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The Cost of Diagnosis of Leprosy by Active Case Detection in Kailali, Nepal

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Abstract

Introduction: Leprosy is a chronic infectious disease caused by Mycobacterium leprae. Current modalities for early diagnosis of leprosy include active case detection campaigns, contact tracing, and skin camps. Active case detection is an effective strategy that enables early treatment, prevents impending disability, and potentially stops the spread of leprosy.

Objectives: This study was conducted to determine the cost of early diagnosis of leprosy by active case detection method in Lamkichuha Municipality of Kailali district.

Materials and Methods: In coordination with the Municipality, Leprosy Control and Disability Management Section of the Ministry of Health and Population surveyed in July 2022. Using active case detection method, orientation on leprosy was given to health workers, followed by household visitsand screening of skin lesions suggestive of leprosy. Dermatologists confirmed suspected cases. Data obtained from the campaign was analyzed, and results were presented as cost per patient.

Results: The team screened 4526 families including 21,472 persons in the Lamkichuha Municipality. Among them, 195 were suspected of leprosy by the health workers and referred to the referral health facility for diagnosis. Three of them were confirmed as leprosy, resulting in the prevalence rate of 1.4 per 10,000 populations. The average cost spent per patient was NRS 250000 (2000 USD).

Conclusion: The cost of diagnosing leprosy by active case detection is high. The national programs should prioritize cost-effective modalities, including awareness-raising campaigns for early diagnosis.

Keywords: Active Case Detection; Cost Effectiveness; Early Diagnosis; Leprosy

Introduction

Leprosy, or Hansen's disease, is a chronic infectious disease caused by Mycobacterium leprae.[1] It is primarily transmitted through droplets and via direct skin-to-skin contact of affected, untreated individuals.[2] The disease presents with skin lesions that are usually asymptomatic loss of sensation, and peripheral nerve enlargement.[3] Diagnosis is confirmed by slit skin smears; however, most physicians rely on clinical diagnosis.[4] Muti drug therapy with dapsone, clofazimine, and rifampicin is the mainstay of treatment.[5] The drugs are free of cost from all government health facilities throughout the country.[6]

Nepal declared the elimination of leprosy as a public health problem in 2010.[7] Nepal Leprosy Roadmap 2021-2030 has envisioned a "leprosy free Nepal" by

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2030 with the goal of interrupting of transmission of leprosy at the municipality level.[8] The National Leprosy Strategy 2021-2025 has identified various active case detection approaches, including household visits in high burden municipalities, contact examinations in moderate burden municipalities, and integrated skin camps in low burden municipalities.[9] Early case detection through active case finding is one of the critical strategies that enable early treatment, prevents impending disability, and potentially stops the spread of leprosy.[10]

Though the goal of elimination has been achieved, epidemiological indicators of leprosy remained stagnant, with an average of 3,200 new cases notified every year till 2019.[8] However, case detection declined sharply in 2020 and 2021, which may be due to the lockdown imposed by the COVID-19 pandemic.[9] The trend of major indicator is increasing, which can partially be explained by the active case finding activities. At the national level, in 2021, a total of 2,173 new leprosy cases were detected.[9] The prevalence rate of Kailali district for 2021 was 1.39 per 10,000, which is above the elimination threshold, and in the district, Lamkichuha Municipality has a relatively higher prevalence rate of 2.03 per 10,000 population.[9] Active case detection campaign was conducted in Lamkichuha Municipality of Kailali district to assess the cost-effectiveness of the approach.

Materials and methods

Following the ethical approval from the Nepal Health Research Council (NHRC), the Leprosy Control and Disability Management Section (LCDMS) of the Ministry of Health and Population (MoHP) selected the Kailali district based on the high burden of leprosy cases reported in the previous years, including the child proportion and proportion of Grade 2 disability. LCDMS, in close coordination with the district health authority, organized a consultative meeting with stakeholders, including the chief of local health facilities, Female Community Health Volunteers (FCHV), and the Health Section chief of Lamkichuha Municipality. The panel selected communities for house visits based on the habitants of marginalized and targeted people, covering all ten wards of the Municipality.

A survey team of two members comprising a health worker and a FCHV was designed, with 25 teams to mobilize in the community. The survey teams collected the data in July 2022 by house-to-house visit, adopting an active case detection method. An orientation was provided to the survey team members before their visit. Orientation included an overview of leprosy and the methodology of the survey. A practical session for filling the survey forms was done. After the orientation, the survey team visited the field. The survey team assessed the population for leprosy through history taking and skin examination. All suspected cases were referred to pre-identified referral health facilities to confirm diagnosis. Chuha Health Post was selected as a referral center as it was relatively accessible. A dermatologist confirmed the suspected cases. After v of diagnosis, the leprosy cases were treated as per national protocol.

Data collection tools

The required data were collected using the structured format of the Leprosy Program for routine recording and reporting. Proforma for additional information was developed by Leprosy Control and Disability Management Section in consultation with experts and program managers. Following Forms were used in Nepali language.

Form No. 1 the House-Hold Level Data Collection Form designed to collect information on family members that reflects the number of persons contacted, age groups, gender, and number of persons suspected of leprosy.

Form No. 2 a Referral Slip for the suspected cases which, has two copies- one for the individual and another for

Ward No.	No. of Family	Total Family Member	No. of Person Assessed							No. of Person Suspected and Referred for Diagnosis
			Age: 0-14 Years			Age: > 14 Years			Grand Total	
			F	M	Total	F	M	Total		
1	714	3,829	543	598	1,150	1,384	1,104	2,488	3,629	37
2	149	590	86	104	190	248	251	499	689	13
3	721	3,395	426	445	871	1,140	1,120	2,260	3,131	31
4	653	2,684	354	445	799	1,008	877	1,885	2,684	33
5	180	880	143	148	291	330	259	589	880	10
6	360	2,011	273	268	541	736	639	1,375	1,916	6
7	360	1,764	172	205	377	710	670	1,380	1,757	8
8	609	3,623	537	525	1,062	1,285	1,275	2,582	3,622	8
9	405	2,242	170	184	354	720	579	1,299	1,653	23
10	375	2,093	157	174	331	598	581	1,179	1,510	26
Total	**4,526**	**23,111**	**2,861**	**3,096**	**5,966**	**8,159**	**7,355**	**15,536**	**21,471**	**195**

Table: Ward-wise household examination data while screening for leprosy

the health worker of the survey team.
Form No. 3 a Recording of the suspected cases visiting the referral health facility. It included data on name, ethnicity, age, sex, address, diagnosis (new case, old case, or no leprosy), Classification Multi-bacillary (MB) or Pauci-bacillary (PB), and Disability Grade (0, 1, or 2).
Form No. 4 a Form for maintaining each leprosy case's individual details, covering demographic and case-based information.

Data compilation and analysis

All the House-Hold Level Data Collection Forms were reviewed by the respective survey team at the end of each day for its completeness and correction for errors. It was further verified by the supervisors for the validity and consistency of the information filled in the form. The information collected was compiled and analyzed. The data were entered into an Excel sheet maintaining ward-wise records.

Results

From the ten wards, a total of 4,526 families were contacted through house visits in the selected communities of Lamkichuha Municipality of Kailali district. Among the recorded 23,111 persons, 21,471 (92.9%) were examined for leprosy. The persons missed for skin examination because they were absent during the time of house visit. A total of 195 persons were suspected of leprosy and were referred to referral health facilities for diagnosis. Three of them were confirmed cases of leprosy. Two were multibacillary type, and one was paucibacillary type. Two of them were male and one was female, two belonged to the upper caste group and one was a disadvantaged ethnic group, and all were farmers. None of them were children, and had a disability at the time of diagnosis. Regarding contact history, one of them had a leprosy case in the neighborhood. The prevalence rate after the active case detection campaign was 1.4 per 10,000 population, which is above the cut-off level of the elimination.
The total cost for the campaign was NRS 750000. The human resource engaged during the campaign were dermatologists, program managers, paramedics, FCHV, TB Leprosy officers, district focal persons, administration staff, accountants, and support staff. Most of the cost was spent on providing orientation to the health workers and travel and daily allowance during field visits. The other cost heading included refreshments, stationaries, hall rent, and miscellaneous. Since the whole amount identified three new cases of leprosy, the total average cost spent for diagnosing a new leprosy was NRS 250000 (2000USD).

Discussion

This study presents the burden of leprosy in Lamkichuha municipality of Kailali district and the cost of identification of a case of leprosy by active case detection method. The findings reveal that active case detection campaigns effectively identify hidden cases in the high prevalent areas. However, in countries like Nepal, where the policy still needs to pay more attention to leprosy in terms of budget and programs, this method is costly to implement throughout the country.[11]
Our study showed a significantly higher cost for active detection of leprosy cases in Nepal as compared to other countries. Ezenduka et al., compared three active case detection methods in two states of Nigeria: household contact tracing, targeted community screening, and a traditional healer incentive. In a rapid village survey conducted in 2009, the authors found that household contact tracing has the lowest cost per new case detected at USD142 per new case detected compared to USD192 per new case detected in the traditional healer incentive and USD313 per new case detected for community screening.[12] However, this cost was the additional cost that was estimated by comparing it against the routine practice.
In Tiendrebeogo et al.'s study, a community screening active case detection campaign conducted in 1997 in Mali cost (USD72 per new case detection) twice as much per new case detected as passive case detection cost (USD 36).[13] The low cost in their study might be because the prevalence of leprosy was higher (3.57/10000) in 1997 in Mali. Lower prevalence indicates fewer cases, and the cost increases as the number decreases. It is because more resources will be required to identify rarer or uncommon cases.
Gillini et al.'s, reporting on a campaign in Nepal, found an additional USD534 per new case detection more than the passive method.[14] The cost was calculated after the active case detection campaign conducted in Banke and Bardiyas districts in May 2017. In our study, the cost came higher due to the inflation of USD and the rise in market price compared to 2017.
There are certain limitations of our study. The study covered only about one-fourth of the total households. So, the findings from this active case detection method may not be generalized to the whole country.

Conclusion

Lamkichuha Municipality shows a high prevalence rate of leprosy after the active case detection campaign. Active case finding of leprosy is an expensive methodology to reduce the burden of the disease. It is recommended to prioritize passive case detection in such high disease burden areas to achieve elimination. Innovative and cost-effective strategies, along with community-targeted information and awareness activities, are required to achieve the country's 2030 target of zero leprosy.

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References

1. Bhat RM, Prakash C. Leprosy: an overview of pathophysiology. Interdiscip Perspect infect Dis. 2012;2012:181089 https://doi.org/10.11555/2012/181089
2. 2. Bratschi MW, Steinmann P, Wickenden A, Gillis TP. Current knowledge on Mycobacterium leprae transmission: a systematic literature review. Lepr Rev. 2015;86(2):142–55. PMID: 26502685
3. Ooi WW, Srinivasan J. Leprosy and the peripheral nervous system: basic and clinical aspects. Muscle Nerve. 2004;30(4):393–409. https://doi.org/10.1002/mus.20113
4. Banerjee S, Biswas N, Kanti Das N, Sil A, Ghosh P, Hasanoor Raja AH, et al. Diagnosing leprosy: revisiting the role of the slit-skin smear with critical analysis of the applicability of polymerase chain reaction in diagnosis. Int J Dermatol. 2011;50(12):1522–7. https://doi.org/10.1111/j.1365-4632.2011.04994.x
5. Kar HK, Gupta R. Treatment of leprosy. Clin Dermatol. 2015;33(1):55–65. https://doi.org/10.1016/j.clinndermatol.2014.07.007
6. Chalise SC. Leprosy disease in Nepal: knowledge and non-compliance of patients. JNMA J Nepal Med Assoc. 2005;44(158):39–43. PMID: 165554869
7. Jha AK. Leprosy: before and after elimination from Nepal.Kathmandu Univ Med J (KUMJ). 2012;10(37):1–2. https://doi.org/10.3126/kumj.v10i1.6903
8. Department of Health Services. Annual Report 2077/78 (2020/21). Government of Nepal Ministry of Health and Population Department of Health Services Kathmandu. https://dohs.gov.np/annual-report-fy-2077-78-2019-20/
9. Government of Nepal, Ministry of Health and Population. Department of Health Services. Leprosy Control and Disability Management Programme. Annual Report: 2076/77 (2019/20). Epidemiology and Disease Control Division, Leprosy Control and Disability Management Section. Teku, Kathmandu, Nepal. www.edcd.gov.np
10. Blok D. GPZL reports on research priorities. Leprosy Review. 2019;90(3):237–89. https://doi.org/10.47276/lr.90.3.237
11. World Health Organization. Towards Zero Leprosy. Global Leprosy (Hansen's Disease) Strategy 2021–2030. World Health Organization, Regional Office for South-East Asia; 2017. http://apps.who.int/iris
12. Ezenduka C, Post E, John S, Suraj A, Namadi A, Onwujekwe O. Cost-effectiveness analysis of three leprosy case detection methods in Northern Nigeria. PLoS Negl Trop Dis. 201220;6(9):e1818. https://doi.org/10.1371/journal.pntd.0001818
13. Tiendrebéogo A, Sow SO, Traore M, Sissoko K, Coulibaly B. Comparison of two methods of leprosy case finding in the circle of Kita in Mali. Int J Lepr Other Mycobact Dis. 1999;67(3):237–42. PMID: 105575402
14. Gillini L, Cooreman E, Pandey B, Bhandari C, Vandelaer J, Rayamajhi R, et al. Implementing the Global Leprosy Strategy 2016–2020 in Nepal: Lessons learnt from active case detection campaigns. Lepr Rev. 2018;89(1):77–82.