

Household Survey to Evaluate the Coverage of Mass Drug Administration for the Lymphatic Filariasis in District Umaria, Madhya Pradesh, India in Year 2023

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Abstract

Background: In 2023, the Umaria district in Madhya Pradesh, India, was identified as an endemic district for Lymphatic Filariasis (LF). The National Programme for Elimination of Lymphatic Filariasis conducted annual mass drug administration (MDA) campaigns in February to eliminate LF by 2027.

Objective: This study aimed to estimate the coverage and compliance rate of MDA in the Umaria district of Madhya Pradesh, India, in 2023.

Methodology: A cluster sampling method was used for evaluation. The district was divided into three implementation units, corresponding to its three administrative blocks. Four clusters were selected within each unit, consisting of one urban and three rural clusters. Thirty households were randomly selected as respondents from each cluster. Data was collected in May 2023 using a standardized coverage evaluation form designed by the World Health Organization.

Result: Among the 360 households surveyed, information on 1606 beneficiaries was obtained. MDA was offered to 94% of the total population, with a coverage and compliance rate of 98.5% among the eligible population. The most common reasons for not consuming the drugs were "not present at house during the campaign" and "fear of drugs." Less than one percent of beneficiaries reported any side effects following the consumption of MDA.

Conclusion & Implication: The coverage and compliance of MDA in the district appear to be optimal. The National Programme for Elimination of Lymphatic Filariasis should now consider conducting Transmission Assessment Surveys to determine the endemicity of districts that have reached the critical threshold of LF infection. Additionally, establishing adequate sentinel sites, organizing night blood examination camps in endemic areas, and improving Information Education Communication activities may aid in achieving LF elimination by 2027.

Keywords

Mass drug administration, Lymphatic filariasis, MDA coverage evaluation, cluster sampling

Introduction

Lymphatic filariasis (LF) is an avoidable, debilitating, disfiguring disease caused by infection with the filarial parasites *Wuchereria bancrofti*, *Brugia malayi*, and *B. timori*, infecting more than half a million people worldwide annually.¹ While many infections are asymptomatic, around one-third of individuals experience clinical manifestations such as hydrocele, lymphedema, and acute adenolymphangitis episodes.^{2,3} The clinical disease

impairs individuals' productivity and limits their educational and employment opportunities, often subjecting them to stigmatisation and discrimination.⁴⁻⁶

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The Global Programme to Eliminate Lymphatic Filariasis was established in 1997 in response to a resolution by the World Health Assembly, with the World Health Organization (WHO) recommending mass drug administration (MDA) as a key strategy for LF elimination.^{7,8} MDA involves treating all eligible individuals residing in endemic areas.⁹ In India, the smallest administrative unit for MDA implementation is an administrative block, chosen based on the estimated prevalence of LF infection sufficient for transmission.⁹ Annual rounds of MDA with effective coverage ($\geq 65\%$ of the eligible population) are crucial for eliminating LF from endemic areas, as this approach proves highly cost-effective, particularly in countries with limited healthcare resources.¹⁰

To achieve LF elimination by 2027, three years ahead of the global target, the Ministry of Health & Family Welfare, Government of India, launched the nationwide Sarva Dawa Sevan or MDA campaign to eliminate LF in February 2023.¹¹ Under this program, high-burden districts were identified, and healthcare workers administered anti-filarial medicine (Diethylcarbamazine and albendazole) door-to-door to all eligible individuals in the selected administrative blocks.¹¹ The campaign aimed to halt disease transmission through the widespread distribution of anti-filarial drugs in endemic districts throughout the country. Among the ten states and union territories, Madhya Pradesh (MP) was identified as a high-burden state for LF. Umaria was one of the eight districts selected for MDA rounds in 2023.¹¹

Assessing and analyzing the implementation of MDA will facilitate identifying coverage compliance and reasons for non-compliance, enabling the program to address shortcomings and improve future MDA implementation.⁶ Treatment coverage rates obtained through treatment coverage evaluation surveys are pivotal in guiding the MDA program.⁶ Additionally, this evaluation aims to gather information on people's awareness of the program during the coverage surveys. Considering this background, the present evaluation was conducted to estimate the coverage and compliance and to explore the challenges of MDA in Umaria district, Madhya Pradesh, India in 2023.

Methodology

Setting: District Umaria is situated in the eastern part of Madhya Pradesh, approximately 500 km away from the state capital, Bhopal. It has a total population of 6,44,758, with 17.2% residing in urban areas. The average literacy rate in Umaria is 65.9%, with male literacy at 72.9% and female literacy at 44.5%. The district is divided into three administrative blocks: Karkeli, Manpur, and Pali.¹² Table 1 provides the estimated population and eligible population for each administrative block in Umaria for 2023.

Study Participants: The study included all eligible individuals from selected households who met the criteria for MDA participation. The eligible population consisted of all residents of the district aged two years or older, excluding pregnant women, children under two years of age, and seriously ill patients, in accordance with the guidelines.⁹ The MDA campaign occurred in the district from February 10th to 22nd, 2023. The campaign began as a booth-level activity at schools and residential hostels for the first few days, followed by outreach activities, and concluded with three days devoted to mop-up activities to maximize coverage.

Study Type: This was a descriptive cross-sectional study.

Sampling and Sample Size: Cluster sampling was employed, with the administrative block serving as the unit of evaluation (IU). As the district of Umaria has only three administrative blocks, all three were selected as IUs based on the guidelines of the National Programme for Elimination of Lymphatic Filariasis (NPELF). As per guidelines, minimum four IUs has to be selected from the district and after that four clusters has to be selected from each IU. Because Umaria has only three administrative blocks hence all three blocks were selected as IUs for the present evaluation survey. To ensure adequate representation of each block, four clusters were randomly selected. Among these clusters, three were from rural areas and one was from an urban area. Within each cluster, 30 households were selected using a sampling interval. Consequently, each IU had a sample size of 120 households (4 clusters x 30 house-

Table 1: Estimated block (Implementation Unit)-wise population and eligible population of district Umaria, Madhya Pradesh in the year 2023

Block Name (IU)	Urban units	Rural units	Total Population	Eligible Population
Pali	01	105	114202	102781
Karkeli	03	274	325721	293148
Manpur	01	211	243048	218743
Total	05	590	682971	614672

Footnote: IU: Implementation Unit (Administrative block), Urban Unit: Nagar Panchayat/Nagar Palika/Nagar Nigam, Rural unit: Villages

holds), and the coverage evaluation survey for the district included 360 households. The process of cluster selection is summarized in Figure 1.

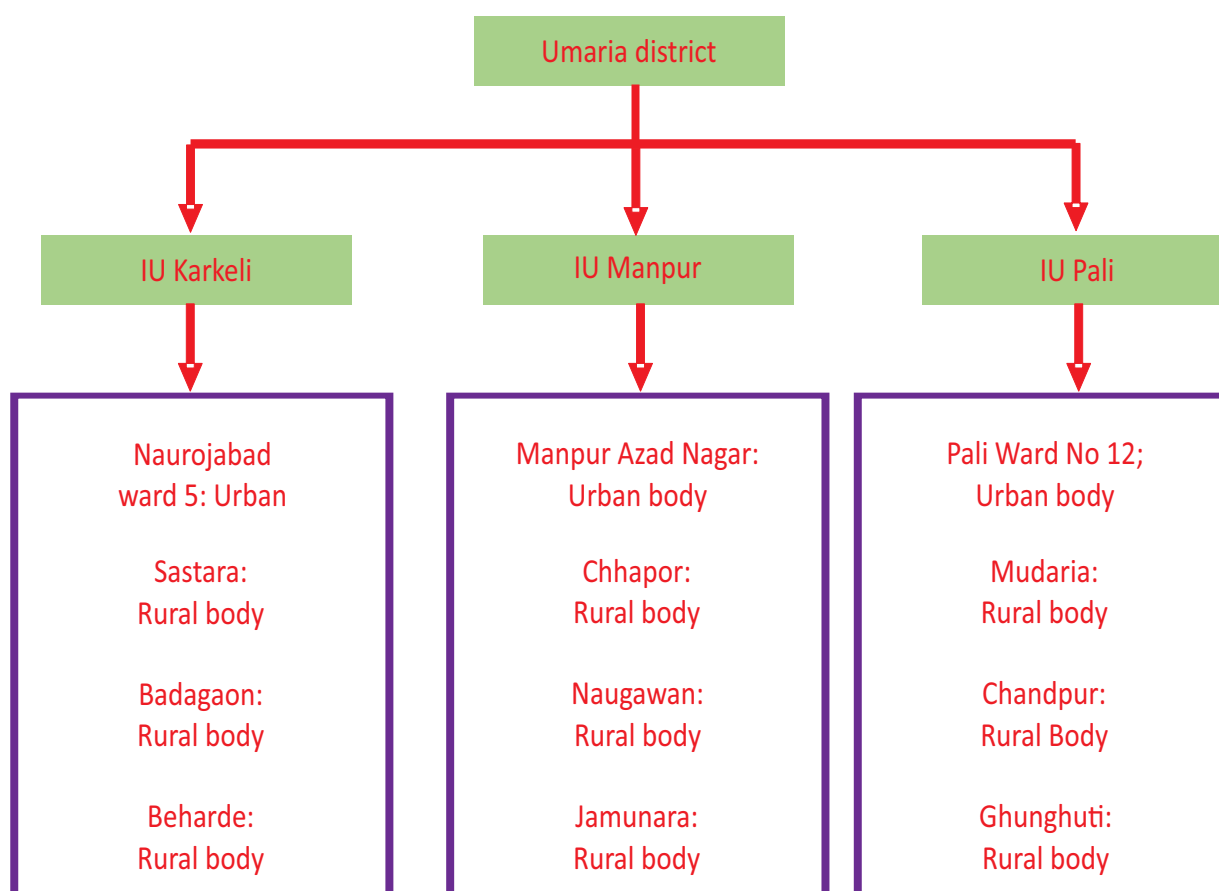
Training of Evaluation Team: The evaluation team consisted of faculty members from the medical college, interns, and research assistants affiliated with the institute's research projects. The institute's faculty members conducted a full-day training session on the data collection process on May 23, 2023.

Data Collection Schedule and Method: Information regarding MDA coverage was collected using a pre-designed and pretested paper-based questionnaire provided by the NPELF, which is uniformly used across all high-endemic districts in the country (9). Clusters were randomly selected, and households were chosen according to the sampling interval. The data collection process in the field was facilitated by the Multipurpose Health Worker and supported by the Accredited Social

Health Activist, Anganwadi Worker, and Community Health Officers stationed in the field. A review of previous years' MDA records was also conducted. The study period was from May 24th to 30th, 2023.

Variables and Analysis: The collected data was extracted into an Excel file and analyzed using EpiData software (version 2.2.2.183 for analysis, EpiData Association, Odense, Denmark). Categorical variables were described in proportions, and continuous variables were described as means. Descriptive analysis was performed for the quantitative data.

Ethical Consideration: The study was conducted as part of the routine evaluation of the National Programme for Elimination of Lymphatic Filariasis by the district health system. The Institutional Ethical and Review Committee of the Government Medical College, Shahdol, Madhya Pradesh, India, approved the study (IERC/23/06/001 dated 30/06/2023).



Footnote; IU: Implementation Units (It is supposed to be the at least four administrative blocks in a district) but Umaria has only three administrative blocks hence study took all three for this evaluation process

Figure 1: Summary of step-wise selection process of the rural and urban bodies for the evaluation of MDA for the LF in the year 2023

Results

A total of 12 clusters comprising 360 households were visited by the evaluation team in the three administrative blocks (IUs). Information regarding MDA was obtained for 1,606 participants. According to the guidelines, 78 participants were found to be non-eligible, 14 were absent during the MDA, and 9 reported having a reason not to receive MDA. Remaining 1,505 participants were offered MDA, and 1,503 consumed the medication in front of healthcare workers (Figure 2).

Table 2 presents the background characteristics of the household survey conducted to measure MDA coverage for LF. In Karkeli and Manpur IUs, there were 565 respondents each, while in the Pali IU, there were 476 respondents. Among the beneficiaries, 65% fell into the age group of 18 to 64 years. Approximately 24% of beneficiaries had no formal education, and 31% provided information for themselves. Of the beneficiaries, 5% reported never consuming MDA, 4% consumed it for the first time, 20% consumed it twice, and 78% consumed it more than two times (Table 2).

Out of the total 1,606 beneficiaries interviewed in the district, the coverage of MDA was found to be 94%. Individual coverage rates were 93% for Karkeli IU, 93% for Manpur IU, and 95% for Pali IU. Among the 101 beneficiaries who did not receive MDA, 52 were less than two years old, nine were pregnant women, and 17 were ill patients. Therefore, the district coverage for MDA was 98.6% for both drugs. The consumption rate

at the district level was also 98.5%. Less than one percent of beneficiaries reported experiencing side effects, with the most common side effect being nausea and vomiting, followed by general weakness, skin rash, and others. A total of 101 beneficiaries reported not being offered MDA due to the reasons mentioned above, and all those who were offered MDA consumed it in front of healthcare workers, resulting in a compliance and consumption rate of 99.5% among the eligible population (Table 3).

Regarding awareness about the information education, and communication (IEC) activities prior to the MDA campaign in the community, 85% of beneficiaries reported having prior information about the MDA activity in the district (Figure 3).

In terms of the source of information about LF, 97% of beneficiaries reported being aware of it. The primary source of information was the Accredited Social Health Activist, either alone or with volunteers, as reported by 90% of beneficiaries. Three percent of beneficiaries reported the Anganwadi Worker as the source of information about LF prior to MDA (Figure 4).

When asked about the cause of LF, 51% of respondents (822 out of 1,606) reported not knowing. Thirty percent of respondents correctly identified mosquito bites as the cause of LF, while 13% reported that it is caused by mosquito bites along with other factors. Six percent of respondents believed that LF is caused by factors other than mosquito bites (Table 3).

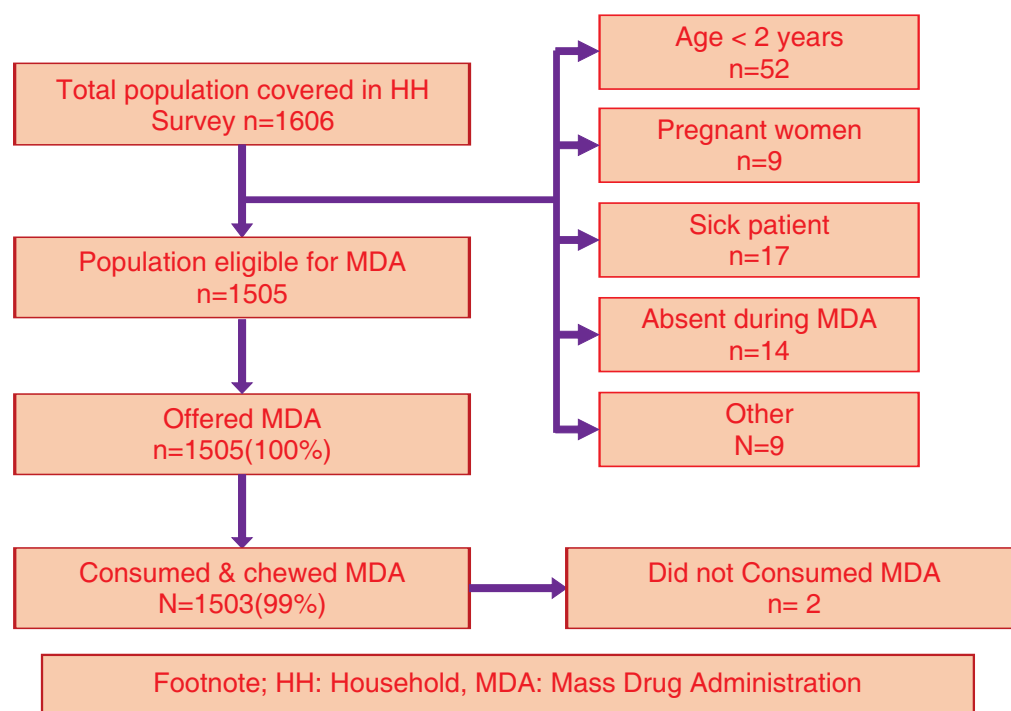


Figure 2: Cascade of evaluation of household survey to assess the MDA coverage in district Umaria Madhya Pradesh (India), in year 2023

Table 2: Background characteristics of household survey to measure coverage in MDA for LF in district Umaria, Madhya Pradesh 2023

Background characteristics of household survey	Karkeli n(%)	Manpur n(%)	Pali n(%)	Total n(%)
Age				
>2 to 17	160(36)	170(38)	114(26)	444(100)
18-59	365(35)	348(33)	327(31)	1040(100)
≥ 60	40(33)	47(38)	35(29)	122(100)
Gender				
Male	294(36)	268(33)	247(30)	809(100)
Female	271(34)	297(38)	229(29)	797(100)
Family size (Mean)	4.7	4.7	3.9	4.4
Education				
No formal education	152(40)	140(36)	92(24)	384(100)
Primary	109(47)	74(32)	47(20)	230(100)
Secondary	232(37)	201(32)	191(31)	624(100)
Higher secondary	48(25)	83(43)	60(31)	191(100)
Graduation	21(14)	62(41)	67(45)	150(100)
Post-graduation	3(11)	5(19)	19(70)	27(100)
Information provided by				
Self	188(37)	177(35)	137(27)	502(100)
Family member	377(34)	388(35)	339(31)	1104(100)
Number of times consumed drugs under MDA (including this time)				
Never	31(37)	40(48)	13(15)	84(100)
1 time	35(50)	17(24)	18(26)	70(100)
2 times	126(40)	117(37)	71(23)	314(100)
>2 times	373(33)	391(34)	374(33)	1138(100)

Discussion

Key findings: The present study focuses on the coverage and compliance of MDA for LF in Umaria district, Madhya Pradesh. Among the 360 households surveyed, information regarding 1,606 beneficiaries was obtained. MDA was offered to 94% of the total population and 98.5% of the eligible population. During the Feb 2023 MDA round, healthcare workers provided the drugs to all eligible individuals and emphasized the importance of consuming and chewing them in their presence, resulting in a coverage and consumption rate of 98.5%. The most common reasons for not consuming the drugs were 'not being present at home during the campaign' and 'fear of drugs'. Less than one

percent of beneficiaries reported experiencing any side effects after consuming MDA, with nausea, vomiting, and general weakness being the most commonly reported adverse effects.

While exploring the effectiveness of information, education, and communication activities prior to the MDA campaign, 85% of beneficiaries reported being aware of the MDA round that year, with ASHA workers being the main source of information (90%). However, only half of the beneficiaries (51%) were correctly aware that mosquito bites cause LF.

Overall, the findings indicate high coverage and compliance with MDA in the district. The proactive approach of healthcare workers in ensuring beneficia-

Table 3: Coverage and compliance of MDA during household survey to measure coverage in MDA for LF in district Umaria, Madhya Pradesh 2023

Coverage & compliance of household information		Karkeli n(%)	Manpur n(%)	Pali n(%)	Total n(%) [#]
Offered DEC					
	Yes	528(93)	525(93)	452(95)	1505(94)
	No	37(7)	40(7)	24(5)	101(6)
Chewed & consumed DEC					
	Yes	526(93)	525(93)	452(95)	1503(93)
	No	36(6)	5(1)	23(5)	64(4)
	Do not know	3(0)	35(6)	1(0)	39(2)
Offered Albendazole					
	Yes	528(93)	525(93)	452(95)	1505(94)
	No	37(7)	40(7)	24(5)	101(6)
Chewed & consumed Albendazole					
	Yes	526(93)	525(93)	452(95)	1503(93)
	No	36(6)	5(1)	23(5)	64(4)
	Do not know	3(0)	35(6)	1(0)	39(2)
Adverse event after MDA^{\$}					
	None	553(98)	564(99)	474(99)	1591(99)
	Nausea & vomiting	7(1)	0(0)	2(0)	9(0.5)
	General weakness	2(0)	0(0)	0(0)	2(0)
	Skin rash	1(0)	0(0)	0(0)	1(0)
	Other	2(0)	1(0)	0(0)	0(0)
Reason MDA was not offered^{##}					
	Not eligible ^{^^}	31(5)	37(6)	10(2)	78(5)
	Absent during MDA	5(0)	1(0)	8(1)	14(1)
	Other	2(0)	1(0)	6(1)	9(0.5)

Depicts column percentages, \$ Addition of side effect may be more than 1606 as, single beneficiary may complaint more than one side effect following MDA. ##: All those who offered the MDA were asked to consume in front of the healthcare worker hence number and reason for both remains same. A total 101 beneficiaries reported they were not offered due to mentioned reason (so they did not consume MDA). ^^: Not eligible includes pregnant women, children of < 2 years and sick patients.

ries consumed the drugs and the low reported side effects suggest the success of the MDA campaign. However, the study also highlights the need to improve awareness regarding the cause of LF, as only half of the beneficiaries were aware of its association with mosquito bites.

Strengths and Limitations: This study possesses several strengths. One strength is that it addresses a gap in the recent evaluation of the MDA campaign for the LF program, particularly in Madhya Pradesh. The program has undergone strategy changes, such as conducting booths at schools and implementing a mop-up round during the final phase of the MDA, which distinguishes it from previous years. Consequently, this study contributes valuable insights to the National

Program to Eliminate Lymphatic Filariasis in M.P.¹¹ However, there are certain limitations to consider. Firstly, the evaluation was conducted three months after the MDA campaign, which inevitably introduces inherent recall bias. Participants may not accurately recall specific details or experiences related to the campaign during this time lapse. Despite this limitation, the study provides valuable information regarding coverage and compliance rates of MDA in the district.

Relevance of Key Findings: The findings of this study hold significant relevance in the context of India's goal to eliminate LF by the year 2027. To achieve this ambitious target, it is crucial to sustain efforts similar to those highlighted in this study. Additionally, considering the success observed, it may be beneficial for India to

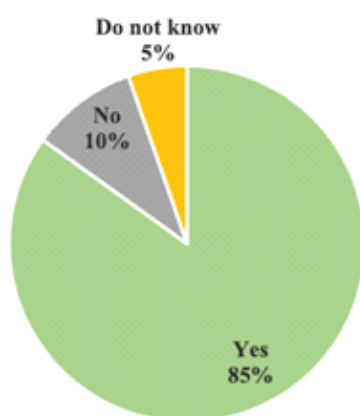


Figure 3: Proportion of beneficiaries receive any prior information about MDA round in district Umaria (M.P.) in year 2023

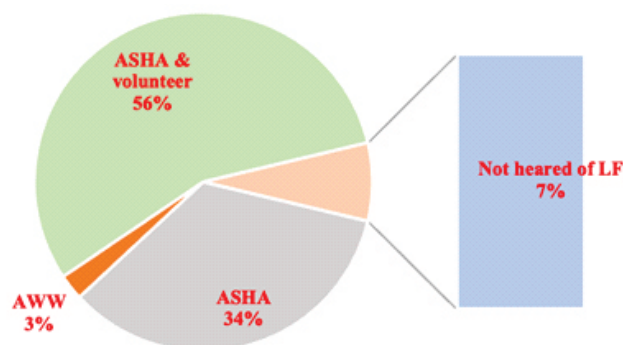


Figure 4: Source of information about LF among beneficiaries of MDA in district Umaria, M.P. in year 2023

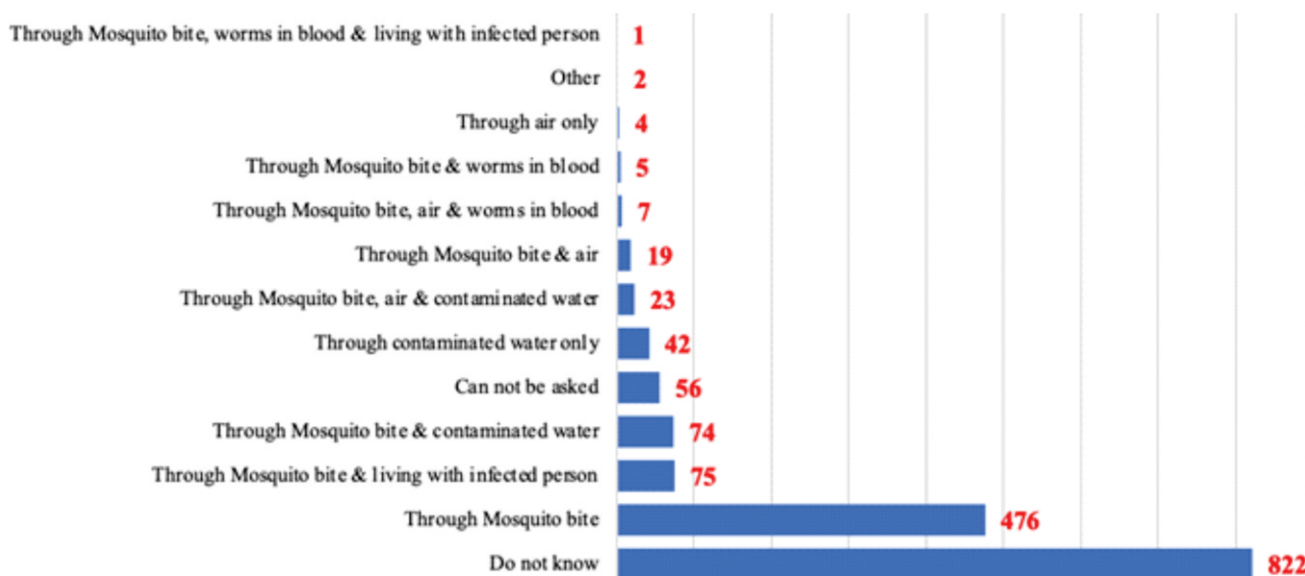


Figure 5: Number of response of the beneficiaries of MDA for the question exploring "Cause of LF" in district Umaria, M.P. in year 2023

contemplate the implementation of a second consecutive round of annual surveys in endemic implementation units, a strategy adopted by many other countries.^{13,14} Additionally, the booth-level MDA strategy has demonstrated immense effectiveness in optimizing coverage. The utilization of booths, particularly in school settings, has proven to be an advantageous approach. It has not only facilitated accessibility but also improved the overall reach and impact of the MDA campaign.

Implications: This is an opportune moment for the National Programme to Eliminate Lymphatic Filariasis

to consider the implementation of Transmission Assessment Surveys.¹⁵ TAS can be specifically designed to assist the program in identifying endemic areas that have reached the critical threshold of LF infection. As the program progresses towards elimination, it becomes imperative to include children between the ages of five and seven in the survey. By surveying this age group, the program can ensure their protection from LF infection, provided that the MDA has effectively interrupted recent transmission.⁶ Furthermore, despite achieving optimal coverage in the district, there is still ample room for enhancing Information, Education, and

Communication activities. Strengthening these activities will help generate increased demand for and ultimately improve the coverage of MDA.

Conclusion

In pursuit of the goal to eliminate LF by 2027, the MDA campaign was launched in February 2023. This campaign aimed to eliminate LF by administering anti-filaria medicine (DEC and albendazole) to all eligible populations through door-to-door visits by healthcare workers. This study provides insights into the coverage and compliance of MDA among beneficiaries in the Umaria district. The evaluation employed a cluster sampling method, selecting four clusters from the district's three Implementation Units (IUs). Within each IU, one cluster was from an urban area, while the remaining clusters were randomly selected from rural areas.

Among the 360 households surveyed in the district, information regarding 1,606 beneficiaries was obtained. MDA was offered to 94% of the total population and 98.5% of the eligible population. During the MDA round in February 2023, healthcare workers offered the drugs to all eligible individuals and ensured that the beneficiaries consumed and chewed the medication in their presence, resulting in a coverage and consumption rate of 98.5%. Among those who did not consume the drugs, the most common reasons reported were being absent from home during the campaign and fear of drugs. Less than one percent of beneficiaries reported experiencing any side effects following the consumption of MDA, with nausea, vomiting, and general weakness being the most frequently reported adverse effects.

The effectiveness of Information, Education, and Communication activities prior to the MDA campaign was explored, and 85% of the beneficiaries reported being aware of the MDA round taking place that year. The primary source of this information was the ASHA worker (90%). However, only half of the beneficiaries (51%) had correct awareness that mosquito bites are the cause of LF.

These findings shed light on the progress and challenges of the MDA campaign in the Umaria district. It highlights the high coverage achieved but still need to address barriers such as absence during the campaign and fear of drugs among the non-compliant population. Additionally, it emphasizes the importance of enhancing IEC activities to improve knowledge and awareness about LF transmission.

Recommendations: Based on the study's findings, the following recommendations are suggested: 1) Continuing the One-week Campaign Approach: The one-week campaign with booth-level arrangements at schools

and hostels proved effective in reaching a significant number of beneficiaries. This approach should be continued in subsequent years as it helps optimise the coverage and accessibility of the MDA campaign. 2) Encouraging Direct Drug Consumption: The strategy of insisting that beneficiaries to consume the drugs in front of healthcare workers has shown positive results in terms of compliance. This approach should be maintained in future MDA campaigns as it promotes accountability and ensures that the medications are properly taken. 3) Conducting Night Surveys in Endemic Villages: To further enhance the coverage and reach of the MDA campaign, it is recommended to conduct more night surveys in villages that are endemic for LF. This will help identify individuals who might be missed during the daytime surveys and ensure a more comprehensive coverage. 4) Involving Local Leaders: Engaging religious and political leaders at the local level is crucial for sustaining community commitment towards LF elimination. Their involvement can help generate awareness, mobilize community participation, and reinforce the importance of the MDA campaign. Collaborating with these leaders will strengthen community engagement and support in the ongoing efforts to eliminate LF.

Implementing these recommendations will contribute to the overall success of the LF elimination program and help India progress towards achieving its goal of LF elimination by 2027.

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