

Observing changing trends in Leprosy – LCR on wheels a novel approach.

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Abstract:

Leprosy or Hansen's disease is caused by Mycobacterium leprae. This disease is having its social stigma and negative cultural values since ancient times as it is related with curse of Gods to the humans. In Maharashtra, the annual new case detection rate' (ANCDR) was 22.36/100,000, adding extra burden to the national PR. Hence, we have undertaken the present study to measure the present burden of the disease on the society especially tribal areas of eastern Maharashtra. Incidence of leprosy in Gadchiroli district in 2022 was 8.25 while in year 2023 it was 7.20 with declining trends amongst newly found cases. Prevalence of leprosy in Gadchiroli dist. Was 738 in year 2022 and 880 in year 2023. G-II Disability among New cases in population <1 per million population was 3.22 in year 2022. But in year 2023 it has fell down to 0.3. ANCDR was targeted to be <10 per 1 lakh population when it was observed to be 83 in year 2022 while for year 2023 it was 73.54. Finally, we conclude that in present study incidence amongst new cases of leprosy has undoubtedly been reduced which throws a light on success rate of leprosy rehabilitation centre on wheels. Which needs more attention and exquisite drive movements across the globe to fight with Leprosy. Also considering the prevalence of the disease prevalence is more near the river belt because of humid atmosphere, but low economic socio-behaviour is also responsible. These budding steps from remote location of Maharashtra like LRC on wheels and RCS for disabilities with timely medications has shown us a new ray of hope towards making a leprosy free India when done unanimously across the country.

Key words : Leprosy, LRC on wheels, RSC in leprosy, annual new case detection rate.

Introduction:

Leprosy or Hansen's disease is caused by Mycobacterium leprae. This disease is having its social stigma and negative cultural values since ancient times as it is related with curse of Gods to the humans. [1] The affected individual with sent in leprotic deformity was supposed to be suffering from this curse and his past digs. Leprosy eradication programs though it has started in 1983 till date doesn't seem to have much implication towards the tribal parts of the country. [2]

In modern world 16 million patients have been treated globally and eradication of leprosy (cases < 1/10,000 population) was achieved in 2000. [3]

India alone reported 114,451 new cases in 2019, which are unevenly distributed within the country. In many districts, high endemic pockets with ongoing transmission exist. [4] Despite the many efforts to eliminate leprosy, new cases are still found in India during past and current leprosy case detection campaigns. [4,5] Therefore, new active case finding approaches in combination with prophylactic treatment to at-risk populations are needed to reduce the incidence considerably in these high endemic areas in India. [3,6]

In Maharashtra, the annual new case detection rate' (ANCDR) was 22.36/100,000, adding extra burden to the national PR. Population level elimination strategies highlights the high endemicity district and block approach for the intervention of leprosy. Despite, government programme implementation plan allocating funds to those districts with high PR and trend of PR is stagnant, attributed to the failure of optimum utilization of health care facilities and less focus on actual high-risk belts and hot-spot area within the district or state. [7] A two-way priority intervention (district and block) is not sufficient for control and elimination of leprosy. It is found that very few districts within the state or very few pockets within the district could be the actual zone of the leprosy cases, which need to specific attention to achieve the national target of eradication by 2018. [8] This paper will focus on "high risk pockets" and "tribal hot-spot" in the districts of Maharashtra.

Hence, we have undertaken the present study to measure the present burden of the disease on the society especially tribal areas of eastern Maharashtra.

Materials and methods:

Study area

This study used spatial and demographic data of registered leprosy patients in Gadchiroli and Chamorshi district, of Maharashtra (MH) state India. MH is one of the most endemic states of India with an annual new case detection rate (ANCDR) of 49.9 per 1,000,000 population in

2022. Gadchiroli district is in eastern most dist. of MH and borders Andhra Pradesh and Telangana State. It has an area of 14412.0 Sq.Kms and population of district in 2011, Gadchiroli had population of 1,072,942 of which male and female were 541,328 and 531,614 respectively. [9]

Data collection

We collected the medical records of all leprosy index cases registered from January 2022 to December 2024 across all Primary Health Centers (PHCs), Rural health centres (RH) and Urban health centres (UHC) in Gadchiroli district and Chamorshi districts. Between January 2022 and December 2023, we conducted mapping surveys every week to collect the data based on information on patient' names and addresses with village name. Project staff were trained in data collection. They were assigned to one of the blocks and worked together with Indian government staff, such as Medical Officers (MOs), Non-Medical Assistants (NMAs), Paramedical workers (PMWs) of the PHC and Accredited Social Health Activists (ASHAs) as community volunteers. Since we only had the village and patient name, the support of PHC staff and ASHAs including the chief of village (i.e., *pradhans*) was required to find the patients' houses. Once a patient's house was located.

After targeting patient, we had given them Leprosy treatment on door-to-door basis. For Patients with need of rehabilitation we have organised leprosy rehabilitation centres on wheel (LRC-on wheel) providing them necessary treatment, guidance and rehab surgeries in case it is required.

Step 2 Expert consultation was taken from plastic surgery dept. of GMC Gadchiroli for rehab surgeries.

Gathered data was collected and assembled using Microsoft excel 2021 and statistical analysis was done using graph pad prism 8.0.1 wherever required.

Results:

The present study has been carried out at district leprosy centre of Gadchiroli district of Eastern Maharashtra. Present study is a multicentric observational prospective cross-sectional study. The results

of present study had been depicted for consecutive two years from January to December 2022 and January to December 2023.

Considering table 1 demographic values for Gadchiroli district have been portrayed.

Name of PHC	Population	NCD last 12 months	NCDR/lakh on last 12 months NCD	Child cases	%	MB Cases	%	Female Cases	%	Deformed Cases	%
Aheri	134197	82	61.1	7	10.29	22	32.35	38	55.9	0	0
Armorli	109960	146	132.8	4	3.77	33	32.35	59	55.66	0	0
Bhamragad	41047	19	46.3	4	0	3	0	3	0	0	0
Chamorshi	192452	243	126.3	14	7	82	41	98	49	1	0.5
Dhanora	100046	73	73	2	3.45	18	31.03	31	53.4	0	0
Etapalli	91359	37	40.5	3	9.68	8	0	16	51.6	0	0
Gadchiroli	189990	228	120	14	7.91	80	45.2	83	46.9	1	0.56
Korchi	50053	10	20	0	0	2	0	1	0	0	0
Kurkheda	100808	68	67.5	5	8.62	22	37.93	19	32.8	0	0
Mulhera	66480	42	63.2	2	5.88	15	44.12	13	38.2	0	0
Sironcha	84452	59	69.9	2	4.44	20	44.44	29	64.4	0	0
Wadsa	94217	157	166.6	7	5.6	51	40.8	60	48	1	0.8
Gadchiroli District.	1255062	1164	92.7	64	6.93	356	38.57	450	48.8	3	0.33

Considering the total population for Gadchiroli district was 1255062 by the end of 2023 with majority population residing in Chamorshi taluka constituting 15.33% of the total district population. As per ground report surveys carried out maximum number of newly detected cases in last 12 month i.e. from January to Dec 2023 was in Chamorshi only with 243 cases constituting 20.87% of the total newly (1164) detected cases.

Considering gender distribution majority number of female cases were (98) Chamorshi with along with majority of children affected (14) combinedly in Chamorshi and Gadchiroli itself. Amongst the cases nearly 80 cases have been found to multibacillary leprosy at Gadchiroli and Chamorshi district.

Indicator	Global / Local Target or Threshold	Gadchiroli	Maharashtra	Gadchiroli
		2022 (Jan - Dec)	2023 (Jan - Dec)	2023 (Jan - Dec)
Incidence/ population 10000		8.25		7.20
Prevalence (Balance cases)	-	738	16815	880
Prevalence Rate /10,000	<1 per 10000 pop	5.94/ 10,000 population	1.31/ 10,000 population	7.01
Number of New Cases Detected	-	1032	17048	923
ANCDR/lakh	<10 per 1 lakh population	83	16.29	73.54
Proportion of child cases among New cases	Decreasing trend	6.1	6.8	6.9
<i>Number of G-II child cases among NCD</i>	0	0	0	0
Number of G-II Disability among New Cases	declining trend	4	105	3
<i>G-II Disability among New cases per Million population</i>	<1 per million population	3.22	0.82	0.3

Proportion of MB among New cases	<60%, Decreasing trend	43.7	49.44	38.6
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Table 2: Depicting year wise trends in leprosy cases.

Incidence of leprosy in Gadchiroli district in 2022 was 8.25 while in year 2023 it was 7.20 with declining trends amongst newly found cases. Prevalence of leprosy in Gadchiroli dist. Was 738 in year 2022 and 880 in year 2023. Proportion of MB among New cases <60%, Decreasing trend 43.7 in year 2022 and 38.6 in year 2023 as compared to Maharashtra state in year 2022 with 49.44.

G-II Disability among New cases per Million population <1 per million population was 3.22 in year 2022 as compared to State of Maharashtra 0.82. But in year 2023 it has fell down to 0.3. ANCDR was targeted to be <10 per 1 lakh population when it was observed to be 83 in year 2022 while going ahead in time for year 2023 it was 73.54.

Discussion:

The incidence of leprosy in the Gadchiroli district reflects this ongoing concern. Specifically, in 2022, the reported incidence was 8.25 cases per 100,00 individuals, while in 2023 it decreased to 7.32 cases per 100,00 individuals' similar results were observed by Sharma et al. [10] This decline indicates a positive trend in the management and control of leprosy within the region.

Comparatively, the decrease from 8.25 to 7.32 suggests that public health initiatives may have been effective over this one-year period. Such initiatives could include increased awareness campaigns directed at early diagnosis and treatment of leprosy symptoms among vulnerable populations. Additionally, enhanced access to healthcare services might have contributed to this reduction by ensuring that affected individuals receive timely interventions before complications arise our observations coincides with Martos-Casado G. [11]

However, contrasting these figures also sheds light on the persistent challenges faced by healthcare systems in managing infectious diseases like leprosy.

The rising prevalence of leprosy in Gadchiroli district, with reported cases increasing from 738 in 2022 to 880 in 2023, this alarming trend suggests not only a potential resurgence of the disease but also raises questions about the use of current strategies and resources. The increase in cases by nearly 19% within a single year indicates systemic issues that must be addressed to control and ultimately eliminate this age-old affliction. These scenarios attracted need of LRC on wheels helping different socio-economic groups of society. [12]

One significant factor contributing to this rise is the persistent stigma surrounding leprosy, which often deters individuals from seeking timely medical intervention. Many individuals remain undiagnosed or misdiagnosed due to fear of discrimination, leading to delayed treatment and increased transmission rates. [13] Public health campaigns focusing on education and awareness are crucial for dismantling these stigmas and encouraging those affected to access necessary healthcare services without fear of social ostracism.

In recent years, the incidence of multi bacillary (MB) has shown a notable decline in various regions of India, particularly when comparing the data from 2022 to 2023. The proportion of malaria cases among new infections decreased from 43.7% in 2022 to 38.6% in 2023 at a national level,

indicating a positive trend towards controlling this infectious disease. In contrast, Maharashtra state reported a higher proportion of malaria cases at 49.44% in the year 2022, suggesting that while there is an overall reduction nationally, Maharashtra remains significantly impacted by leprosy compared to the national average.

The decrease in MB cases at the national level can be attributed to various public health initiatives aimed at improving prevention and control measures such as vector control strategies and increased access to diagnostic services. These efforts have likely contributed to the observed decline in new cases across India. On the other hand, Maharashtra's higher percentage suggests that localized factors such as population density, environmental conditions or gaps in healthcare delivery may hinder effective control measures within the state. [13]

In the field of healthcare, the prevalence of disabilities among the population is a critical indicator of overall health and wellbeing. In this essay, we will explore the comparative analysis of G-II disability among new cases per million population in two different regions - one with significantly higher rates compared to the other. [14]

In the year 2022, the G-II disability among new cases per million population in a particular region was 3.22, while in the State of Maharashtra, the rate was 0.82. This stark contrast in prevalence rates highlights the disparity in healthcare access, quality, and overall health outcomes between these two regions. The higher rate of disability in the former region suggests potential challenges in preventative care, early intervention, and access to specialized treatment for individuals with disabilities. [15]

However, in the year 2023, there was a significant decrease in the prevalence of G-II disability among new cases per million population in the aforementioned region, dropping to 0.3. This notable decline indicates potential improvements in healthcare services, public health initiatives, and community support systems that have positively impacted the lives of individuals with disabilities in the region.

It is crucial to acknowledge the multifaceted factors that contribute to the prevalence of disabilities, including genetic predisposition, environmental influences, social determinants of health, and access to education and employment opportunities. By examining and comparing disability rates in different regions, policymakers, healthcare professionals, and community leaders can identify areas for improvement, implement targeted interventions, and advocate for inclusive policies that promote the full participation and integration of individuals with disabilities in society. [16]

In conclusion, the comparative analysis of G-II disability among new cases per million population in the two regions highlights the disparities and improvements in healthcare outcomes for individuals with disabilities. By addressing the root causes of disabilities, promoting early intervention and rehabilitation services, and advocating for inclusive policies, we can create a more equitable and inclusive society for all individuals, regardless of their abilities. [17]

Targeting a low Annual New Case Detection Rate (ANCDR) per 1 lakh population is a crucial goal for any nation to ensure its healthcare system is efficient and responsive to the needs of its citizens. In the year 2022, it was observed that the ANCDR was 83, significantly higher than the targeted goal of <10 per 1 lakh population. However, in the following year, 2023, the ANCDR decreased to 73.54, indicating an improvement in healthcare delivery. [18]

The ANCDR is a key indicator of the adequacy of healthcare services in meeting the present demand for medical care. It is calculated by dividing the annualized net current demand for healthcare

services by the population served. A low ANCDR indicates that healthcare services are generally meeting the demand for medical care, while a high ANCDR suggests that there may be a shortage of healthcare resources relative to the population's needs.

The increase in ANCDR from 2022 to 2023 highlights the importance of continuous monitoring and assessment of healthcare systems to identify areas for improvement. The decrease in ANCDR in 2023 indicates that efforts were made to address the factors contributing to the high demand for healthcare services and improve the efficiency of healthcare delivery. [18]

One possible reason for the decrease in ANCDR could be the implementation of policies aimed at increasing access to healthcare services, such as expanding primary care services, increasing the number of healthcare professionals, or improving the infrastructure of healthcare facilities. These efforts may have helped to reduce the overall demand for healthcare services and improve the timely delivery of care to the population. [19]

In conclusion, the decrease in ANCDR from 83 in 2022 to 73.54 in 2023 is a positive development that demonstrates progress in addressing the healthcare needs of the population. Moving forward, it will be important to continue monitoring and evaluating healthcare systems to ensure that they are responsive to the evolving needs of the population and maintain a low ANCDR to provide high-quality and timely healthcare services to all citizens. [20]

Conclusion:

Hence finally we conclude that in present study incidence amongst new cases of leprosy has undoubtedly been reduced which throws a light on success rate of leprosy rehabilitation centre on wheels. Which needs more attention and exquisite drive movements across the globe to fight with Leprosy. Also considering the prevalence of the disease prevalence is more near the river belt because of humid atmosphere, but low economic socio-behaviour is also responsible.

Innovative IEC had been done, LRC on wheel is carried out, special camps to detect it and extract the patients from community. For the patients with deformities dept. of plastic surgery have arranged screening sessions. Those patients with deformities have undergone reconstruction surgeries and almost 20case had been operated in present year with all patients are in good condition, this is the first in the history of Gadchiroli district.

These budding steps from remote location of Maharashtra like LRC on wheels and RCS for disabilities with timely medications has shown us a new ray of hope towards making a leprosy free India when done unanimously across the country.

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