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Original Research Article

Assessment of Mass Drug Administration for Control of Lymphatic Filariasis in Palamu District of Jharkhand, India in 2023

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Abstract

Background: Lymphatic filariasis remains a significant public health problem in several endemic regions of India. Mass Drug Administration (MDA) is the cornerstone strategy for interrupting transmission, and its effectiveness depends on achieving high population coverage and drug consumption. Periodic evaluation of MDA performance is essential to identify gaps and guide programmatic improvements.

Objectives: To assess population coverage, drug receipt, drug consumption, and reasons for non-eligibility, non-receipt, and non-compliance during the Mass Drug Administration programme for lymphatic filariasis in Palamu district, Jharkhand, in 2023.

Methods: A retrospective analysis was conducted using data from a coverage evaluation survey carried out in September 2023 in Palamu district. A total of 600 households across five blocks were surveyed, covering a population of 2,984 individuals. Information on eligibility, drug receipt, drug consumption, and reasons for exclusion as well as non-compliance was analyzed using descriptive statistics.

Results: Of the total population surveyed, 2,816 individuals were eligible for MDA. Antifilarial drugs were received by 2,655 eligible individuals, and 2,629 consumed the drugs, resulting in an overall drug consumption rate of 88.10%. Underage status was the most common reason for ineligibility. Absence during drug distribution was the primary reason for non-receipt, while fear of side effects was the leading cause of non-compliance. Block-wise variation in consumption rates was observed across the district.

Conclusion: The MDA programme in Palamu district achieved satisfactory coverage and compliance during 2023. While overall performance was encouraging, addressing operational barriers and behavioral concerns through improved microplanning and community sensitization could further strengthen programme outcomes and support lymphatic filariasis elimination efforts.

Keywords: Lymphatic Filariasis; Mass Drug Administration; Coverage Evaluation Survey; Drug Compliance; Jharkhand; Public Health.

Introduction

Lymphatic filariasis (LF) is a chronic, disabling neglected tropical disease that continues to pose a major public health challenge in many tropical and subtropical regions of the world. The disease is caused predominantly by Wuchereria bancrofti and is transmitted by mosquito vectors, leading to progressive lymphatic damage. Clinically, LF manifests as lymphedema, hydrocele, and elephantiasis, conditions that result in long-term physical disability, social stigma, psychological distress, and substantial economic loss. Although LF is rarely fatal, its disabling nature places a heavy burden on affected individuals, families, and health systems, particularly in resource-limited settings [1]. Globally, lymphatic filariasis has been targeted for elimination as a public health problem through coordinated international efforts. The World Health Organization (WHO) launched the Global Programme to Eliminate Lymphatic Filariasis (GPELF) with the primary objective of interrupting transmission and managing morbidity in affected populations [2]. Central to this strategy

is mass drug administration (MDA), which involves the annual distribution of antifilarial medications to all eligible individuals in endemic areas, irrespective of infection status. The rationale behind this approach is to reduce the microfilarial load in the community to levels insufficient to sustain transmission by mosquito vectors.

India accounts for a substantial proportion of the global LF burden and remains one of the most important countries in the global elimination effort. The disease is endemic in several states, with transmission driven by factors such as high population density, favorable climatic conditions for mosquito breeding, inadequate sanitation, and socioeconomic vulnerability [3]. Recognizing the long-term public health and socioeconomic consequences of LF, India adopted MDA as a nationwide strategy under the National Vector Borne Disease Control Programme. Repeated annual rounds of MDA using diethylcarbamazine (DEC) in combination with albendazole have been implemented with the goal of achieving and sustaining high population coverage over consecutive years [4].

The effectiveness of MDA in interrupting LF transmission depends not only on drug efficacy but also on achieving high levels of coverage and compliance among the eligible population. WHO recommends that at least 65–85% of the total eligible population should consume the drugs during each MDA round to achieve transmission interruption [2]. However, achieving this level of coverage in real-world settings remains challenging. Operational issues such as inadequate community awareness, fear of adverse drug reactions, absence of household members during drug distribution, and refusal to consume medications can significantly affect program outcomes [5].

While routine program reports often indicate high coverage based on drug distribution data, these figures may not accurately reflect actual drug consumption at the community level. The distinction between drug receipt and drug consumption is critical, as only consumed drugs contribute to reducing microfilarial load. Overestimation of coverage based on distribution alone can lead to false assumptions regarding program success and may delay the identification of persistent transmission foci [6]. Therefore, independent assessments that capture both coverage and compliance are essential components of MDA monitoring and evaluation.

Coverage Evaluation Surveys (CES) are designed to provide an objective assessment of MDA performance by validating reported coverage and identifying gaps in implementation. These surveys typically assess key indicators such as the proportion of the population eligible for MDA, the proportion who received the drugs, the proportion who actually consumed them, and the reasons for non-eligibility, non-receipt, and non-compliance. Findings from CES help in understanding community-level barriers and operational weaknesses that may not be apparent from routine reports [7]. Importantly, CES data support evidence-based decision-making and enable targeted interventions to improve future MDA rounds.

Jharkhand, an eastern state of India, is recognized as endemic for lymphatic filariasis, with several districts reporting ongoing transmission. Palamu district, characterized by a predominantly rural population and diverse geographic and socioeconomic conditions, has been included in regular MDA activities as part of the national elimination strategy. Despite multiple rounds of MDA conducted over the years, the persistence of eligible non-consumers and variations in consumption rates across blocks highlight the need for detailed evaluation at the district level. Understanding local patterns of drug distribution and consumption is particularly important in such settings to ensure that elimination goals are met within the targeted timelines [8].

In this context, the present study was undertaken to assess the performance of the Mass Drug Administration programme for lymphatic filariasis in Palamu district of Jharkhand during the year 2023. Using data from a coverage evaluation survey conducted in September 2023, this retrospective analysis evaluates household coverage, population eligibility, drug receipt, and actual drug consumption across selected blocks and villages. The study also examines specific reasons for non-eligibility, non-receipt, and non-compliance among the surveyed population. By providing a detailed and district-level assessment of MDA implementation, the findings aim to contribute to program strengthening efforts and support the ongoing goal of eliminating lymphatic filariasis as a public health problem in endemic regions.

Methodology

Study Design: This study was a retrospective, descriptive evaluation of the Mass Drug Administration (MDA) programme for lymphatic filariasis conducted in Palamu district of Jharkhand during the year 2023.

The analysis was based on secondary data obtained from a coverage evaluation survey carried out after the completion of the MDA campaign. The study aimed to assess population coverage, drug receipt, drug consumption, and reasons for non-eligibility,

non-receipt, and non-compliance among the surveyed population.

Study Area: The study was conducted in Palamu district, located in the western part of Jharkhand state, India. Palamu district comprises both rural and semi-urban areas with varied demographic, geographic, and socioeconomic characteristics. The district has been identified as endemic for lymphatic filariasis and has been included in routine MDA activities under the national elimination programme. For the purpose of this evaluation, five administrative blocks within the district were covered, namely Lesliganj, Patan, Daltonganj (Rural), Chainpur, and Bishrampur.

Study Duration: The coverage evaluation survey was conducted over a period of one month in September 2023, following the completion of the MDA round in August that year. The retrospective analysis of the survey data was undertaken thereafter.

Study Population: The study population included all individuals residing in the households surveyed during the coverage evaluation exercise. A total of 600 households were surveyed across the selected villages in Palamu district. The cumulative population covered by these households was 2,984 individuals, which constituted the sample size for the study. All age groups except those less than two years and both sexes were included in the survey population.

Eligibility Criteria: Individuals were considered eligible for MDA if they met the program-defined criteria for drug administration. Persons excluded from eligibility included children below the age of two years, pregnant women, breastfeeding mothers during first week of birth, and individuals who were acutely ill at the time of drug distribution.

Eligibility status was recorded for each individual during the survey, along with the specific reason for ineligibility wherever applicable.

Sampling Method: The coverage evaluation survey followed a cluster sampling approach as per program guidelines wherein five blocks from the district were chosen.

In each selected block, four villages or clusters were identified randomly for inclusion in the survey. Within each village, 30 households were selected by systematic random method. The same methodology was applied across all blocks and villages to maintain uniformity and comparability of findings.

Data Collection: Data was collected using a standardized survey format designed for MDA coverage evaluation. The assessment team consisted of faculty members and other staff from the Department of Community Medicine. Various ground level workers such as Sahiya (ASHA), Sevika assisted during the data collection process in the field. Participants were comprehensively informed regarding survey's purpose and verbal consent was taken from them prior to the interview. Information was collected on household size, total number of residents, eligibility for MDA, receipt of three antifilarial drugs specifically DEC, Albendazole and Ivermectin during the MDA campaign, and actual consumption of these drugs. For individuals who did not receive the drugs or did not consume them despite receiving, the specific reasons were recorded.

The survey captured few key indicators such as drug coverage (receipt of drugs among eligible individuals), and consumption percentage which was computed by dividing total number of persons who consumed all the three drugs by total number of persons in the house. Reasons for non-eligibility, non-receipt, and non-compliance were documented in predefined categories to ensure uniformity.

Variables Studied: The primary variables included the number of household's surveyed, total population, eligible population, number of individuals who received drugs, number of individuals who consumed drugs, and overall consumption percentage. Secondary variables included reasons for non-eligibility (underage, sick, pregnant, breastfeeding during first week of birth), reasons for non-receipt of drugs (nobody available at home, failure to visit, refusal) and reasons for non-compliance (fear of side effects, large number of tablets, other reasons).

Data Management: Collected data were compiled at the village and block levels and subsequently aggregated at the district level. Data entry was carried out using spreadsheet software, and internal consistency checks were performed to ensure accuracy and completeness. Cross-verification was done to ensure logical consistency between eligibility, drug receipt, and drug consumption variables.

Statistical Analysis: Data analysis was primarily descriptive in nature. Frequencies and proportions were calculated for key indicators such as eligibility, drug receipt, and drug consumption. Consumption percentage was calculated as the proportion of individuals who consumed the drugs among the total population surveyed. Block-wise and district-wise comparisons were performed to identify variations in coverage and compliance. Results were presented using tables and figures to summarize findings in a clear and interpretable manner.

Ethical Considerations: As the study was based on secondary data collected during a routine program evaluation exercise, no direct

interventions or experiments were conducted on human participants. Confidentiality of respondents was maintained.

Results

A total of 600 households were surveyed across five blocks of Palamu district during the coverage evaluation survey conducted in September 2023. These households comprised a total population of 2,984 individuals which formed the study sample. Of the total population surveyed, 2,816 individuals were found to be eligible for Mass Drug Administration (MDA), accounting for the majority of the population. The remaining individuals were categorized as ineligible based on predefined program criteria. Overall coverage and compliance indicators derived from the survey data provide insights into the performance of the MDA programme at both block and district levels.

Population Coverage and Eligibility: Among the 2,984 individuals surveyed, 2,816 (94.37%) were eligible to receive antifilarial drugs during the MDA round. A total of 168 individuals were identified as ineligible for drug administration.

The major reasons for ineligibility included being underage, acute illness at the time of drug distribution, pregnancy, and breastfeeding during first week of birth in which case ivermectin is not given. Underage individuals constituted the largest proportion of the ineligible population, followed by those who were sick and pregnant. Breastfeeding accounted for a very small proportion of ineligible cases.

Block-wise analysis revealed variations in the number of ineligible individuals across surveyed blocks. However, the pattern of reasons for ineligibility remained consistent across all blocks, with underage status being the most common cause. These findings indicate that ineligibility was largely attributable to biological and program-defined exclusion criteria rather than operational gaps. A detailed distribution of eligibility and ineligibility across blocks is presented in Table 1.

Table 1: Block-wise distribution of population surveyed, eligibility, and drug receipt during MDA-2023 in Palamu district

Block	No. of households surveyed	Total population	Eligible population	Ineligible population	Received drugs	Did not receive drugs
Lesliganj	120	577	553	24	532	21
Patan	120	616	573	43	529	44
Daltonganj (Rural)	120	572	537	35	504	33
Chainpur	120	603	567	36	522	45
Bishrampur	120	616	586	30	568	18
Total	**600**	**2984**	**2816**	**168**	**2655**	**161**

Drug Receipt among Eligible Population: Out of the 2,816 eligible individuals, 2,655 (94.28%) reported having received all three antifilarial drugs during the MDA campaign. This reflects a high level of drug distribution coverage across the district.

However, 161 eligible individuals did not receive the drugs. The most commonly reported reason for non-receipt was absence of the individual at the time of drug distribution, followed by situations where no household member was available when the drug distributor visited. A smaller proportion of individuals actively refused to accept the drugs.

Block-level differences were observed in drug receipt rates, with some blocks reporting relatively higher proportions of non-receipt compared to others. Despite these variations, absence during drug distribution remained the predominant reason for non-receipt across all blocks. These findings suggest that logistical and timing-related factors played a significant role in limiting complete drug coverage. Block-wise drug receipt data is summarized in Table 1.

Drug Consumption and Compliance: Of the 2,655 individuals who received antifilarial drugs, 2,629 reported consuming the drugs, resulting in an overall drug consumption rate of 88.10% for the district.

Only 26 individuals who received drugs did not consume them, indicating relatively high compliance among recipients. The primary reason for non-compliance was fear of side effects, which accounted for the majority of non-consumption cases. Other reported reasons included the perception of consuming too many tablets especially in persons who were on medication due to some pre-existing condition such as diabetes or hypertension and a small number of miscellaneous reasons such as child being too small to take the drug.

Consumption rates varied across blocks, ranging from lower consumption percentages in certain villages to higher rates exceeding 90% in others. Despite this variability, most blocks achieved consumption rates considered acceptable for MDA programme effectiveness.

Block-wise drug consumption percentages are detailed in Table 2.

Table 2: Block-wise distribution of drug consumption and non-compliance during MDA-2023 in Palamu district

Block	Eligible population	Received drugs	Consumed drugs	Did not consume drugs (non-compliance)	Drug consumption (%)
Lesliganj	553	532	530	2	91.85
Patan	573	529	526	3	85.39
Daltonganj (Rural)	537	504	494	10	86.36
Chainpur	567	522	519	3	86.06
Bishrampur	589	568	560	8	90.90
Total	**2816**	**2655**	**2629**	**26**	**88.10**

Block-wise Distribution of Coverage Indicators: Analysis of block-wise data revealed heterogeneity in MDA performance within Palamu district. Some blocks demonstrated consistently high eligibility, drug receipt, and consumption rates, while others showed comparatively lower values, particularly in terms of drug consumption. These differences highlight the influence of local factors such as population mobility, community awareness, and effectiveness of drug distribution strategies.

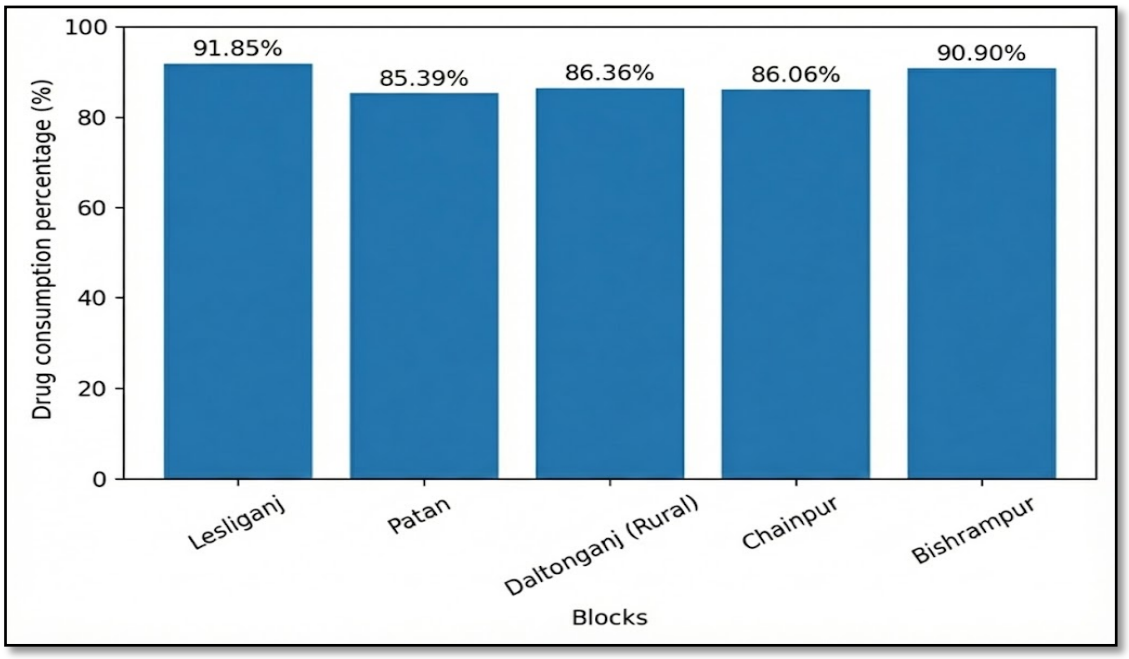

Figure 1: Block-wise drug consumption percentage during MDA-2023 in Palamu district

The comparative distribution of drug consumption percentages across different blocks is illustrated in Figure 1, which demonstrates variation in compliance levels within the district. This visual representation highlights blocks that performed well and those that may require targeted programmatic attention in future MDA rounds.

Reasons for Non-Eligibility and Non-Receipt: The distribution of reasons for non-eligibility across the district is depicted in Figure 2.

Underage individuals formed the largest share, followed by those who were sick and pregnant at the time of MDA. Breastfeeding was the least common reason for ineligibility. This pattern was consistent across all surveyed blocks, suggesting uniform application of eligibility criteria.

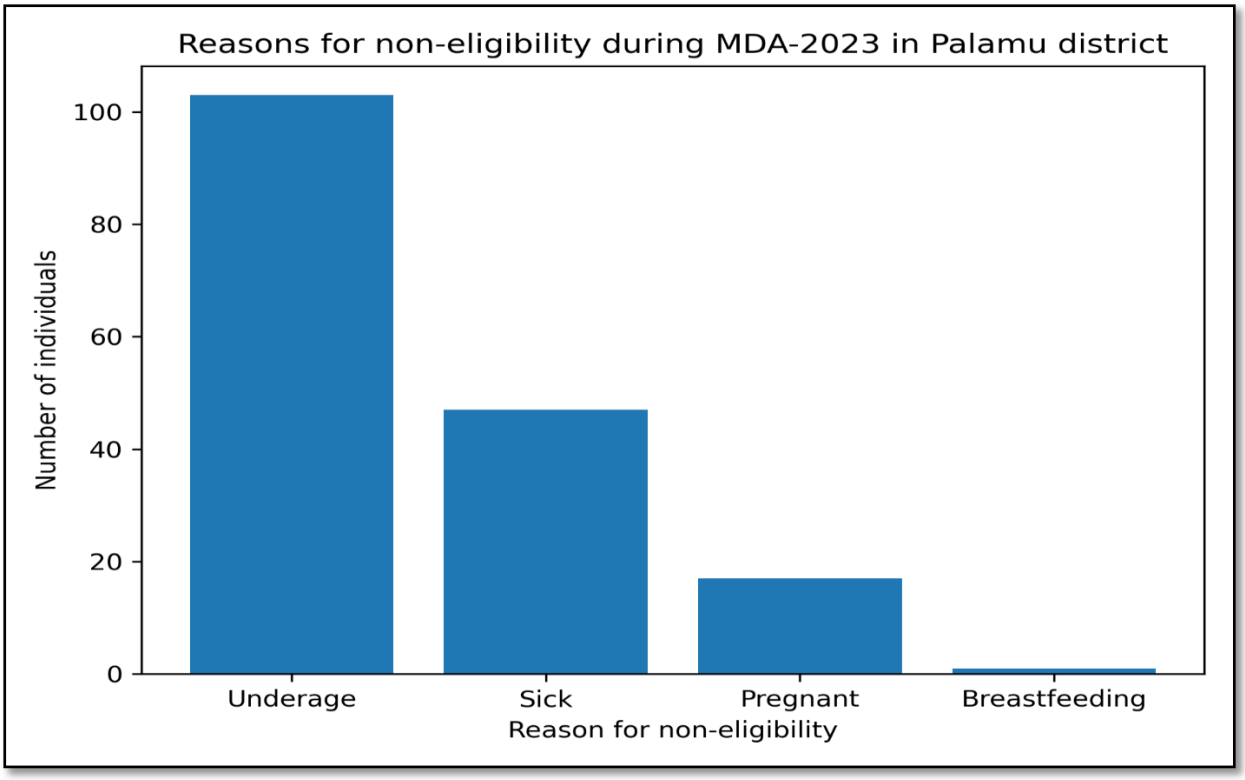

Figure 2: Reasons for non-eligibility during MDA-2023 in Palamu district

Similarly, Figure 3 illustrates the reasons for non-receipt of drugs among eligible individuals. Absence of household members during the time of drug distributor's visit emerged as the most frequent cause, followed by failure of drug distributor to visit home. Refusal to accept drugs was relatively uncommon, indicating overall community acceptance of the MDA programme.

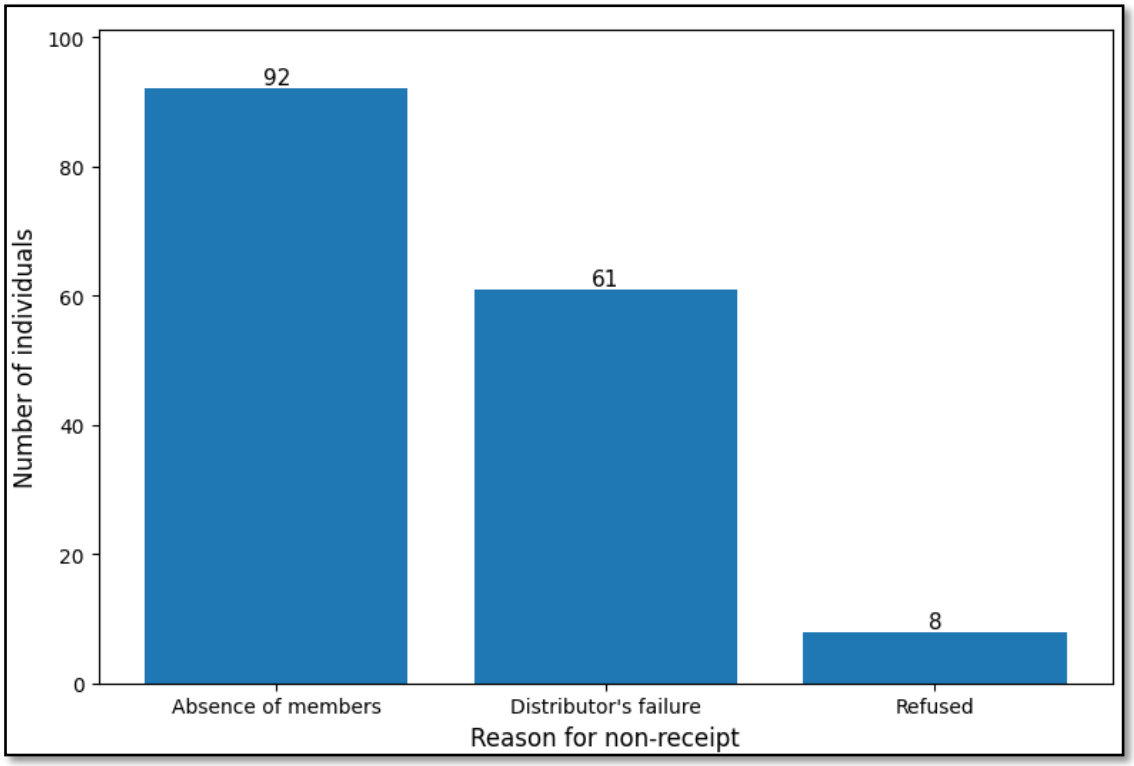

Figure 3: Reasons for non-receipt of drugs during MDA-2023 in Palamu district

Furthermore, figure 4 delineates the reasons for non-compliance among the 26 eligible individuals who received the antifilarial regimen but abstained from consumption. The primary barrier was the fear of side effects, which accounted for the vast majority of non-compliance (20 individuals). A smaller cohort cited the high pill burden (4 individuals) or other specific reasons like the child's age (2 individuals). These findings indicate that while logistical coverage is robust, targeted behavioral interventions are essential to mitigate safety concerns and enhance adherence.

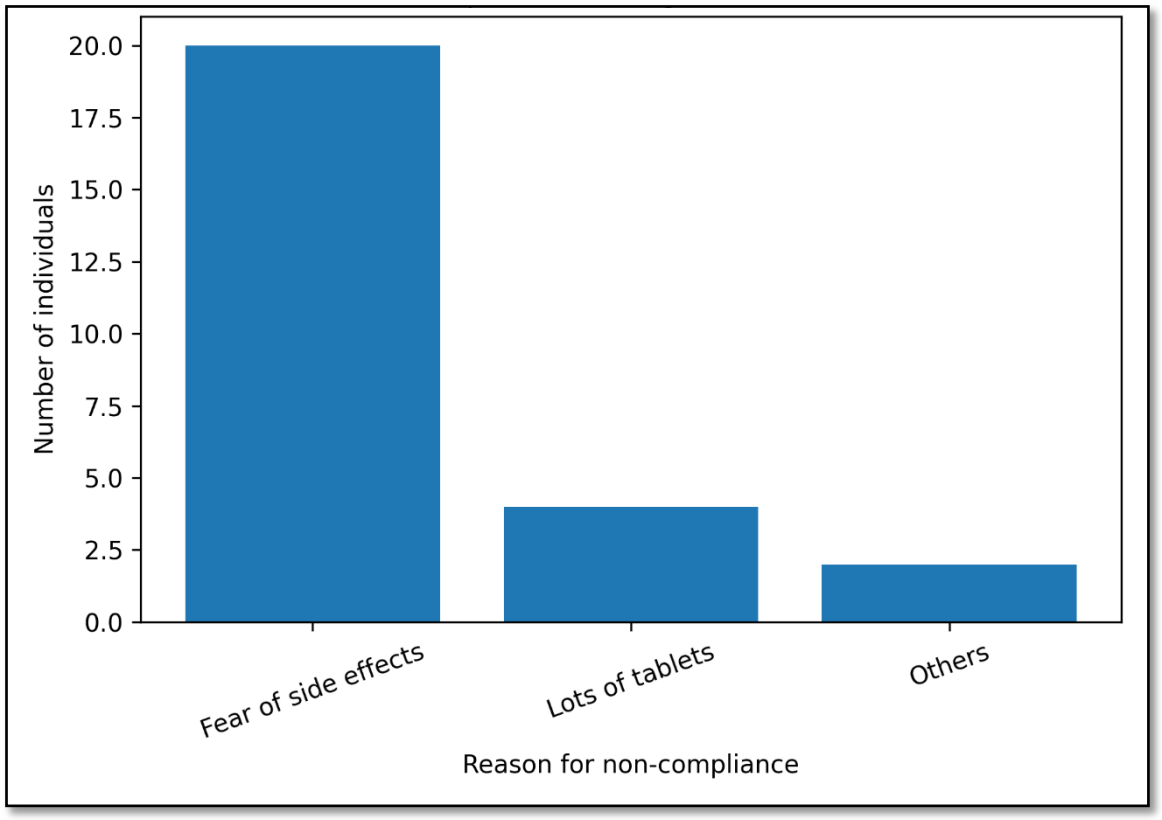

Figure 4: Reasons for non-compliance of drugs during MDA-2023 in Palamu district

District-level Summary: At the district level, the MDA programme in Palamu achieved high levels of drug distribution and consumption among the eligible population. While a small proportion of individuals were missed due to operational constraints or personal reasons, the overall findings suggest satisfactory performance of the MDA campaign during 2023. The results underscore the importance of strengthening strategies to reach absent individuals and addressing concerns related to fear of side effects to further improve compliance in future rounds.

Discussion

The present retrospective assessment evaluated the performance of the Mass Drug Administration (MDA) programme for lymphatic filariasis in Palamu district, Jharkhand, during 2023 using coverage evaluation survey data. The findings provide important insights into population eligibility, drug distribution, consumption, and reasons for gaps in coverage and compliance. Overall, the MDA programme demonstrated satisfactory performance at the district level, with relatively high eligibility, drug receipt, and consumption rates. However, the observed block-wise variations and documented reasons for non-receipt and non-compliance highlight persistent operational and behavioral challenges that require focused attention to sustain progress towards elimination.

Coverage and Consumption Performance of MDA: The overall drug consumption rate of 88.10% observed in Palamu district indicates a strong level of programme acceptance and implementation. This level of consumption meets and exceeds the minimum thresholds recommended for effective interruption of lymphatic filariasis transmission, provided such coverage is sustained across multiple rounds [9]. High eligibility (94.37%) and drug receipt (94.28% among eligible individuals) further suggest that the MDA programme has achieved substantial reach within the community.

Despite these encouraging overall figures, block-wise analysis revealed heterogeneity in consumption rates. Some blocks demonstrated

consumption percentages exceeding 90%, while others showed relatively lower values. Such intra-district variation has been reported in other MDA evaluations and underscores the importance of localized programmatic assessment rather than reliance on aggregate district-level indicators alone [10]. Differences in population mobility, awareness levels, health worker engagement, and timing of drug distribution activities may contribute to these variations.

The relatively small gap between drug receipt and drug consumption at the district level indicates good compliance among individuals who received the drugs. This suggests that once drugs reach households, most individuals are willing to consume them. This finding is encouraging, as non-compliance after receipt is often considered a more complex challenge than non-receipt, being influenced by perceptions, beliefs, and fear of adverse effects [11].

Determinants of Non-Eligibility, Non-Receipt, and Non-Compliance: Analysis of reasons for non-eligibility revealed that underage individuals constituted the largest proportion, followed by those who were sick or pregnant at the time of MDA. These findings are consistent with programmatic exclusion criteria and reflect appropriate adherence to national guidelines rather than program failure. The minimal contribution of breastfeeding as a reason for ineligibility further suggests that exclusion criteria were narrowly and correctly applied. Similar patterns have been observed in coverage evaluations from other endemic regions, where biological and safety-related exclusions account for most ineligible cases [12].

In contrast, reasons for non-receipt of drugs highlight operational challenges. Absence of individuals at the time of drug distributor visits was the most frequently reported reason, followed by situations where no one came to distribute the drug. Refusal to accept drugs accounted for a comparatively small proportion of cases. These findings indicate that non-receipt was driven primarily by logistical and timing-related issues rather than active resistance to the programme. Population mobility, work-related absence, and single-visit distribution strategies are well-documented contributors to such gaps in MDA coverage [13].

Non-compliance among individuals who received drugs was relatively low, with only 26 individuals reporting non-consumption. Fear of side effects emerged as the predominant reason for non-compliance, followed by concerns about consuming a large number of tablets. These concerns have been consistently reported across MDA programmes globally and remain a significant behavioral barrier to optimal compliance [14]. Even when actual adverse events are rare or mild, fear and misinformation can disproportionately influence individual decision-making.

The small number of non-compliant individuals suggests that community trust in the MDA programme is generally high in Palamu district. However, the persistence of fear-related non-compliance indicates a need for strengthened health education and risk communication. Clear messaging about the safety of drugs, expected minor side effects, and the public health benefits of MDA could further reduce non-compliance in future rounds.

Programmatic Implications and Way Forward: The findings of this study have important implications for strengthening lymphatic filariasis elimination efforts in Palamu district. While overall performance indicators are satisfactory, the observed gaps point to areas where targeted interventions could yield substantial gains. Improving strategies to reach absent individuals, such as follow-up visits, extended distribution hours, or mop-up rounds, may help reduce non-receipt rates. Engaging community leaders and local influencers could further enhance participation and availability during MDA campaigns.

Addressing fear of side effects requires sustained community engagement beyond the distribution period. Pre-MDA sensitization activities, interpersonal communication by frontline health workers, and the use of locally appropriate information materials may help counter misinformation and build confidence in the programme. Evidence from other endemic settings suggests that when communities understand the purpose and safety of MDA, compliance improves significantly [15].

The block-wise variability observed in this study underscores the importance of decentralized planning and monitoring. Uniform strategies may not be equally effective across all blocks, given differences in population structure, accessibility, and social dynamics. Block-specific microplanning, informed by coverage evaluation data, can help tailor interventions to local needs and optimize outcomes. From an elimination perspective, sustaining high consumption rates over consecutive MDA rounds is critical. Even small pockets of persistent non-compliance or non-receipt can act as reservoirs for continued transmission. The relatively low number of non-consumers observed in this study is encouraging; however, continued vigilance is required to ensure that these numbers do not increase over time.

Finally, the use of coverage evaluation survey data in this retrospective analysis highlights the value of routine program monitoring tools in guiding evidence-based decision-making. Such evaluations provide a more accurate picture of ground realities than administrative reports alone and are essential for identifying hidden gaps in programme implementation. Strengthening the quality and use of CES data can play a key role in accelerating progress towards the elimination of lymphatic filariasis as a public health problem in endemic districts like Palamu.

Conclusion

The present retrospective assessment of the Mass Drug Administration programme for lymphatic filariasis in Palamu district, Jharkhand, during 2023 demonstrates that the programme achieved satisfactory coverage and compliance levels at the district level. With a high proportion of the population found to be eligible for MDA, substantial drug distribution coverage, and an overall drug consumption rate exceeding recommended thresholds, the findings indicate effective implementation of the programme during the study period. The relatively small gap between drug receipt and consumption reflects good community acceptance and suggests that once drugs reach households, compliance is generally high. However, the presence of block-wise variation in consumption rates highlights the need for continued localized monitoring and targeted interventions. Non-eligibility was largely attributable to standard programmatic exclusion criteria, indicating appropriate adherence to guidelines. In contrast, non-receipt of drugs was mainly driven by operational factors such as absence of individuals at the time of distribution, while non-compliance was predominantly associated with fear of side effects and concerns regarding tablet burden.

These findings emphasize that further improvements in programme performance can be achieved through enhanced microplanning, repeated or flexible distribution strategies, and strengthened community sensitization efforts. Addressing behavioral concerns through effective communication and reinforcing trust in the safety of antifilarial drugs remain critical for sustaining high compliance. Overall, the study underscores the value of coverage evaluation surveys in identifying gaps that may not be evident through routine reporting and highlights their role in guiding evidence-based program strengthening. Continued efforts to improve reach and compliance, particularly in underperforming blocks, will be essential to sustain progress and advance towards the goal of eliminating lymphatic filariasis as a public health problem in Palamu district.

References

1. Shenoy RK, Bockarie MJ. Lymphatic filariasis in children: clinical features, infection burdens and future prospects for elimination. Parasitology. 2011 Oct;138(12):1559-68.
2. World Health Organization. Global programme to eliminate lymphatic filariasis: progress report, 2011= Programme mondial pour l'élimination de la filariose lymphatique: rapport 2011. Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire. 2012;87(37):346-56.
3. Sabesan S, Vanamail P, Raju KH, Jambulingam P. Lymphatic filariasis in India: epidemiology and control measures. Journal of postgraduate medicine. 2010 Jul 1;56(3):232-8.
4. Sinha A, Kumar S, Dayal D, Yadav V, Pramanik A, Chaubey KK, Kumar S. Elimination of lymphatic filariasis: Where do we stand so far? Asian Pacific Journal of Tropical Medicine. 2023 Sep 1;16(9):385-99.
5. Ottesen EA. The global programme to eliminate lymphatic filariasis. Tropical Medicine & International Health. 2000 Sep;5(9):591-4.
6. Angadi MM, Shashank KJ, Rohith M. Coverage and Compliance of Mass Drug Administration for Elimination of Lymphatic Filariasis In Endemic Areas of Bagalkot District, Karnataka.
7. World Health Organization. Monitoring and epidemiological assessment of mass drug administration in the global programme to eliminate lymphatic filariasis: a manual for national elimination programmes. World Health Organization; 2025 Jul 8.
8. Shepard DS, Lwin AK, Pulikkottil SI, Kalimuthu M, Arunachalam N, Tyagi BK, White GB. Cost-effectiveness of vector control for supplementing mass drug administration for eliminating lymphatic filariasis in India. PLoS neglected tropical diseases. 2024 Dec 4;18(12):e0011835.
9. Ottesen EA, Hooper PJ, Bradley M, Biswas G. The global programme to eliminate lymphatic filariasis: health impact after 8 years. PLoS neglected tropical diseases. 2008 Oct 8;2(10):e317.
10. Tyagi BK, editor. Mosquitoes of India: Mosquito-borne Diseases, Diagnosis and Control. CRC Press; 2025 Jun 9.
11. Krentel A, Fischer PU, Weil GJ. A review of factors that influence individual compliance with mass drug administration for elimination of lymphatic filariasis. PLoS neglected tropical diseases. 2013 Nov 21;7(11):e2447.
12. Haldar D, Ghosh D, Mandal D, Sinha A, Sarkar GN, Sarkar S. Is the coverage of mass-drug-administration adequate for elimination

of Bancroftian filariasis? An experience from West Bengal, India. Tropical Parasitology. 2015 Jan 1;5(1):42-9.
13. de Souza DK, Bockarie MJ. Current perspectives in the epidemiology and control of lymphatic filariasis. Clinical Microbiology Reviews. 2025 Jun 12;38(2):e00126-23.
14. Babu BV, Babu GR. Coverage of, and compliance with, mass drug administration under the programme to eliminate lymphatic filariasis in India: a systematic review. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2014 Sep 1;108(9):538-49.
15. Njomo DW, Amuyunzu-Nyamongo M, Magambo JK, Njenga SM. The role of personal opinions and experiences in compliance with mass drug administration for lymphatic filariasis elimination in Kenya. PLoS One. 2012 Nov 19;7(11):e48395.