

POPULATION BASED COVERAGE SURVEY RESULTS FOLLOWING MASS DRUG ADMINISTRATION (MDA) AGAINST LYMPHATIC FILARIASIS IN BARAGARH DISTRICT, ODISHA

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Abstract

Background: A collection of parasitic illnesses known as lymphatic filariasis (LF), which mostly affects people in conditions of extreme poverty, is a significant public health issue in India. It can result in deformity, disability, and chronic discomfort. Additionally, it leads to stigmatisation and discrimination against people and their families in the community, which has a negative impact on their social and economic well-being. Since 2004 in Odisha, mass drug administration (MDA) has been used to eradicate LF. **Materials and Methods:** In the month of April 2021, Baragarh district underwent a cross-sectional study. A pre-designed, pre-tested questionnaire was used to gather information about MDA from 300 households (HHs): 200 rural and 100 urban. The results were reported as percentages, and tests of significance were used as necessary. **Result:** A total of 300 houses with a total of 1412 people were surveyed after the MDA in Baragarh. 1367 (96.8%) of them were judged to be eligible. Compliance was 94.1% of individuals who received the medication. MDA had an 82% overall effective coverage rate. However, there was no significant difference in compliance across the three clusters under study. In all age groups, just 25% of those who were eligible had used drugs in front of the DD (Effective Supervised coverage). **Conclusion:** The effective supervised coverage of MDA is still low, despite the fact that coverage and compliance were determined to be better. The mainstay of the plan for eliminating LF should be strong compliance together with efficient supervised coverage, not just MDA coverage.

INTRODUCTION

Lymphatic filariasis, commonly known as elephantiasis, is a neglected tropical disease. Infection occurs when filarial parasites are transmitted to humans through mosquitoes. Infection is usually acquired in childhood causing hidden damage to the lymphatic system.^[1]

The painful and profoundly disfiguring visible manifestations of the disease, lymphoedema, elephantiasis and scrotal swelling occur later in life and can lead to permanent disability. These patients are not only physically disabled, but suffer mental, social and financial losses contributing to stigma and poverty.^[2]

In 2020, 863 million people in 50 countries were living in areas that require preventive chemotherapy to stop the spread of infection. The global baseline estimate of people affected by lymphatic filariasis was 25 million men with hydrocele and over 15 million people with lymphoedema. [3] At least 36

million people remain with these chronic disease manifestations. Eliminating lymphatic filariasis can prevent unnecessary suffering and contribute to the reduction of poverty.^[4]

Lymphatic filariasis is caused by infection with parasites classified as nematodes (roundworms) of the family Filariidae. There are 3 types of these thread-like filarial worms: *Wuchereria bancrofti*, which is responsible for 90% of the cases, *Brugia malayi*, which causes most of the remainder of the cases and *Brugia timori*, which also causes the disease.^[5]

Adult worms nest in the lymphatic vessels and disrupt the normal function of the lymphatic system. The worms can live for approximately 6–8 years and, during their lifetime, produce millions of microfilariae (immature larvae) that circulate in the blood.^[6]

Mosquitoes are infected with microfilariae by ingesting blood when biting an infected host. Microfilariae mature into infective larvae within the

mosquito. When infected mosquitoes bite people, mature parasite larvae are deposited on the skin from where they can enter the body. The larvae then migrate to the lymphatic vessels where they develop into adult worms, thus continuing a cycle of transmission.^[7]

Lymphatic filariasis is transmitted by different types of mosquitoes for example by the *Culex* mosquito, widespread across urban and semi-urban areas, *Anopheles*, mainly found in rural areas, and *Aedes*, mainly in endemic islands in the Pacific.^[8]

World Health Assembly resolution WHA50.29 encourages Member States to eliminate lymphatic filariasis as a public health problem. In response, WHO launched its Global Programme to Eliminate Lymphatic Filariasis (GPELF) in 2020. In 2020, GPELF set the following goals for the new NTD Road Map (2021-2030): 58 (80%) of endemic countries have met the criteria for validation of elimination of LF as a public health problem, with both sustained infection rates below target thresholds for at least 4 years after stopping MDA and providing the essential package of care in all areas with known patients; 72 (100%) of endemic countries implement post-MDA or post-validation surveillance and reduction to 0 of the total population requiring MDA. Hence assessment of MDA programme is being done by independent team members who are not directly connected with MDA programme. In Odisha, till 2014 coverage was more than 85%, except for 2012 when the survey was not done (Hussain et al., 2014). The objective of the present study is to estimate the coverage of MDA and to enlist the reasons for non-consumption of the drugs and the side effects encountered in Bargarh district of Odisha situated in Eastern India.

MATERIALS AND METHODS

A post-MDA coverage review utilising a cross-sectional study design was carried out in the Bargarh district in the month of April 2021. All eligible persons residing in the houses at the time of the MDA distribution were included in the study population.

The current assessment was carried out in 4 clusters of the Bargarh district in accordance with the Ministry of Health and Family Welfare's recommendation to the Government of Odisha for the evaluation of MDA as a part of the filariasis elimination programme (two rural and two urban). The sample size was computed as 1266 based on the prevalence of 71% reported in a study by Bhatia et al. (2018), with a 95% confidence interval and a 2.5% margin of error. Since there are typically four family members living in a household, 300 households will be covered. To choose the necessary number of houses to be polled in both rural and urban areas, multistage random sampling was used.

Rural Area

Using a straightforward random technique, two blocks from the Bargarh district—Gaisilet and

Ambabhona—were chosen in the first stage, and two sub-centers per block were chosen in the second. Sardhapali and Malmunda were the two chosen sub-centers in the Gaisilet block, while Ambabhona and Bhainatora were the two sub-centers in the Ambabhona block. In the third stage, five villages per sub-center area were then randomly chosen (as shown in the fig.1). Ten houses from each hamlet were chosen by systematic random sampling in the fourth step. Thus, a total of 200 rural households (10 HH/village * 5 Villages * 2 Sub-centre areas * 2 Blocks * 2 Districts) were included in the survey.

The sampling units were households in the chosen villages, and the respondents in each of those households were the adults living there. Once in the village's centre, one house was chosen at random. From that house, a different alternate house was chosen, and if that house was closed or had no adults home to reply, the next house was chosen, and so on, until a total of 10 families had been chosen.

Urban Area

One ward in each of the towns of Bargarh and Barpali was randomly chosen, and the other two towns were purposefully chosen. The crew visited the first junction on the main roadway in each ward of the urban area, then picked a street at random from there and continued to survey the homes until they reached the tenth home. In this way, 50 households were visited at the next crossroads by randomly choosing one street. As a result, 50 households per ward, or 100 HH, were assessed in urban areas.

Data collection was done using a pre-made, semi-structured schedule that was adapted from the suggested procedures for performing post-MDA assessments. The distribution of the families' ages and sexes was detailed in the schedule. Additionally, details on drug distribution, absence or presence of an eligible family member at the same time, consumption of DEC and Albendazole tablets, justifications for not doing so, potential side effects, sources of information on the MDA programme, and details on drug distribution were included.

The crew arrived in the selected villages and wards with assistance from the block supervisors thanks to prior knowledge of the district. When the investigative team arrived at the home, they made themselves known and described their mission to any responsible adults or the head of the household who might be present. Data was gathered utilising the scheduled interview approach with their permission. Reluctant participants were not allowed to participate in the study.

All individuals above the age of two who are not pregnant or seriously ill are regarded to be eligible for the MDA program's medication distribution.

Drug Distributors: People that dispensed drugs within the community were known as Drug Distributors (DD). They were ASHAs / MPW (F), with AWW and MPW in tow (M).

RESULTS

A total of 300 households were covered in the post MDA survey of Bargarh with 1412 individuals. Of them, 1367 (96.8%) were found to be eligible. Among the eligible, 710 (51.9%) were males and 657(48.1%) were females and 249(18.2%) were <15 years of age & 1118(81.8%) were ≥15 years of age. A total of 45 persons (3.2%) were not eligible for drug consumption. Of them, 36 (80.0%) were less than 2 years of age, 2(4.4%) were pregnant and 7(15.6%) were seriously ill.

In the surveyed area, drug was distributed for 1266 (92.6%) individuals out of 1367 eligible population and all had received the drugs at their homes. In Gaisilet block, of the total 465 eligible persons, 405 had received the drugs amounting to overall coverage of MDA as 87.1% (95% C.I. = 86.4%- 87.8%).

Coverage in different age and sex groups were as follows; persons ≥15 years of age (males- 88.4%, females- 88.4%) & persons <15 years age(females 88.6%, males 74.4%). Of those who received the drugs, compliance was 94.1%. Overall effective coverage of MDA was 82%. In all the age groups approximately 25% of the eligible persons had consumed the drugs in front of the DD (Effective Supervised coverage).

In the surveyed areas of Bargarh district though drug was distributed for 1266 individuals out of 1367 eligible population, 1212 had consumed the drugs. Hence Coverage, Compliance and effective coverage were 92.6% [95% C.I.: 92.0%- 93.0%], 95.7% [95% C.I.: 95.4%- 96.0%] and 88.7% [95% C.I.: 88.0%- 89.4%] respectively. But effective supervised coverage was only 52% [95% C.I.: 48.8%- 55.2%] [Table 1].

Table 1: Comparison of Coverages and Compliance of MDA activity in 4 surveyed areas of Bargarh district

Indicators Areas	Coverage (b/a*100)	Compliance (c/b*100)	Effective coverage c/a*100	Eff. Supervised coverage (d/a*100)
Gaisilet	87.1%	94.1%	82.0%	26.5%
Ambabhona	95.6%	96.5%	92.2%	56%
Bargarh Urban	95.6%	100%	95.6%	94.6%
Barpali Urban	95.2%	93.6%	89.1%	57.7%
Bargarh District	92.6% (95% C.I.: 92.0%- 93.0%)	95.7% (95% C.I.: 95.4%- 96.0%)	88.7% (95% C.I.: 88.0%- 89.4%)	52% (95% C.I.: 48.8%- 55.2%)

The coverage & effective coverage in Ambabhona, Bargarh and Barpali were significantly more than Gaisilet [$\chi^2=31.3655$, $p<0.05$] & [$\chi^2=36.3871$, $p<0.05$] respectively. But the effective supervised coverage of Bargarh, is significantly more than the other 3 blocks [$\chi^2=276.0511$, $p<0.05$] [Table 2].

Table 2: Area wise comparison of Coverage, Effective coverage & Effective supervised coverage among Eligible population (n=1367)

Areas Indicators	Gaisilet (n=465)	Ambabhona (n=450)	Bargarh Urban (n=204)	Barpali Urban (n=248)	Bargarh District (n=1367)	Test of Significance
Coverage						
Received drugs	405(87.1%)	430(95.6%)	195(95.6%)	236(95.2%)	1266(92.6%)	$\chi^2 = 31.3655$ $p<0.05$
Not received drugs	60(12.9%)	20(4.4%)	9(4.4%)	12(4.8%)	101(7.4%)	
Effective Coverage						
Consumed	381(81.9%)	415(92.2%)	195(95.6%)	221(89.1%)	1212(88.7%)	$\chi^2 = 36.3871$ $p<0.05$
Not consumed	84(18.1%)	35(7.8%)	9(4.4%)	27(10.9%)	155(12.3%)	
Effective Supervised Coverage						
Consumed in front of DD	123(26.5%)	252(56%)	193(94.1%)	143(57.7%)	711(52%)	$\chi^2 = 276.0511$ $p<0.05$
Not consumed in front of DD	342(73.5%)	198(44%)	11(5.9%)	105(42.3%)	656(48%)	

Out of all the surveyed areas, the compliance in Bargarh town was 100% and this is statistically significant than other 3 areas [$\chi^2=12.3827$, $p<0.05$]. The compliance was significantly more among females (97.5%) than the males (94.0%) in all the surveyed areas [$\chi^2=9.4789$, $p<0.05$]. No significant difference in compliance was found between persons <15yrs and ≥15 yrs aged eligible population [$\chi^2=0.0612$, $p>0.05$] [Table 3].

Table 3: Area wise comparison of Coverage, Effective coverage & Effective supervised coverage among Eligible population (n=1367)

Area Compliance	Gaisilet (n=405)	Ambabhona (n=430)	Bargarh urban (n=195)	Barpali urban (n=236)	Bargarh District (n=1266)	Test of Significance
Consumed	381 (94.1%)	415 (96.5%)	195 (100%)	221 (93.6%)	1212 (95.7%)	$\chi^2 = 12.3827$ $p<0.05$
Not consumed	24	15	0	15	54	

	(5.9%)	(3.5%)	(0%)	(6.4%)	(4.3%)	
Sex wise Compliance						
Sex Compliance	Male (n=655)	Female (n=611)		Total (n=1266)	Test of Significance	
Consumed	616(94%)	596(97.5%)		1212(95.7%)	$\chi^2 = 9.4789$	
Not consumed	39(6%)	15(2.5%)		54(4.3%)	p<0.05	
Age wise Compliance						
Are(yrs) Compliance	<15 (n=227)	≥ 15 (n=1039)		Total (n=1266)	Test of Significance	
Consumed	218(96%)	994(95.7%)		1212(95.7%)	$\chi^2 = 0.0612$	
Not consumed	9(4%)	45(4.3%)		54(4.3%)	p>0.05	

As per the programme, all the eligible persons were supposed to take the drugs in front of the DD to achieve 100% Effective supervised Coverage. But 501(36.6%) had not consumed the drugs in front of the DD. Reasons were asked to the respondents regarding the same. In the three surveyed areas, majority {Gaisilet [164 (63.6%)], Barpali [69 (88.4%)] and Ambabhona [54 (33.1%)]} reported that they were advised by the DD to consume the drugs after taking lunch or dinner and preferably after dinner. But in contrast, in urban area of Bargarh, all except two eligible persons who were not at home at the time of drug distribution, had taken the drugs in front of DDs. Other reasons were, many members [147 (29.3%)] were in empty stomach during the drug distribution {Ambabhona [85 (52.2%)], Gaisilet [61(23.6%)], and Barpali [1(1.3%)]}, absence of eligible family members [54 (10.8%)] during the visit of DD {Gaisilet [20(7.8%)], Ambabhona [24(14.7%)] and Barpali [8(10.3%)]} and fear of side effects among 13(5%) people in Gaisilet block [Table 4].

Table 4: Reasons for not consuming drugs in front of DDs by eligible population (n=1367)

Name of Area	Gaisilet N (%)	Ambabhona N (%)	Bargarh urban N (%)	Barpali urban N (%)	Bargarh District N (%)
Beneficiaries not Consumed Drugs in front of DDs	258(55.5%)	163(36.2%)	2(1%)	78(31.5%)	501(36.6%)
Reasons for non-consumption of drugs in front of DDs					
In empty stomach during visit of DD	61(23.6%)	85(52.2%)	0(0%)	1(1.3%)	147(29.3%)
Absent at home during visit of DD	20(7.8%)	24(14.7%)	2(100%)	8(10.3%)	54(10.8%)
DDs advised to take drugs after dinner	164(63.6%)	54(33.1%)	0(0%)	69(88.4%)	287(57.3%)
Fear of side effects	13(5%)	0(0%)	0(0%)	0(0%)	13(2.6%)
Name of Area	Gaisilet N (%)	Ambabhona N (%)	Bargarh urban N (%)	Barpali urban N (%)	Bargarh District N (%)
Beneficiaries not Consumed Drugs in front of DDs	258(55.5%)	163(36.2%)	2(1%)	78(31.5%)	501(36.6%)
Reasons for non-consumption of drugs in front of DDs					
In empty stomach during visit of DD	61(23.6%)	85(52.2%)	0(0%)	1(1.3%)	147(29.3%)
Absent at home during visit of DD	20(7.8%)	24(14.7%)	2(100%)	8(10.3%)	54(10.8%)
DDs advised to take drugs after dinner	164(63.6%)	54(33.1%)	0(0%)	69(88.4%)	287(57.3%)
Fear of side effects	13(5%)	0(0%)	0(0%)	0(0%)	13(2.6%)

In the Bargarh district, 155(11.3%) eligible persons had not consumed the drugs. Of them 54(4%) had received the drugs, but due to various reasons had not consumed. The reasons were as follows; fear of side effects (42.6%), concerned person were away from home (35.2%), forgot to take (7.4%), old age (5.5%), taking other medicine (3.7%), loose Albendazole tablets which the mother was afraid to give to her children who returned home late (3.7%) and one person had not taken medicine as he was not given any prior information on MDA.

Rest 101(7.4%) persons had not received the drugs which was more in Gaisilet block 60(59.4%). In Barpali 2(2%) old age persons were not given drugs by DD though old age without any illness was not a contraindication. Similarly, 6 (5.9%) children were not given drugs in Gaisilet block by the DD though they were >2 years of age. Forty-eight (47.5%) respondents, (28 from Gaisilet block, 15 from Ambabhona block & five from Barpali) had not received the drug as their houses were locked during the visit of the DDs and DDs had not given the drugs for absent members of the family 22(21.8%) in urban area of Bargarh 9 persons, Barpali 5, and in Ambabhona&Gaisilet block four persons each). In Baddunguripali village of Sardhapali sub-centre of Gaisilet block 21(20.8%) persons complained that the DDs had not visited their houses for drug distribution. On further enquiry, they responded that because of the stock out, the drug was not given [Table 5].

Table 5: Area wise Distributions of Reasons for not consuming drugs by Eligible population (n=1367)

Areas Variables	Gaisilet	Ambabhona	Bargarh Urban	Barpali Urban	Bargarh Distric
Drugs Received but not consumed	24(1.8%)	15(1.1%)	0(0%)	15(1.1%)	54(4%)
Reasons for Non-consumption of Drugs					
Old age	1	2	-	-	3(5.5%)
Forgot	-	3	-	1	4(7.4%)
Taking other medicines	1	1	-	-	2(3.7%)
Fear of side effects	13	4	-	6	23(42.6%)
No prior information on MDA	-	-	-	1	1(1.8%)
Concerned person was away from home residing elsewhere	7	5	-	7	19(35.2%)
Loose Albendazole Tablets	2	-	-	-	2(3.7%)
Drugs not Received	60(4.4%)	20(1.5%)	9(0.6%)	12(0.9%)	101(7.4%)
Reasons for Non-receipt of Drugs					
Old age	-	-	-	2	2(2.0%)
Young age	6	-	-	-	6(5.9%)
Handicap	1	1	-	-	2(2.0%)
DD didn't go	21	-	-	-	21(20.8%)
Concerned members not at home	4	4	9	5	22(21.8%)
None of the members at home	28	15	-	5	48(47.5%)

Among 1212 beneficiaries who had consumed the drugs, only 81(6.7%) persons complained of some side effects. Majorities were from Gaisilet block 45(55.6%) and Ambabhona block 21(25.9%). The main complaints were as follows: - reeling of head (3%), vomiting (1.4%), headache (1.1%), nausea (1%), followed by fever (0.7%) & loose motion (0.3%). But none of them attended any health care facility rather seven persons have contacted quack for treatment.

Regarding IEC activities 133(44.3%) HHs had received the information and among them, 104 (78.2%) had received the information within 3 days and rest had received the information more than 3 days before the drug distributions. Few 20(12%) respondents from those who had not received any prior information about MDA reported that they have received the drugs for COVID-19. regarding the source of information regarding MDA, for majority of HHs 84(47.2%), the source of information was ASHAs followed by AWW 74(41. Very few HHs had received information from ANM.

Table 6:

Prior information on MDA	Gaisilet (n=100 HH)	Ambabhona (n=100 HH)	Bargarh Urban (n=50 HH)	Barpali Urban (n=50 HH)	(Bargarh District) (n=300 HH)
Yes	15	61	40	17	133(44.3%)
No	85	39	10	33	167(55.7%)
If Yes, Number of Days before MDA(n=133)					
≤3 days	11	50	27	16	104(78.2%)
>3 days	4	11	13	1	29(21.8)
Source of information regarding MDA(Multiple responses)					
ASHA	10	48	24	2	84(47.2%)
AWW	6	32	21	15	74(41.6%)
ANM	-	2	-	-	2(1.1%)
Neighbours	1	-	-	1	2(1.1%)
Miking	-	14	-	-	14(7.9%)
TV	1	-	1	-	2(1.1%)
Total	18(10.1%)	96(53.9%)	46(25.8%)	18(10.1%)	178(100%)

DISCUSSION

To stop the spread of LF and eradicate it, at-risk populations must have coverage of 65%, and endemic areas must have compliance of more than 85% for five consecutive years (Satapathy et al., 2016; WHO). The coverage of DEC among households in this study is 92.6%, but it is substantially lower in a study by Roy et al. (2013), and much higher in a study by Ranganath et al (Ranganath et al., 2012). In some other investigations, a comparable pattern is also visible (Babu et al., 2008; Kumar et al., 2009). Compliance with MDA was the more accurate metric since it

shows how many tablets the beneficiaries really use as opposed to just whether they are covered. In our study, 95.7% of MDA was complied with. More people in the urban than the rural areas demonstrated a proportionately higher level of compliance. The urban populace may have used drugs more frequently as a result of increased awareness. According to studies by Bhatia V. et al., Kulkarni et al., and Roy et al., compliance rates were 77.7%, 72.5%, and 70.07 percent, respectively (Bhatia et al., 2018; Kulkarni et al., 2018; Kumar et al., 2009). Banerjee et al., however, found a very low compliance rate of 48.5% in a study conducted in Nagpur (Banerjee et al., 2019). Regarding medicine consumption, 7.4% of

recipients didn't use the medication they did receive while 11.3% of beneficiaries didn't obtain it. The most frequent excuse given by those who did not receive any medication was that the recipients were not at home during the medicine distribution. The dread of the pills' negative effects, according to the beneficiaries who received the medications but did not take them, was a significant factor. The DDs ought to have provided the beneficiaries with enough knowledge about the illness and the rationale behind drug consumption to allay their concerns and win their confidence.

In contrast to another study by Bhue et al. in 2021, only 5.7% of the beneficiaries who took the medications reported experiencing any negative effects. In this study, only side effects of the treatment were observed in just 6.7% of people. In this study, ASHA is the primary source for IEC information, in contrast to Satapathy et al 2015.'s report from another western district that stated AWWs were the primary source of information, followed by ASHAs.

CONCLUSION

The effective supervised coverage of MDA is still low, despite the fact that coverage and compliance were determined to be better. Instead of just covering MDA, a solid compliance rate together with efficient monitored coverage ought to be the cornerstone of any strategy for LF eradication. Drug distributors should receive training on how to advise eligible individuals to take medications in front of them after eating rather than advising beneficiaries to take medications at night after supper in order to boost the coverage and effectiveness of MDA. By doing this, the supervised coverage will be more efficient. Therefore, planning needs to be done appropriately to serve the population. Mop up rounds should be conducted for two days following the conclusion of distribution to cover the excluded. An encouragement for them will come from acknowledging the district's high-performing DDs. Giving awards to the best-performing villages or blocks could lead to more community involvement. To allay concerns about side effects, IEC initiatives should be concentrated heavily on the communities.

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