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Comparative Evaluation of Operational Performance and Therapeutic Coverage of Mass Drug Administration for Lymphatic Filariasis in Chhatarpur, Madhya Pradesh

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ABSTRACT

Background: The elimination of lymphatic filariasis (LF), a neglected tropical disease, depends critically on achieving and sustaining high levels of drug coverage and compliance through Mass Drug Administration (MDA) campaigns. In India, these campaigns are spearheaded by the Ministry of Health and Family Welfare (MoHFW) as part of the National Programme for Elimination of Lymphatic Filariasis. This study presents a detailed comparative evaluation of MDA performance in the Chhatarpur district of Madhya Pradesh. It draws upon data collected through Coverage Evaluation Surveys conducted in consecutive years 2023 and 2024 to assess trends in drug distribution coverage, population compliance, and overall program effectiveness. The analysis aims to identify progress, challenges, and opportunities to enhance future MDA rounds in the region. **Methods:** A cross-sectional comparative assessment was conducted across five administrative blocks of Chhatarpur district during the Mass Drug Administration (MDA) surveys in June 2023 and March 2024. The study evaluated key programmatic indicators, including the distribution and consumption of antifilarial drugs, direct observation of drug intake, and house-to-house coverage. It also aimed to identify operational gaps and barriers to drug compliance, particularly reasons for non-consumption. Furthermore, the assessment examined the effectiveness of Information, Education, and Communication (IEC) strategies and assessed community awareness regarding the National Filaria Control Program (NFCP). **Results:** The comparative assessment of MDA indicators between 2023 and 2024 highlights both progress and emerging challenges. House-to-house coverage improved slightly from 91.0% to 92.8%, and supervised drug intake increased from 88.58% to 91.7%, indicating better outreach and monitoring. However, overall drug consumption declined from 86.85% to 84.7%, with non-compliance rising from 13.15% to 15.3%. Key barriers such as lack of information (2.26% to 13.92%), fear of adverse effects (1.90% to 11.71%), and drug intake on an empty stomach (3.18% to 19.62%) increased notably. Despite full participation of ANMs and AWWs and enhanced use of mass media, these findings emphasize the need for strengthened community awareness, health education, and targeted interventions to improve compliance. **Conclusion:** In conclusion, the comparative analysis of MDA performance from 2023 to 2024 highlights a complex picture of operational improvement alongside rising community level challenges. While gains in house-to-house coverage (91.0% to 92.8%) and supervised drug intake (88.58% to 91.7%) indicate better implementation, the decline in overall drug consumption (86.85% to 84.7%) and increased non-compliance (13.15% to 15.3%) reflects gaps and barriers, including misinformation, fear of side effects, and poor timing of drug administration. The sharp rise in unawareness about MDA activities and reduced knowledge of treatment services signal the need for targeted, culturally appropriate communication strategies. Continued engagement of frontline health workers and broader use of mass media remain promising, but sustained program impact will require integrated efforts focused on health education, community trust-building, and adaptive

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service delivery. **Keywords**: Mass Drug Administration, MDA, Lymphatic Filariasis, Drug Distribution, Drug Consumption, Public Health, Chhatarpur, House to House Survey.

INTRODUCTION

Background: Lymphatic filariasis (LF) remains a significant public health concern globally, with over one billion individuals at risk across approximately 80 countries, and more than 120 million already affected. The disease manifests in chronic and disabling conditions such as lymphoedema, elephantiasis, and hydrocele, which typically appear later in life and can lead to irreversible disability accounting for over 5 million disability-adjusted life years (DALYs) annually (1). Beyond physical impairment, affected individuals often suffer mental distress, social exclusion, and economic hardship, perpetuating stigma and poverty (2). As of 2023, an estimated 657 million people in 39 countries still reside in areas requiring preventive chemotherapy to interrupt transmission (2,4).

India contributes nearly 40% of the global LF burden, positioning it as a critical focus within the World Health Organization's (WHO) Global Programme to Eliminate Lymphatic Filariasis (GPELF). The disease's impact on productivity, quality of life, and the healthcare system underscores its public health significance in endemic regions (2). In 1997, WHO Member States committed to eliminating LF as a public health problem by 2020, via World Health Assembly Resolution WHA 50.29. India's National Health Policy (2002) had initially set 2015 as the elimination target, later revised to 2021. The formation of the Global Alliance to Eliminate Lymphatic Filariasis (GAELF) in 2000 further bolstered international efforts (3,4).

The WHO recommends Mass Drug Administration (MDA) as the principal strategy to halt LF transmission, involving annual administration of a combination of diethylcarbamazine citrate (DEC) and albendazole to all eligible individuals in endemic regions. India launched its National Program to Eliminate LF in 2004, initially with single-drug DEC therapy, later transitioning to a dual-drug regimen (DEC + albendazole) (4). The effectiveness of MDA programs hinges on several key elements: efficient drug distribution, high community compliance, robust Information, Education and Communication (IEC) initiatives, and strong engagement of local health personnel. Coverage Evaluation Surveys (CES) serve as a crucial tool for monitoring program effectiveness and guiding strategic improvements (5).

Rationale and Significance

In 2017, following positive outcomes from clinical trials, the WHO endorsed a triple-drug regimen ivermectin, DEC, and albendazole (IDA) to accelerate LF elimination (4). In June 2018, India committed to implementing this strategy and piloted the IDA protocol in five districts. This study examines India's experience in operationalizing the new protocol, outlining its planning, execution, successes, challenges, and key learnings.

Chhatarpur district in the Bundelkhand region of Madhya Pradesh is one of the LF-endemic areas designated by the National Vector Borne Disease Control Program (NVBDCP), with 681 identified patients recorded in 2023 and 2024 (5). MDA has been conducted annually in the district under national guidelines. The 2023 CES indicated relatively high drug distribution rates; however, drug consumption and awareness levels remained suboptimal. In response, the 2024 campaign incorporated enhanced IEC strategies, intensified community mobilization efforts through frontline health workers including Accredited Social Health Activists (ASHAs), Anganwadi Workers (AWWs), and Auxiliary Nurse Midwives (ANMs) and more rigorous supervision by senior officials, particularly via direct observation of treatment (6-9).

This study presents a comparative analysis of the 2023 and 2024 MDA-CES rounds to evaluate

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programmatic progress, identify persisting gaps, and generate insights for improving the reach, acceptability, and effectiveness of future interventions. The comparative design offers a valuable framework to assess the influence of IEC enhancements and field-level modifications, informing evidence-based public health planning in similarly endemic settings (10).

MATERIALS AND METHODS

A community-based cross-sectional Coverage Evaluation Survey (CES) was conducted in Chhatarpur district, Madhya Pradesh, to evaluate the implementation and effectiveness of the Mass Drug Administration (MDA) campaign for Lymphatic Filariasis (LF). The survey was carried

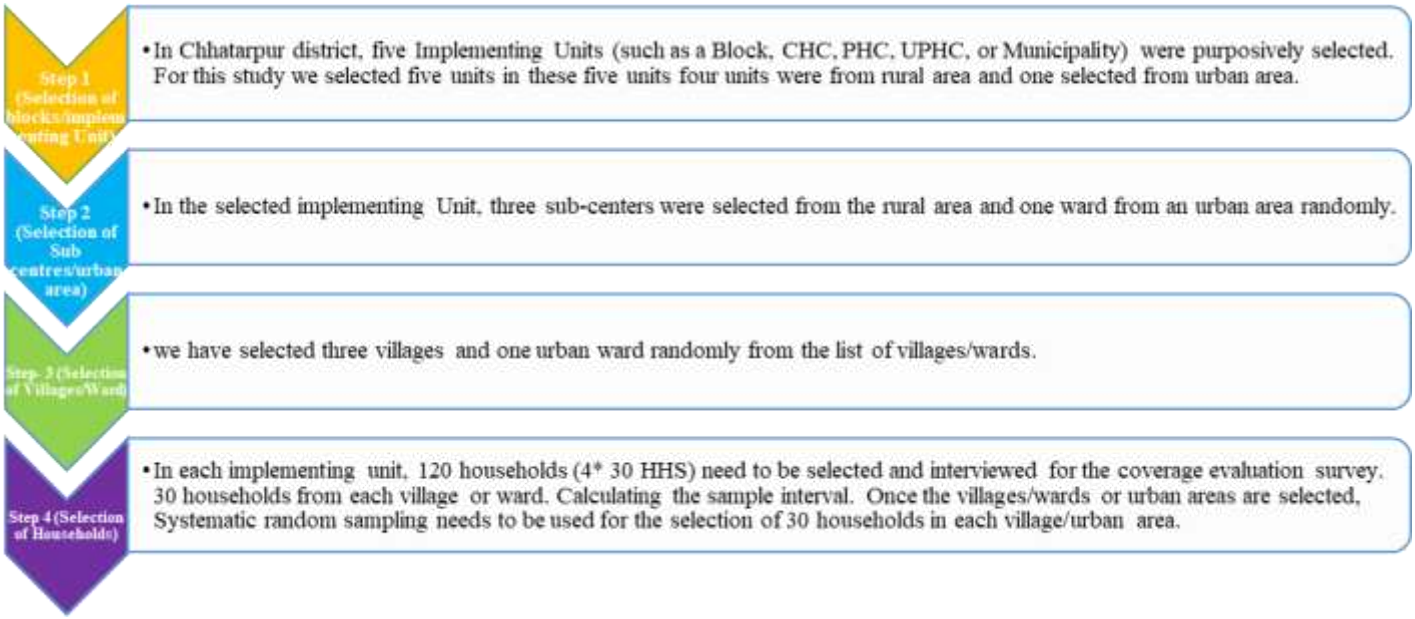

Figure1: Schematic Representation of MDA-CES Methodology in Chhatarpur District

out immediately after the MDA rounds conducted in June 2023 and March 2024, covering all five administrative blocks of the district. Chhatarpur is designated as an LF-endemic region under the National Vector Borne Disease Control Programme (NVBDCP) and has been implementing annual MDA rounds as part of India's national LF elimination strategy.

The target population for the survey included individuals aged two years and above who were eligible to receive antifilarial drugs during the MDA campaign. In accordance with national guidelines, exclusions applied to pregnant women, children under two years of age, and individuals with serious illness at the time of drug administration. To ensure district-wide representativeness, a multistage random sampling technique was employed. Five Implementing Units defined as administrative divisions such as blocks, Community Health Centres (CHCs), Primary Health Centres (PHCs), Urban PHCs (UPHCs), or municipalities were purposively selected. These included four rural and one urban unit to achieve balanced geographic coverage. Within each rural Implementing Unit, three sub-centres were randomly selected, and within each sub-centre, three villages were chosen using simple random sampling. For the urban unit, one ward was randomly selected. From each selected village or ward, 30 households were chosen via systematic random sampling, yielding a total of 120 households per Implementing Unit. This sampling strategy ensured a robust and

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representative sample across both rural and urban settings. Figure 1 illustrating about methodology.

Data Collection and Analysis

Data were collected using a pre-tested, semi-structured questionnaire adapted from the NVBDCP's CES toolkit. The instrument captured key indicators including socio-demographic characteristics, receipt and consumption of antifilarial drugs, timing of drug intake, direct observation of treatment, awareness and knowledge of LF and MDA, sources of Information, Education and Communication (IEC), and self-reported side effects. One eligible respondent was interviewed per household. Trained surveyors conducted face-to-face interviews using standardized protocols to ensure data consistency and reliability. Data were subsequently coded, entered, and analyzed to assess coverage, compliance, and factors influencing MDA uptake. A trained team comprising faculty members and postgraduate students from Bundelkhand Medical College conducted house-to-house visits using offline proforma. Spot verification of drug consumption was carried out where possible, including checks for indelible ink marks and interviews with drug distributors. Data were entered into Microsoft Excel 2021 and analyzed using SPSS trial version 26. Descriptive statistics such as frequencies and percentages were used for categorical variables, and a comparative analysis between the 2023 and 2024 survey data was conducted to assess trends in MDA indicators.

Some variables and formulas:

1. **House to house coverage** $(\%) = \frac{\text{Total house visited by MDA drug distributors during MDA}}{\text{Total House visisted by our team}} \times 100$

2. **Drug Distribution or Drug Consumption Rate** $= \frac{\text{Total population recieved drugs}}{\text{Total eligible population}} \times 100$

3. **Drug Consumption Rate in front of Drug distributors** $= \frac{\text{Total } \textit{population} \text{ swallowed drugs}}{\text{Total } \textit{population recieved drugs}} \times 100$

RESULTS

The comparative assessment of Mass Drug Administration (MDA) indicators for the years 2023 and 2024, as illustrated in Table 1 and Figure 2, highlights both improvements and setbacks in key areas of implementation. The coverage of house-to-house surveys increased marginally from 91.0% in 2023 to 92.8% in 2024, reflecting a 1.8 percentage improvement, which suggests better outreach and mobilization efforts. Despite this, the overall drug distribution or consumption rate dropped by 2.15 percentage, from 86.85% in 2023 to 84.7% in 2024, indicating a minor decline in community acceptance or adherence to the MDA program. Interestingly, drug consumption in the presence of the drug distributor rose from 88.58% to 91.7%, a 3.12 percentage point increase, suggesting stronger community compliance when supervised. However, non-compliance also rose from 13.15% to 15.3%, a 2.15 percentage increase, highlighting a growing segment of the population either unwilling or unable to participate in the program.

Table 1: Comparative assessment of MDA indicators done in 2023 & 2024.

INDICATORS	SURVEY 2023	SURVEY 2024
Total House Surveyed by our team	600	600
Coverage of House-to-House visits by MDA Drug distributors	547	557
Coverage rate of House-to-House Visits	91 %	92.8 %
Population Covered During Survey	2276	2376
Total eligible population for MDA	1947	2067

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Total Population received medicines	1691	1751
Total Population not received medicines	256	316
Distribution Rate/ Drug Consumption Rate	86.85 %	84.7 %
Distribution Rate/ Drug Consumption Rate in front of drug distributors during MDA	88.58 %	91.7 %
Non-Compliance Rate	13.15 %	15.3 %

Expanding on the community-related parameters and challenges as shown in Table 2 and Figure 2, the data reveal significant increases in several barriers to compliance. The proportion of individuals reporting "No information about LF/MDA/DEC" jumped from 2.26% in 2023 to 13.92% in 2024, representing a more than six-fold increase (an 11.66 percentage rise), which suggests a possible communication gap or declines in effective health education outreach. Similarly, fear of drugs increased from 1.90% to 11.71%, marking a 9.81 percentage increase, potentially due to rumours, lack of trust, or previous negative experiences. The issue of empty stomach at the time of visit increased sharply from 3.18% to 19.62%, a 16.44 percentage jump, indicating a logistical mismatch in drug administration timing. Reports of side effects or prior complications also rose from 1.44% to 6.96%, a 5.52 percentage increase, which could contribute to hesitancy.

Table 2: Comparative assessment of MDA parameters done in 2023 & 2024.

Gaps and Challenges for Not Compliance	**Survey (2023)**	**Survey (2024)**
No Information about LF/MDA/DEC	2.26%	13.92%
Fear of Drugs	1.90%	11.71%
Empty Stomach at Time of Visit	3.18%	19.62%
Side Effects/Previous Complications	1.44%	6.96%
Not at Home / Forgot / Not suffering / Others combined	4.37%	11.08%
Awareness about Nearest Treatment Facility	96.55%	82.7%
Source of Information: Miking / Radio / TV / Print	20%	80%

Additional reasons for non-compliance, such as not being at home, forgetting the schedule, or believing the drug was unnecessary, collectively increased from 4.37% in 2023 to 11.08% in 2024, an increment of 6.71 percentage. Awareness of the nearest treatment facility showed a concerning decline, dropping from 96.55% in 2023 to 82.7% in 2024, a 13.85 percentage decrease, which could negatively affect timely treatment-seeking behaviour. Despite these challenges, the source of information through ANMs (Auxiliary Nurse Midwives) and AWWs (Anganwadi Workers) remained consistent at 100% in both years, indicating their continued central role in community mobilization. Additionally, mass media sources (miking, radio, TV, and print) saw a significant increase in usage from 20% in 2023 to 80% in 2024, reflecting a 60-percentage rise and a shift towards broader, technology-enabled communication strategies. Overall, the data from Figure 2 and Figure 3 illustrate both the strengths and evolving challenges of the MDA program.

While there is evidence of improved operational outreach and communication diversification, rising non-compliance and gaps in public awareness underscore the need for targeted education, better

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logistical planning, and sustained community engagement.

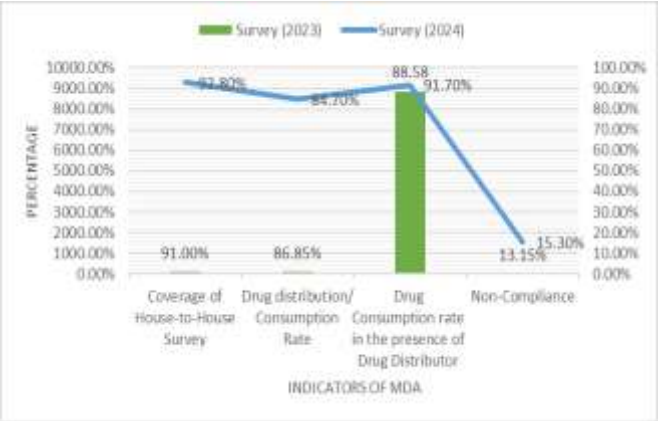

Figure 2: Comparison of MDA Implementation Indicators in Survey 2023 and 2024

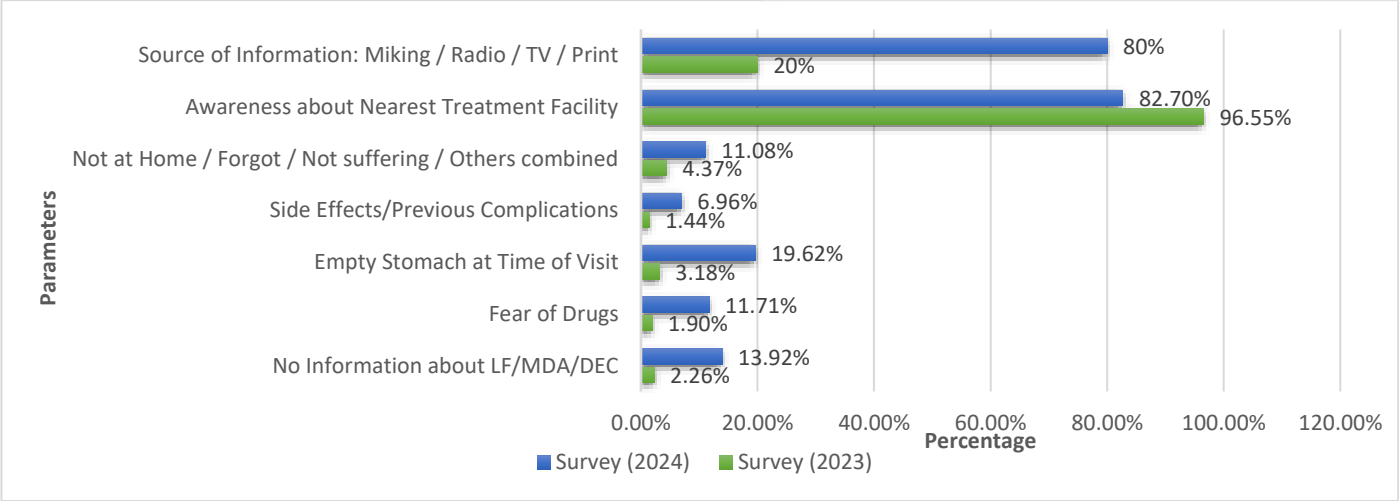

Figure 3: Comparison of responses from the community according to various parameters in survey 2023 & 2024

DISCUSSION

The comparative analysis of Mass Drug Administration (MDA) indicators between 2023 and 2024 provides critical insights into the program's evolving strengths and operational gaps. The marginal increase in house-to-house survey coverage from 91.0% to 92.8% reflects improved planning and outreach mechanisms. This trend corroborates the findings of Amarnath et al. (2022) in Rewa and Kumar et al. (2021) in Tamil Nadu, where effective micro-planning, community mobilization, and the active involvement of frontline health workers significantly enhanced survey coverage (10). However, despite broader outreach, drug consumption rates declined from 86.85% to 84.7%, indicating a disconnect between distribution and actual ingestion. Similar observations were made by Rakesh Mahore et al. (2021) and Babu and Kar (2004), who noted that inadequate awareness and mistrust in public health initiatives often contribute to suboptimal drug uptake (8,11).

Conversely, the rise in supervised drug consumption from 88.58% to 91.7% is a positive development, emphasizing the value of direct observation strategies. Studies by Patel et al. (2019) and Nandha and Krishnamoorthy (2007) support this finding, highlighting that compliance improves significantly when community drug distributors

oversee ingestion (12,13). Nonetheless, non-compliance also rose to 15.3% in 2024, echoing findings from Santraj Ram et al. (2020) and Ramaiah et al. (2006), who linked non-participation

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to urban residency, misinformation, and low disease perception. A particularly concerning shift is the increase in individuals citing a lack of information about LF/MDA/DEC from 2.26% to 13.92% suggesting communication breakdowns. This aligns with earlier work by Babu et al. (2005) and Subramanian et al. (2008), who emphasized the impact of weak IEC (Information, Education, and Communication) activities on public understanding and program participation (11,13–15).

Moreover, fear of adverse drug reactions rose sharply from 1.90% to 11.71%, consistent with the findings of Singh et al. (2017) and Ramaiah et al. (2003), who documented how fear—often based on rumors or past side effects hampers compliance. The issue of drug intake on an empty stomach also increased markedly, from 3.18% to 19.62%, mirroring challenges noted by Joseph et al. (2015) and Kumaran et al. (2009), who emphasized the need for aligning drug delivery with meal times to enhance acceptability. Reports of side effects rose from 1.44% to 6.96%, consistent with observations by Das et al. (2019) and Mahapatra et al. (2013), indicating that even minor adverse effects can deter future participation if not addressed with appropriate follow-up and reassurance (10–12,14–17).

Additional barriers such as absence during distribution, forgetfulness, or perceiving the drugs as unnecessary increased collectively from 4.37% to 11.08%. These findings are supported by Amarnath et al. and Kiran et al. (2016), who stressed the importance of flexible delivery strategies and follow-ups, especially in urban areas with high population mobility. The notable decline in awareness about treatment facilities, from 96.55% to 82.7%, may also influence program uptake and trust, as reflected in studies by Ravishankar et al. (2020) and Chandrakala et al. (2012). Despite these challenges, community health workers such as ANMs and AWWs maintained a 100% presence as sources of information, a consistent strength echoed by Mahore et al. and Nandha et al., who underscored their pivotal role in community engagement. Additionally, the expansion of mass media usage from 20% to 80% aligns with findings by Kumar et al. (2020) and Sarkar et al. (2018), affirming the potential of multimedia platforms to complement traditional IEC efforts and enhance MDA visibility and understanding (8,17–20).

CONCLUSION & RECOMMENDATIONS

The analysis of Mass Drug Administration (MDA) for lymphatic filariasis (LF) from 2023 to 2024 reveals a mix of improvements and ongoing challenges. While there was a slight increase in house-to-house survey coverage, from 91.0% to 92.8%, indicating better outreach, the overall drug consumption rate declined by 2.15%, from 86.85% to 84.7%, pointing to challenges in community compliance. Factors such as rising fear of drugs, lack of information about LF, and timing issues (e.g., administering drugs on an empty stomach) contributed to this decline. Additionally, the increase in non-compliance, particularly in urban areas and among certain demographics, underscores the need for more targeted interventions. Despite these setbacks, the success of supervised drug distribution, with a rise in consumption rates when distributors were present, demonstrates the potential for improved compliance with better monitoring.

Moving forward, a multifaceted approach is needed to address the challenges identified. First, strengthening Information, Education, and Communication (IEC) efforts to bridge knowledge gaps about LF and MDA can help combat fears and misconceptions about the drugs. This should include not only traditional methods like community meetings but also the expanded use of mass media and digital platforms to reach a broader audience. Tailoring MDA to fit the needs of urban populations, including adjusting drug distribution schedules and locations, will help overcome logistical barriers. The continued engagement of frontline workers, such as ANMs and AWWs, is critical, but they must be equipped with the necessary resources and support to be more effective. Furthermore, expanding the use of supervised drug administration can increase compliance, particularly in areas with higher rates

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of non-compliance. Finally, addressing the rise in adverse effects reports and ensuring the public is aware of the nearest treatment facilities will help maintain trust in the program and encourage participation. With these recommendations, the MDA program for LF elimination can achieve more comprehensive and sustained success in the coming years.

Strengths:

The MDA program for lymphatic filariasis demonstrated progress in outreach and communication, with house-to-house survey coverage improving from 91.0% to 92.8%, suggesting enhanced mobilization. A major strength was the expanded use of mass media, increasing from 20% to 80%, which broadened the reach of health messaging. Drug consumption in the presence of distributors also rose, indicating the value of supervised administration in boosting compliance. Additionally, the sustained role of frontline workers like ANMs and AWWs ensured consistent and trusted communication within communities.

Limitations:

Despite these gains, the program faced setbacks in adherence, as overall drug consumption dropped from 86.85% to 84.7%, and non-compliance rose to 15.3%. Contributing factors included limited awareness about LF, fear of drug side effects, and poor alignment of drug delivery with household schedules. Notably, awareness of treatment facilities declined from 96.55% to 82.7%, indicating a gap in follow-up support. The rise in reported side effects further hindered trust and participation, highlighting the need for better communication, reassurance, and logistical improvements.

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Nill

Conflicts of Interest:

There are no conflicts of interest

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