Indian J Lepr 2020, 92 : 211-219

http://www.ijl.org.in

Original Article

Evaluation of National Leprosy Eradication Programme in Pune city of Maharashtra from 2008 to 2019 – A Record Based Study

V Anand[1], R Kunte[2], S Jathar[3], S Patrikar[4]

Received : 18.03.2020 Accepted : 27.06.2020

The Government of India launched the National Leprosy Eradication Programme in 1983 with an aim to eradicate leprosy. Several recommendations from this program for early detection of new cases, early initiation of MDT, checking for reactions/complications and rehabilitation for the disabled were adopted. Various studies have been carried out to evaluate this programme at state, district and city levels. These studies aimed at assessing the performance of the programme, the status of leprosy disease and decide strategy towards achieving programme goals. Objective of the present study was to evaluate National Leprosy Eradication Programme in Pune City of Maharashtra from 2008-2019. For this purpose a record based study of leprosy was conducted at Urban Leprosy Centre of Pune city. The indicators used for evaluation were prevalence rate, annual new case detection rate, multibacillary rate, grade II disability rate, female rate, child rate and treatment completion rate from 2008 to 2019. Analysis of records over past decade in urban area of Pune city showed a decline in prevalence rate from 0.36 in 2008-09 to 0.21 in 2018-19 and from 3.47 per 100,000 to 2.7 per 100,000 for annual new case detection rate. The proportion of female cases and child cases among new cases remained below 45% and 11% respectively throughout the study period. Grade II disability rate was variable with a maximum rate of 10.2% and multibacillary rate showed an increasing trend from 69% to 93% during the study period. Overall treatment completion rate calculated using cohort analysis method for past three years was found in between 80% to 90%. It is concluded that the trend of NLEP indicators for the urban area of Pune city of Maharashtra has been favourable towards maintaining leprosy within elimination range, however higher multibacillary rate and grade 2 disability rate are an area of concern.

Keywords : NLEP, Evaluation, Pune, Prevalence, Multibacillary

Introduction

Leprosy is one of the oldest diseases prevalent in the world. It is caused by infection due to *Mycobacterium leprae* with an incubation period ranging from months to years. Hypopigmented hypoanaesthetic patches, thickened nerves and presence of acid fast bacilli in slit skin smear are the cardinal signs of leprosy (Park 2017). Though prevalence of leprosy has reduced over the years in world, yet 184,212 cases on treatment have

[1] Maj (Dr) Vivek Anand, Clinical Tutor, Dept of Community Medicine, Armed Forces Medical College, Pune, India
[2] Air Cmde (Dr) Renuka Kunte, Prof & Head of Department, Dept of Community Medicine, Armed Forces Medical College, Pune, India
[3] Dr Sanjay Jathar, Medical Officer, Supervisory Urban Leprosy Centre, Pune, India
[4] Dr Seema Patrikar, Lecturer, Dept of Community Medicine, Armed Forces Medical College, Pune, India
Correspondence : Maj (Dr) Vivek Anand, **Email** : va18cm@gmail.com

been reported by world health organization (WHO) globally at the end of reporting year 2018 which corresponds to prevalence rate of 0.24 per 10000 population (WHO 2019). In the same year, 208,619 new cases were reported globally corresponding to new case detection rate of 2.74 per 100,000 population (WHO 2019).

India is home to almost 60% of leprosy cases in the world according to 2018 data released by WHO. The total number of cases in India was 85,302 while 120,334 new cases were detected at the end of 2018 (WHO 2019). National leprosy eradication programme is the centrally sponsored health programme of the Ministry of Health & Family Welfare with the aim to eradicate leprosy in India and has succeeded in bringing the national prevalence of leprosy down to "elimination as a public health problem" i.e. less than 1 case per 10,000 population in December 2005 (NLEP 2019). Introduction of free Multidrug therapy has been one of the key steps in decreasing the prevalence of leprosy. 34 States / UT have achieved elimination till date with the exception of Dadra & Nagar Haveli and Chhattisgarh. On comparing states on the basis of the burden of disease, Bihar tops the list while Maharashtra ranks at third position (NLEP Annual Report 2017-18). Maharashtra also shows great disparity in clinico-epidemiological profile and NLEP indicators among its districts. Some districts with high prevalence rate are Gadchiroli, Gondia, Amravati, Buldhana & Chandrapur and districts like Beed, Aurangabad, Ahmednagar, Mumbai & Latur show the lowest rate (NLEP data for 2016-17). The city of Pune since many decades is home to students and working population from many states across the country with the rate of migration of people coming to Pune for job or education at 10 percent. Pune is one of the better performing districts in the state of Maharashtra with prevalence rate of around 0.5 per 10,000 population (Katkar et al 2017).

Over the years NLEP has introduced newer strategies and campaigns to encourage early detection of new cases, prevention of disability, reducing stigma and rehabilitation for the disabled with the broader aim of leprosy eradication. Evaluation of NLEP using specific indicators is necessary to study the impact of these campaigns and any change in the disease status as well as trend. Various studies have been carried out for evaluation of NLEP at the levels of cities, regions, districts and states but no similar evaluation found in the study area.

Patients and Methods

This record based study was carried out at the supervisory Urban Leprosy Centre of Pune Municipal Corporation where all leprosy cases among urban population of Pune city are registered. The study population included all cases of leprosy registered at this centre between years 2008 to 2019. (Table 1) A retrospective analysis of the data of eleven years (2008 to 2019) obtained from Urban Leprosy Centre, was carried out. The supervisory urban leprosy centre caters to a total population of approximately 34 lakhs. NLEP indicators used to assess the trend of leprosy in urban area of Pune included prevalence rate (PR), annual new case detection rate (ANCDR), child rate, female rate, multibacillary rate, grade 2 deformity rate and treatment completion rate. Trend analysis for these NLEP indicators was carried out using chi-square for trend by epi info version 7.0 statistical software. Operational definitions used for these indicators are the same as given by NLEP (NLEP 2013). Total cases released from treatment and other deletions which collectively included those who refused treatment, left area permanently, not traceable and dead were also recorded. Treatment completion rate was calculated for last three years (2016-17, 2017-18 & 2018-19) using

cohort analysis method separately for male – female and paucibacillary – multibacillary leprosy.

Prior permission of competent authority was obtained for the use of their record based data & ethical clearance was obtained from Institutional Ethics Committee.

Results

The prevalence rate of leprosy in urban Pune shows a declining trend from 0.36 per 10,000 population in 2008-09 to 0.21 per 10,000 population in 2018-19. Similarly the annual new case detection rate also showed a declining trend more so during later half of the decade from 3.47 per 100,000 population to 2.7 per 100,000 population as shown in Fig 1. As regards the proportion of female cases among new cases as depicted in Fig 2, it remained between 28% & 43.5%. The proportion of child cases among new cases which reflect active infection in the community showed fluctuating trend during the study with a total of 98 cases of childhood leprosy being recorded in past eleven years.

A significant observation in the study was that of the proportion of multibacillary cases among new cases which showed a continuous higher proportion and a rising trend, from 82.2% in 2008-09 to 93.5% in 2018-19, reflecting the load of infectious cases and potential risk of reaction. The grade 2 disability rate also rose from 4.2% in 2008-09 to 6.52% in 2018-19 with maximum rate of 10.2% observed during the study period as shown in Fig 3. Total number of cases released

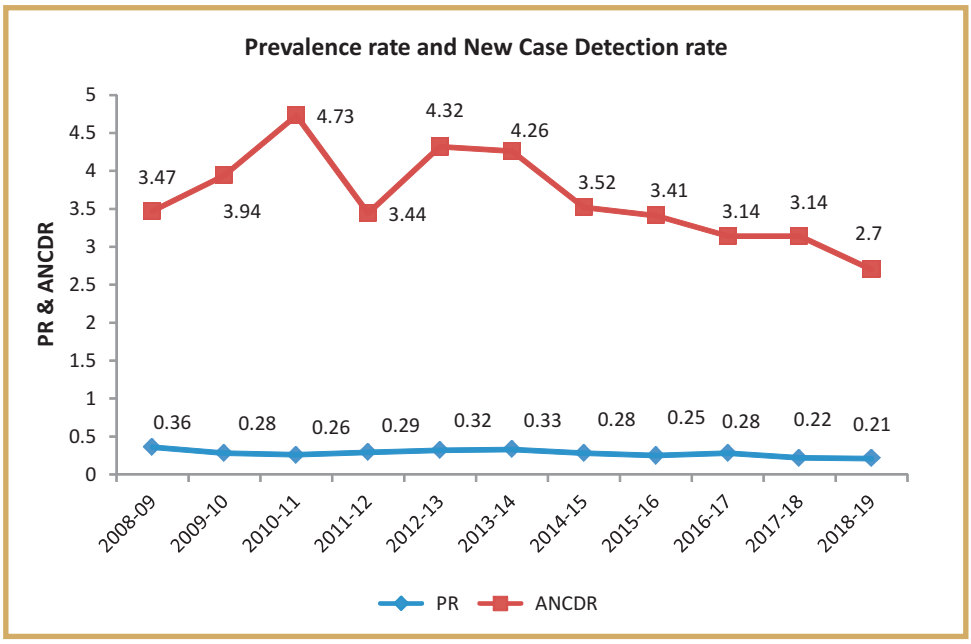

Fig 1 : Trend of new case detection rate (χ^2 trend = 13.49 p value = 0.0002) and prevalence rate (χ^2 trend = 12.725 p value = 0.0003) of leprosy in Pune city (Urban) from 2008 to 2019

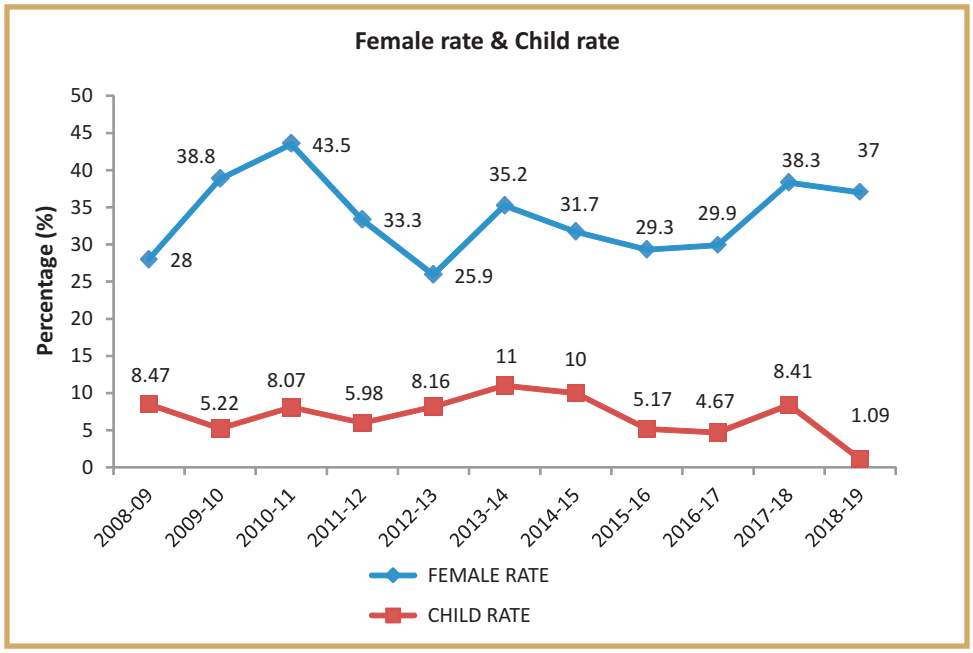

Fig 2 : Trend of Child rate (χ2 trend = 1.233 p value = 0.267) and Female rate (χ2 trend = 0.111 p value = 0.739)

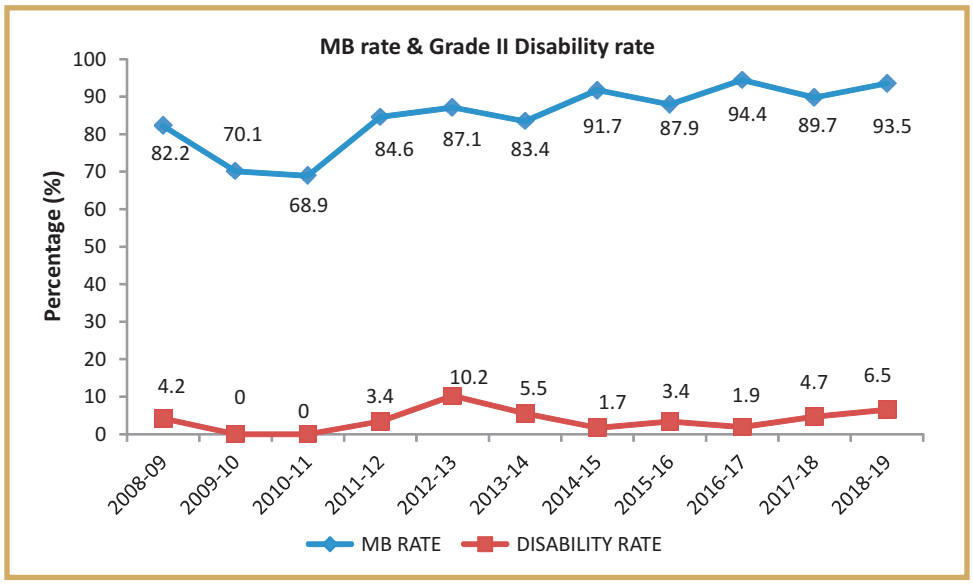

Fig 3 : Trend of Multibacillary rate (χ2 trend = 42.54 p value <0.001) and Grade II Disability rate (χ2 trend = 2.557 p value = 0.109)

Table 1 : Leprosy case data from supervisory urban leprosy center, Pune from 2008 to 2019

Year	Total leprosy cases detected	Cases on treatment at March end	MB cases	Female cases	Child cases	Grade 2 disability cases
2008 - 09	118	122	97	33	10	5
2009 - 10	134	97	94	52	7	0
2010 - 11	161	88	111	70	13	0
2011 - 12	117	99	99	39	7	4
2012 - 13	147	109	128	38	12	15
2013 - 14	145	112	121	51	16	8
2014 - 15	120	94	110	38	12	2
2015 - 16	116	85	102	34	6	4
2016 - 17	107	95	101	32	5	2
2017 - 18	107	75	96	41	9	5
2018 - 19	92	71	86	34	1	6

Table 2 : Release from treatment & other deletions data of leprosy cases from 2008 to 2019

Year	RFT	Other Deletions
2009 - 10	125	34
2010 - 11	109	61
2011 - 12	89	17
2012 - 13	112	25
2013 - 14	134	8
2014 - 15	113	25
2015 - 16	104	21
2016 - 17	88	9
2017 - 18	109	18
2018 - 19	79	17

from treatment as well as other deletions is shown in table 2 for the study period except for 2008-09 for which data could not be ascertained. A total of 1062 cases of leprosy have been released from treatment after completing schedule of MDT in past ten years. We calculated treatment completion rate in cohort analysis as per the guidelines of NLEP for the past three years for paucibacillary & multibacillary cases as well as males & females. An average total treatment completion rate in between 80 to 90% was found over the past three years as shown in Table 3.

Table 3 : Treatment Completion Rate among Leprosy cases of urban area of Pune for reporting years 2016-17 (A), 2017-18 (B) and 2018-19 (C)

Reporting Year : 2016-17 Year of treatment for PB (2015-16), MB (2014-15)							Treatment Completion Rate (%)		
Cases	Male		Female		Total		Male	Female	Total
	Started treatment	Completed treatment	Started treatment	Completed treatment	Started treatment	Completed treatment			
PB	5	5	9	8	14	13	100	88.88	92.85
MB	78	65	32	31	110	96	83.33	96.88	87.27
TOTAL	83	70	41	39	124	109	84.34	95.12	87.9

3A

Reporting Year : 2017-18 Year of treatment for PB (2016-17), MB (2015-16)							Treatment Completion Rate (%)		
Cases	Male		Female		Total		Male	Female	Total
	Started treatment	Completed treatment	Started treatment	Completed treatment	Started treatment	Completed treatment			
PB	5	5	1	1	6	6	100	100	100
MB	77	63	25	21	102	84	81.82	84	82.35
TOTAL	82	68	26	22	108	90	82.93	84.62	83.4

3B

Reporting Year : 2018-19 Year of treatment for PB (2017-18), MB (2016-17)							Treatment Completion Rate (%)		
Cases	Male		Female		Total		Male	Female	Total
	Started treatment	Completed treatment	Started treatment	Completed treatment	Started treatment	Completed treatment			
PB	3	3	8	5	11	8	100	62.5	72.73
MB	70	64	31	30	101	94	91.43	96.77	93.07
TOTAL	73	67	39	35	112	102	91.78	89.74	91.07

3C

Discussion

The decadal trend in this study is important for the relevance, need and the future course of the leprosy program. The successes and failures, the lessons learnt and newer interventions to energize the program are highlighted by this time trend analysis. The prevalence rate has shown declining trend over the past decade in most part of the world including India. But there are still many districts in India which have either

maintained high prevalence of leprosy or shown a steady rise in recent years. Prevalence rate in urban area of Pune city has shown a declining trend in this study which is similar to that observed in a study in Satara district of Maharashtra in 2013 where PR of leprosy decreased from 5.8 per 10000 population to 1.3 per 10000 population in urban area (Mohite et al 2013). The PR of leprosy in satara district has further declined to 0.34 per 10,000 population in 2017 as per the latest report by NLEP (NLEP Annual Report 2016-17). Similar trend was also observed in a study in Rajkot district, Gujarat by Chudasama et al (2016), where PR of leprosy decreased from 0.44 in 2003-04 to 0.15 in 2014 per 10000 population. Prevalence rate of leprosy in India at present is 0.67 per 10000 population while that of Maharashtra is 0.79 per 10000 (below elimination level) which is higher than the current PR in this study (NLEP Annual Data 2017-18).

Annual new case detection rate in Pune city is well below the recent Maharashtra rate of 12.89 per 100000 and India overall figure of 10.17 per 100000 population (NLEP Annual Data 2017-18). It showed inconsistency in trend till 2012-13 and then it had declined gradually. Most of the previous studies reveal decrease in ANCDR like study done in Satara, Maharashtra (Mohite and Durgawale 2011) & Jamnagar, Gujarat (Yadav 2007), however recently many strategies were undertaken for early detection of new cases of leprosy. Early detection of new cases of leprosy is necessary to prevent the development of disability due to the disease. In 2016 government launched intensified active leprosy campaigns like Leprosy case detection campaign (LCDC). A study done in Jharkhand showed positive impact of LCDC on detection of new cases of leprosy (Bhagat et al 2016). It is a significant observation that LCDC was launched in 2017 in the study region and if we compare the 2016-17 and 2017-18 data in our study, it did not reflect any change in ANCDR. It may be explained by the fact that most of the cases would have been detected through regular screening; though assessment of overall impact of these new screening strategies would require further monitoring.

The proportion of female cases among newly detected cases showed a fluctuating trend in this study with an average female rate of 34% over past eleven years. Few studies have shown rise in trend of female rate as in a study done in Dahod, Gujarat by Gadhvi (2013). Female rate indicates the differential behavior of women towards attainment of positive health while approaching health care services. A lot of social stigma is attached with this disease and an affected female attracts much more discrimination and ill behavior (Vlassoff et al 1996).

Proportion of child cases is an indirect indicator of prevalence of the active disease in the community. A wide variability was observed in proportion of child cases during the study period which ranged from 1% to 11% with an average of 9%. On comparing the average child rate with the latest NLEP report, it was found to be slightly higher than the national level data but below the child rate of Maharashtra state (NLEP Annual Data 2017-18). To detect child cases early, an active case finding using school based survey may be undertaken in the region with high child rate as a screening tool.

The most surprising of the NLEP indicators found in this study was that of proportion of multi-bacillary cases among new cases which showed a rising trend and was continuously found to be more than 80% since 2011-12. Most of the previous studies had proportion of MB cases below 50% to 60% (Mohite et al 2013, Katkar et al 2017). However a similar finding of high MB rate was observed in a study done in Ahmedabad,

Gujarat by Rathod and Mistry (2017) where ratio of MB to PB cases was 4:1. MB cases may increase with a decline in total cases because these are difficult to treat and will cluster in the numerator while denominator decreases. It may also be explained by the risk of misclassification that exists with WHO method of clinical classification (Parkash 2009).

Proportion of grade 2 disability among new cases though did not show a consistency in trend but occasional year's data had been higher than both country and Maharashtra level. At present percentage of grade 2 deformity among new cases in India is 3.34 while that of Maharashtra is 2.76 (NLEP Annual data 2017-18). High proportion of MB cases and grade 2 disability rates can be attributed to ever changing demographic profile with high percentage of migration population, unauthorized urban slums & overcrowding in Pune city which was also recently declared as best city to live in India as per a national survey. In migrant populations access & compliance to treatment is poor and chance of active/passive contact is more. Migration as a key factor and a challenge in eradication of leprosy has been brought out in previous studies (Chudasma et al 2016, Rathod and Mistry 2017). Chemoprophylaxis for contacts as per the NLEP guidelines should be religiously followed. Sustained surveillance activities & active case finding with IEC activities targeting migrant population pockets and unauthorized urban slums will help in early detection of these cases. Desired level of attainment of treatment completion rate may be hampered by the above issues in Pune city as it also leads to under reporting. A treatment completion rate of 92% for MB cases and 96% for PB cases was reported by India for the year 2018 as per the latest global leprosy update released by WHO and for the same time period our study showed treatment completion rate of 93% for MB cases and 73% for PB cases in Pune city (WHO 2019).

Limitations

To know the impact of migration & other factors affecting NLEP indicators, study of individual patient data needed to be studied. Under-reporting of the leprosy cases is always a concern, as it is a disease with lot of stigma attached which can affect the evaluation of the program.

Conclusion

Considering the findings and analysis of the NLEP indicators, it can be concluded that the programme continues to maintain leprosy at elimination level in Pune city over the last decade indicating an efficiently performing programme. Pune even being a low prevalent city with a dynamic population, programme guidelines are actively being followed. Though overall number of leprosy cases in the region is low, the proportion of multibacillary cases and grade 2 disability are an area of concern that would require improving supervision, monitoring & surveillance activities as well as IEC activities and effective counseling of the patient. This will help in early detection of cases of leprosy and improving compliance to treatment. To study the impact of NLEP on overall changing scenario of leprosy in a low prevalent region like Pune, a clinico-epidemiological profile study of cases would also be required.

References

1. Bhagat V, Baviskar S, Giri V et al (2016). Evaluation of Leprosy Case Detection Campaign (LCDC) in Jharkhand: The Way Forward for Elimination of Leprosy. *Online J Health Allied Sci.* **15**(4) : 2.
2. Chudasama R, Lakkad S, Patel U et al (2016). Evaluation of national leprosy eradication program after integration into general health system in Rajkot district, Gujarat from 2003 to 2014. *Indian J Dermatol.* **61(1) :** 57-62.
3. Gadhvi M (2013). Internal Evaluation of National Leprosy Elimination Programme District – Dahod in Gujarat. *Periodic Res*. **II(II)**: 1-4.

4. Katkar D, Mote B, Adhav A et al (2017). Epidemiological perspective of National Leprosy Eradication Programme in Maharashtra: Focusing on "Tribal Hot-spot" of Tribal District. *Indian J Comm Med.* **42(3)** : 174-176.
5. Mohite R, Durgawale P (2011). Evaluation of national leprosy eradication programme in Satara district, Maharashtra. *Indian J Lepr.* **83**: 139-143.
6. Mohite RV, Mohite VR, Durgawale PM (2013). Differential Trend of Leprosy in Rural and Urban Area of Western Maharashtra. *Indian J Lepr.* **85**: 11-18.
7. National Leprosy Eradication Programme (NLEP) (2013). Training Manual For Medical Officer [Internet]. New Delhi; [cited 2019 Nov 17]. Available from: http://nlep.nic.in/pdf/MO training Manual.pdf.
8. NLEP Annual Report (2016-17). District Wise Annual New Case Detection and Prevalence as on March 2017 [Internet]. Nlep.nic.in. 2019 [cited 29 November 2019]. Available from: http://nlep.nic.in/pdf/DisttwiseNCDR-Mar.2017.pdf.
9. NLEP Annual data (2017-18) [Internet]. National Leprosy Eradication Programme. 2019. Available from: nlep.nic.in/data.
10. National Leprosy Eradication Programme (NLEP) [Internet]. Nlep.nic.in. [cited 20 November 2019]. Available from: http://nlep.nic.in/about.html.
11. Park K (2017). Leprosy. In : Park's Textbook of Preventive and Social Medicine. 24th ed., (K Park, Editor), Banarsidas Bhanot Publishers, Jabalpur, p 332.
12. Parkash O (2009). Classification of leprosy into multibacillary and paucibacillary groups: an analysis. *FEMS Immunol Med Microbiol*. **55(1)**: 1-5.
13. Rathod S and 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.
14. Vlassoff C, Khot S, Rao S (1996). Double jeopardy: women and leprosy in India. *Rapp Trimest Statist Sanit Mond.* **49**: 120-126.
15. World Health Organization (2019). Global leprosy update, 2018 [Internet]. *Weekly Epidemiol Rec.* No 35/36, **94**: 389-412. Available from: who.int/wer.
16. Yadav S (2007). Record based evaluation of national leprosy eradication programme in Jamnagar district. *Indian J Commun Med.* **32(1)**: 49-50.

How to cite this article : Anand V, Kunte R, Jathar S et al (2020). Evaluation of National Leprosy Eradication Programme in Pune city of Maharashtra from 2008 to 2019 – A Record Based Study. *Indian J Lepr.* **92**: 211-219.