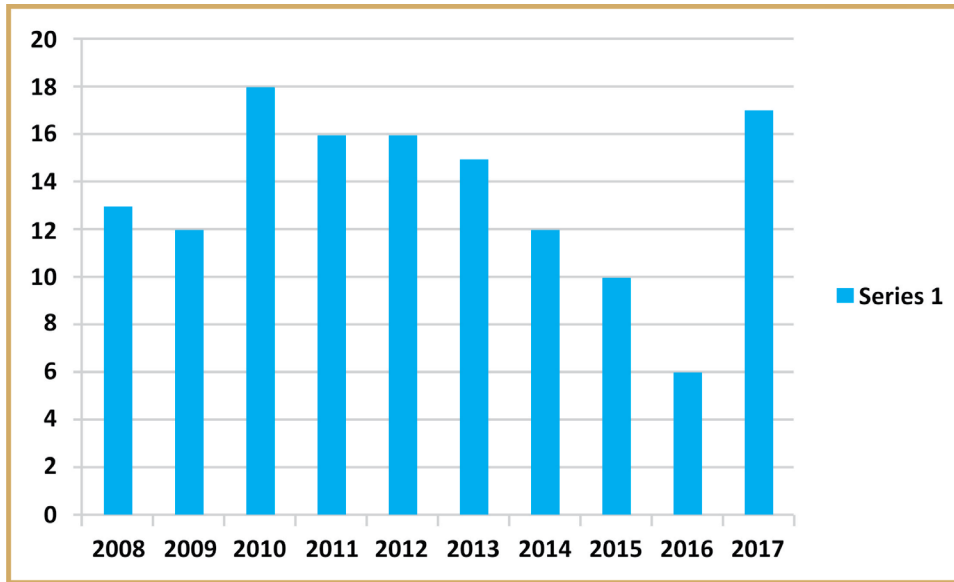


Fig 1 : Distribution of Leprosy Cases Over the Years

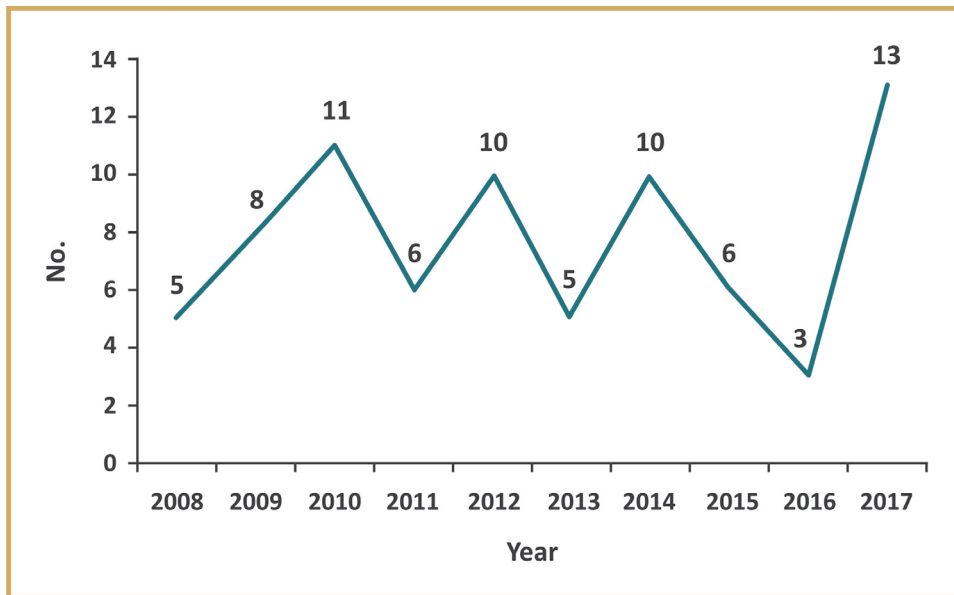


Fig 2 : Distribution of MB Leprosy Cases Over the Years

10 years, we couldn't observe any significant reduction in the number of multibacillary cases with the maximum number of MB cases in 2017

(Fig. 2). Migrant labourers constituted 9.7% (13) of total cases, of which 69% (9) were multibacillary cases.

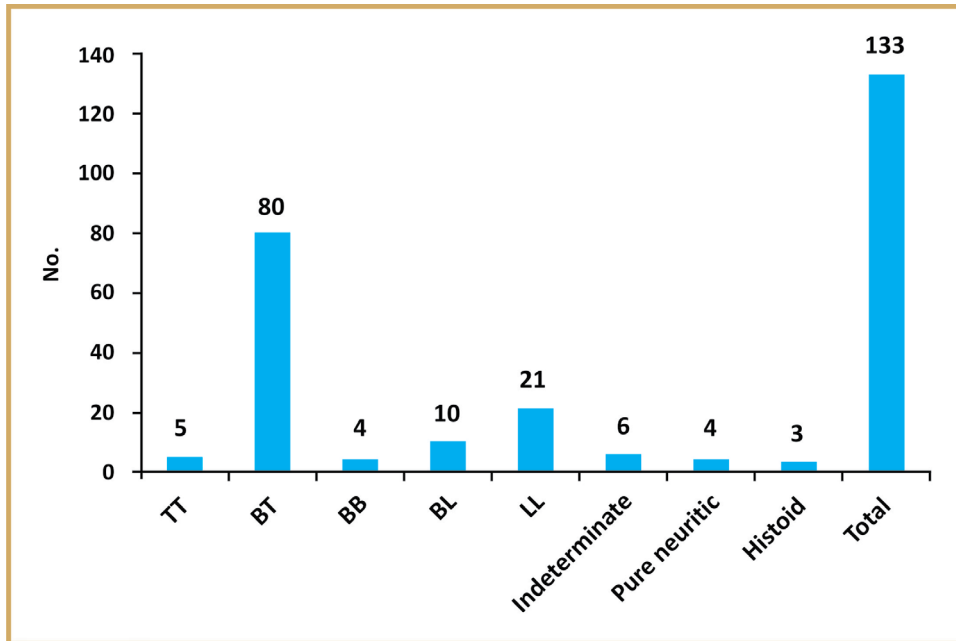


Fig 3 : Morphological Types of Leprosy Cases Over the Years

Of these 133 cases, 80 cases (60.15%) were HD-BT type, 21 (15.79%) cases were HD-LL, 4 (3%) were pure neuritic type, 3 (2.26%) were histoid type, 5(3.76%) were HD-TT type, 4 were HD-BB (3%), 10 were HD-BL (7.52%) (Fig. 3). Proportion of lepromatous cases over these ten years did not demonstrate any decline.

Leprosy reactions were seen in 50 (37.59%) cases, of which 76% (n=39) were in type 1 reaction and 24% (n=11) were type 2 reaction. Most of the type 1 reaction occurred in borderline spectrum where as all the type 2 reaction occurred in lepromatous spectrum.

While analysing the slit skin smear results, 74.43% of cases (n=99) of leprosy were found to be Acid Fast Bacilli negative and 25.56% (n=34) were AFB positive (Fig. 4). Number of AFB positive cases were high in 2017 compared to previous 3 years (< 10%), 23.53%.

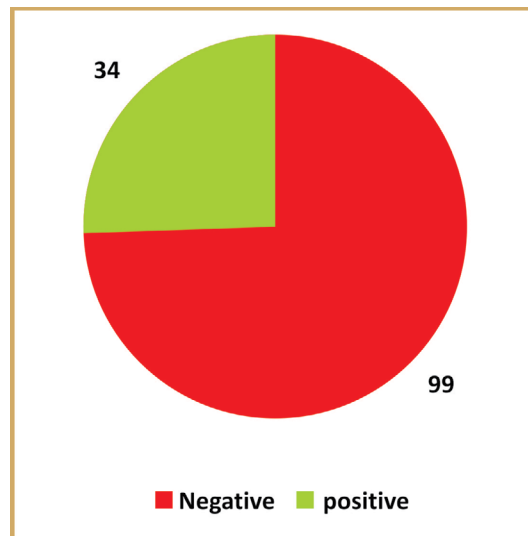


Fig 4 : Slit Skin Smear Results

Deformities were noticed in 19 (13.53%) cases, of which 13 (66.67%) had grade 2 disability (Fig. 5). Majority of disabilities were associated

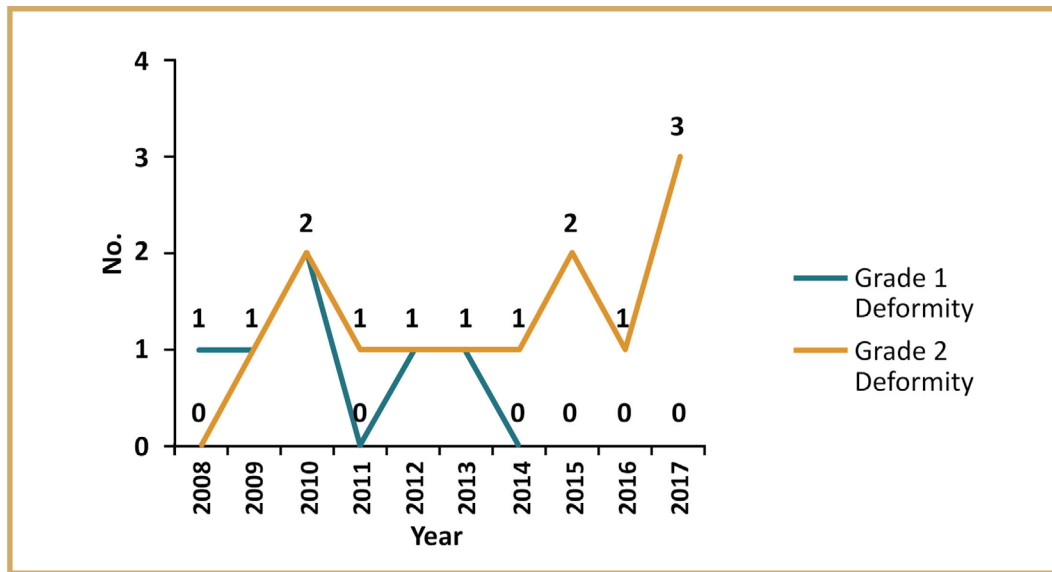


Fig 5 : Trends in disabilities in study group

with lepra reactions (57.89%). While comparing the number of cases with deformities, grade 2 deformities didn't seem to decline over the years, even though the number is small.

Biopsies were taken in all cases except in pure neuritic type due to the practical difficulty in our setting, and specimens were sent for histopathology evaluation. On histopathological evaluation of 129 biopsied cases, 115 (89.13%) cases were consistent with clinical diagnosis. The most common type of HD diagnosed clinically as well as histopathologically was BT. All cases were started on WHO-MDT (PB/MB) depending upon whether they are paucibacillary (n=56) or multibacillary type (n=77).

Discussion

Leprosy is still a public health problem, in some areas in India. The precise, knowledge of its spatial distribution and clustering, particularly in the urban municipalities is patchy (Rathod & Mistry 2017). As per the recent leprosy data by NLEP in 2016-17 the prevalence rate reported

was 0.66 per 10,000 populations. Annual new case detection rate as per the recent leprosy data by NLEP in 2016-17 was 10.17 per 1,00,000 populations.

A total of 34 states/UT have achieved the level of elimination, i.e. PR less than 1 case per 10,000. One state and one UT, i.e. Chhattisgarh and Dadra and Nagar Haveli respectively have PR of 2 and 5 per 10,000 population. Five other states/UT viz Odisha, Chandigarh, Bihar, Goa and Lakshadweep reported a prevalence rate of >1/10,000 (NLEP 2017).

Accurate diagnosis and classification is of fundamental importance in leprosy, for correct and timely treatment of cases, management and prevention of disabilities. Under diagnosis as well as incorrect classification of the disease will lead to continued transmission and increased morbidity of the disease. AFB positivity in SSS as well as histopathological examination of skin lesion is an important tool in accurate definitive diagnosis and classification of leprosy.

From 2010 to 2016 there is a gradual reduction in number of new cases, but 2017 had an increase in cases. Our maximum numbers of new cases were 18, in 2010. This fluctuation in number of leprosy cases registered for treatment between 2008 and 2017 with maximum number of cases in year 2010 (18) and 2017 (17) can occur in a tertiary hospital with a wide catchment area.

Of the total 133 cases, 94 (70.68%) were males and 39 (29.32%) were females. In endemic regions, WHO study in 2011 observes that males are affected twice as commonly as females (WHO 2011). Our study also got a M:F ratio of 2.4:1. According to NLEP – annual report for the year 2016- 2017 female patients were 39.17%, which is more than our statistics.

Majority of cases belongs to the age group of 20-40 years (48.87%) in our study. In a study conducted by Kumar et al (2015) most patients (21.6%) belonged to age group 35–44 years. Age distribution found in this study was similar to that reported in literature. As we can see, the burden of the disease affects mainly the young productive male population of the society.

The most commonly encountered type of leprosy in our study was BT (60.15%), followed by LL (15.79%). Most of the cases belong to the borderline spectrum of Hansen's disease. These results are similar to findings of other workers (Kakkad et al 2016, Sharma et al 2008, Shivaswamy et al 2012). Another study also noted Borderline tuberculoid (60.25%) as the most common, followed by borderline lepromatous (13.52%) and Lepromatous leprosy (12.1%) (Relhan et al 2016). Even though majority of cases belongs to less infectious, borderline tuberculoid spectrum, presence of 15% of lepromatous leprosy cases are still alarming and the statistics over the 10 years does not show an expected decline in the lepromatous spectrum.

In our study slit skin smear results were negative in 99 patients, 74.44%. 25.56% cases were AFB

positive. In a study by Relhan et al (2016) slit skin smears were positive in 16.27% of the patients examined and among these 57% belonged to lepromatous leprosy spectrum. Here also the statistics does not show a promising regular decline in AFB positive cases. In fact, 2017 shows the highest number of AFB positive patients, 23.53%. As sample size is comparability Small, it will not be fair to draw important conclusions. In our study, a total of 77 patients, (57.9%) of cases were multibacillary as per WHO definition. According to NLEP 2016-2017 annual report proportion of MB cases in India was 49.57%, which is less than our statistics. In another study, 80% of patients had multibacillary leprosy (Rathod & Mistry 2017). Over these 10 years, the number of multibacillary cases didn't show a decreasing trend and the maximum number of MB cases in 2017 was 16.9%.

High proportion of MB cases indicates late stage reporting for diagnosis and treatment (Daniel et al 2009). The proportion of multi bacillary is an indicator of delayed diagnosis due to difficult access to services or inadequate public awareness programmes. Patient might have acquired the disease long back in their original states, evolved over time to MB spectrum. Another reason for the rise in the MB cases could be due to the shift from active to passive case detection (Relhan et al 2016). 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.

Migrant labourers constituted 9.7% (13) of total cases, of which 69% (9) were multi bacillary cases. Majority among this, i.e.; 69% were multibacillary. This clearly indicates probable late detection and delayed treatment initiation among migrant labourers. Migration of persons affected by leprosy was described as early as

1930 (Bhaskara Rao 1930), from India as well as other countries. All the new cases of leprosy in Isfahan Province, Iran were migrants (Asilian et al 2005). Chudasama et al (2007) observed increase in leprosy cases in Surat district due to labour migration. Migration may contribute reporting of cases in urban areas, where the people come for work (Rathod & Mistry 2017).

Over these 10 years deformities were noticed in 19 (13.53%) cases, of which 13 (66.67%) had grade 2 disability. Percentage of grade 2 deformity is 9.77%. Majority of disabilities were associated with lepra reactions (57.89%). While comparing the number of cases with deformities, grade 2 deformities didn't seem to decline over the years, even though the number is small. 13.5% of patients with deformities, even after 12 years post elimination does not look impressive, especially in a state like Kerala with high health indices. The percentage of patients with deformities is direct indicators of lapse in early detection and prompt treatment initiation. As per NLEP 2016-17 data, 3.87% patients reported with grade 2 deformity.

Out of 133 cases of leprosy, 37.59% cases were in leprosy reactions, of which 39 cases were in type 1 reaction and 11 were in type 2 reaction. A relatively high proportion (14%) of the patients were in Type 1 reactions at the time of diagnosis in Balgon et al (2010) study as compared to published reports which indicate average frequency from 2.6% to 6.4% (Lienherdt & Fine 1994). Signs of reaction was seen in 22.1% cases another study (Relhan et al 2016).

In our study, the most common type of HD diagnosed clinically as well as histopathologically was BT. This was in concordance with the study conducted by various authors (Moorthy et al 2001, Bijjargi et al 2012, Lobo et al 2014). On histopathological evaluation of 129 biopsied cases, 115 (89.13%) cases were consistent with clinical diagnosis. Histopathology was consistent

with the diagnosis in 68.9% cases, while in rest a non-specific histology was reported in another study (Relhan et al 2016).

In case of leprosy, the parameter taken for elimination is not zero prevalence, but less than 1 in 10,000. By proclaiming elimination, a false sense of security has been created, and vertical control programme of leprosy was abolished and was merged with general health control programs. The multipurpose workers now carry out leprosy work and they may lack the desired clinical skills to detect cases of leprosy. Incorporation of a national control programme to the general health programs dampens the sustainability of these programs and quality of service provided. The termination of active surveillance and new case detection is unscientific, as the leprosy programs were established for detecting and treating new cases (Nair & Vidyadharan 2016). After elimination of leprosy as a public health problem, other diseases tend to become relatively more important for national health administrations with a decrease in focus and funds for leprosy control.

Unlike other infections, the impact of control programmes for leprosy is limited due to many factors including the long incubation period, individuals incubating the disease may already harbour many bacilli, and these individuals might have transmitted disease to others much before their disease becomes clinically manifest. Other factors include nasal carriage of infection, persistence of *M. leprae* in the soil as well as in animal reservoirs (Singal & Sonthalia 2013). There is clear need to study these factors in detail. More active case detection and strengthening of health education strategies should also be sort out.

Statistics during 2005 to 2015, reveals that both prevalence rate and annual new case detection rate has remained in a plateau phase in India and the latter always exceeded the values of

the former (Sengupta 2018). This is a clear indicator of active transmission of infection. In our study also, the relative high proportion of multi bacillary patients with a significant number of smear positivity suggests the possibility of continued spread of disease necessitating the more active vigilance.

Small sample size is a major limitation of this study. Another limitation is that, as sample population represents a small region, which makes the generalization of our study findings difficult.

Conclusions

The most commonly encountered type of leprosy in our study was BT followed by LL. Among these 25.56% were smear positive cases and 57.95% patients were MB. Deformities were seen in 13.5% patients; of which majority was grade 2 deformity. As evident, many of the parameters did not show a promising persistent decline over the time. Since we could not sustain the rapid rate of reduction in leprosy burden attained during nineties, towards the post elimination era, it is reasonable to raise the question, "Was the declaration of leprosy elimination, a premature, badly planned decision."

Acknowledgment

The authors wish to thank Dr Binu Divakaran for her assistance in statistical analysis.

References

1. Aasilian A, Faghihi G, Momeni A et al (2005). Leprosy Profile in Isfahan (A Province of Iran). *Int J Lepr.* **73**: 129-130.
2. Balagon MF, Cellona RV, Abalos RM et al (2010). The efficacy of a fourweek, Ofloxacin Containing regimen compared with standard WHO MDT in PBI Leprosy. *Lepr Rev.* **81**: 2733.
3. Bhaskara Rao P (1930). Working of the Skin Clinics R. M. Headquarters Hospital, Tanjore, for the Year 1929. *Lepr India.* **2**: 76-78.
4. Bijjargi S, Kulkarni V, Suresh KK et al (2012). Correlation of clinical and histopathological classification of leprosy in post elimination era. *Indian J Lepr.* **84**: 271-275.
5. Brandsma JW, van Brakel WH (2003). WHO disability grading - operational definitions. *Lepr Rev.* **74** : 366-373.
6. Chudasama RK, Godara N, Tripathi VS et al (2007). An observation of leprosy situation in Surat district from 2001 to 2006. *Indian J Dermatol Venereol Leprol.* **73**: 434-435.
7. Daniel S, Arunthathi S and Rao PSS (2009). Impact of integration on the profile of newly diagnosed leprosy patients attending a referral hospital in South India. *Indian J Lepr.* **81**: 69-74.
8. Dhillon GP (2006). NLEP - Current situation and strategy during the 11th Plan Period (2007-2012). *J Indian Med Assoc.* **104**: 671-2.
9. Global Leprosy Update, 2014 (2015). Need for early case detection. *Wkly Epidemiol Rec.* **90**: 461-74.
10. Indian Association of Leprologists (1982). Clinical, histopathological and immunological features of the five type classification approved by the Indian Association of Leprologists. *Lepr India.* **54**: 22-32.
11. Kakkad K, Padhi T, Pradhan K and Agrawal KC (2016). A study of clinical, bacteriological & histopathological correlation in leprosy cases attending a Government Medical College in Western Odisha: Some observations. *Indian J Lepr.* **88**: 97-103.
12. Kumar A, Girdhar A, Girdhar BK (2015). A randomized controlled trial to compare cure and relapse rate of paucibacillary multidrug therapy with monthly rifampicin, ofloxacin, and minocycline among paucibacillary leprosy patients in Agra district, India. *Indian J Dermatol Venereol Leprol.* **81**: 356-62.
13. Lienherdt C, Fine PE (1994). Type 1 reaction, neuritis, disability in leprosy. What is the current epidemiological situation ? *Lepr Rev.* **65**: 9-33.
14. Lobo AC, Pai RR, Gautam K and Kuruvila M (2014). Correlation of clinicopathological classification of Hansen's disease In a South Indian city. *Indian J Lepr.* **86**: 147-154.
15. Moorthy BN, Kumar P, Chatura KR et al (2001). Histopathological correlation of skin biopsies in leprosy. *Indian J Dermatol Venereol Leprol.* **67**: 299-301.

16. Nair P, Vidyadharan S (2016). A Study of the prevalence of smear-positive leprosy cases in a tertiary care centre in the post-elimination phase of leprosy. *Int J Dermatol*. **55**: 680-686.
17. NLEP - Annual Report for the year 2016-17, Ministry of Health and Family Welfare Government of India, New Delhi.
18. Rathod SP, Mistry AS (2017). Current scenario and challenges of urban leprosy in a tertiary care regional centre in western India - A 5 year observational retrospective study. *Indian J Lepr*. **89**: 1-7.
19. 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.
20. Sengupta U (2018). Elimination of leprosy in India: An analysis. *Indian J Dermatol Venereol Leprol*. **84**: 131-6.
21. Singal A, Sonthalia S (2013). Leprosy in Post-Elimination Era in India: Difficult journey ahead. *Indian J Dermatol*. **58**:443-46.
22. Sharma A, Sharma RK, Goswami KC et al (2008). Clinico-histopathological correlation in leprosy. *JK Science*. **10**: 120-124.
23. Shivaswamy KN, Shyamprasad AL, Sumathy TK et al (2012). Clinico histopathological correlation in leprosy. *Dermatol Online J*. **18**:2
24. World Health Organization (1988). WHO Expert Committee on Leprosy. Tech Rep Ser. 768, WHO, Geneva, Switzerland.
25. World Health Organisation (2011). *Wkly Epidemiol Rec*. **86**:398-4

How to cite this article : Thyvalappil A, Pretty M, Anumod B et al (2019). Current Trends of Leprosy in a Tertiary Care Centre in North Kerala: A 10 Year Observational Retrospective Study. *Indian J Lepr*. **91**: 175-183.