

# Mass Drug Administration Coverage Evaluation Survey for Lymphatic Filariasis in Bagalkot and Gulbarga Districts

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## ABSTRACT

**Background:** Lymphatic filariasis (LF) is endemic in 83 countries and territories, with more than a billion people at risk of infection. In view with the global elimination, mass drug administration (MDA) with single dose of diethylcarbamazine and albendazole tablets was carried out for the eligible population in Bagalkot and Gulbarga districts. **Objective:** Assess coverage of MDA against LF in Bagalkot and Gulbarga districts. **Materials and Methods:** In this cross-sectional coverage evaluation survey, one urban and three rural clusters were selected randomly in each district. The data were collected in a pretested performa, computed and analyzed using SPSS-10 to calculate frequencies and proportions. **Results:** A total of eight clusters in two districts resulted in a total study population of 1,228 individuals. The overall compliance rate in Bagalkot district was 78.6% and in Gulbarga district it was only 38.8%. The prime reason for noncompliance was fear of side effects and not received tablets. **Conclusion:** There is an urgent need for more effective drug delivery strategies to improve the compliance in both the districts.

**Keywords:** Albendazole, diethylcarbamazine, evaluation, India, lymphatic filariasis, mass drug administration, survey

## Introduction

Lymphatic filariasis (LF) is one of the important public health and socioeconomic problem faced by many developing countries in the world.<sup>(1)</sup> It is endemic in 83 countries and territories, with more than a billion people at risk of infection. Nearly 120 million people are affected worldwide of whom about 40 million are incapacitated and disfigured by the disease. It is one of the world's leading causes of permanent and long-term disability with an estimated 5.1 million disability adjusted life years (DALYs) are lost due to this disease.<sup>(2,3)</sup>

Estimates reveal that 554.2 million people are at risk of LF infection in 243 districts across 20 states and union territories of India.<sup>(4)</sup> The global programme to eliminate LF began its first mass drug administration (MDA) campaign in 1999 after the 50<sup>th</sup> World Health Assembly resolved that LF should be eliminated as a public health problem.<sup>(5)</sup>

Recent research studies showed that annual single-dose MDA with diethylcarbamazine (DEC) is an effective tool for the control of LF and 5–10 rounds of treatment with 75–80% coverage could possibly eradicate it by reducing the transmission to very low levels.<sup>(6)</sup> The Government of India (GOI) in 2004 began a nationwide MDA campaign in all the known LF endemic districts with an annual single dose of DEC with the aim of eliminating it as a public health problem by the year 2015 according to National Health Policy 2002.<sup>(7)</sup> World Health Organization has recommended single-dose DEC and albendazole as a preferred combination for repeated,

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annual MDA in filariasis endemic areas, which reduces blood microfilaria (MF) counts.<sup>(8,9)</sup>

In the year 2007, around 600 million people in 250 districts/union territories of India, which are considered endemic for LF, were covered under the MDA campaign.<sup>(10)</sup>

The 5<sup>th</sup> MDA campaign in the eight LF endemic districts of Karnataka state was held on November 11, 2008, followed by mopping up activities on two successive days. A combination of single dose of DEC and albendazole tablets was distributed to the eligible population of the districts by drug distributors. The entire implementation of the programme was supervised by concerned district malaria officer and chief medical officer at the regional office for health and family welfare.

An effective surveillance can help fulfill the aim of global elimination of LF as a public health problem.<sup>(5)</sup> Hence, this survey is to assess the actual coverage of MDA of single dose DEC and albendazole in Bagalkot and Gulbarga districts of Karnataka state and to recommend mid course improvements. This evaluation survey was conducted 3 months after the MDA campaign over a period of 1 week by the author for the GOI through Chief Medical Officer, Regional Office for Health and Family Welfare, Bengaluru.

## Materials and Methods

### Study area

The study areas were one of the filaria endemic districts (Bagalkot and Gulbarga) in Karnataka state.

### Study design

This was a cross-sectional survey.

### Study period

The field part of the study was conducted during the 3<sup>rd</sup> week of February 2010 (22-2-2010 to 27-2-2010).

### Study population

All the sampled eligible population who belong to the MDA campaign area.

### Exclusion criteria

The eligible population did not include pregnant and lactating women, children below two years of age and seriously ill persons.<sup>(3)</sup>

### Investigator

The interviewer who conducted the interviews in the two districts. The interviewer was trained informally in the regional office for health and family welfare, Bengaluru in all aspects of coverage survey.

## Sampling

One cluster (ward) from urban area and three clusters (three primary health centre's (PHC)) from rural areas were selected randomly from the list of urban wards and PHC's where the MDA was carried out. From the PHC's, one subcenter was selected and then one village from that subcenter was selected randomly from the list of subcenters and villages in the PHC's. In those selected villages, 50 randomly selected households were covered. All the available individuals at the time of interview in the household were taken. The coverage survey captured data on a sample of 150 individuals from each cluster to get a district total study population of minimum 600 individuals in each district.

## Survey

House to house field survey was conducted and filled the performa using personal interview method. Informal consent was obtained from the participants.

## Drug distributors

Who were health workers, anganwadi workers, accredited social health activist and student volunteers?

## Training

A formal training programme was organized to all the staff (PHC medical officers and health workers) who was involved in the MDA campaign in the district headquarters. A training manual was also distributed to the participants which covers all the aspects of MDA implementation programme.

## Ethics

The study was cross sectional and does not involve patient intervention methods; hence, ethical issue does not arise.

## Limitation

This study was conducted after 3 months of MDA campaign which is a limitation (recall bias). This survey assessed only the coverage aspect and not the entire MDA implementation programme.

## Analysis and statistical methods

The data were collected in a pretested performa, computed in Microsoft Excel and analyzed using the statistical program SPSS-10. The data were used to calculate frequencies and proportions. Chi-square test was used to indicate the difference in proportions. *P* value <0.05 was considered as significant.

## Results

A total of eight clusters (one urban ward and three rural villages from each district) resulted in a total study population of 1,228 individuals. Table 1 depicts the basic

characteristics of the study population. Majority of the respondents were in the age group of 15–59 years (62.7% in Bagalkot and 63.9% in Gulbarga districts, respectively). The male and female distribution was more or less similar in both the districts. Table 2 shows the distribution of study population based on the consumption of MDA tablets. Approximately 79% in Bagalkot and 39% of the study subjects in Gulbarga district reported that they actually consumed both DEC and albendazole tablets. The remaining were, either who did not consume at all or consumed inadequate dosage of the tablets, the prime reasons for not consuming the tablet was, not received tablet (27.9%), followed by not present at home (18.4%) and drug given at home but no information (9.5%) in Bagalkot district [Table 3]. However, the main reason in Gulbarga district was fear of side effects (51.2%) and did not receive tablets (15.2%). Only 8% of people who consumed tablets in Bagalkot district and 2.3% in Gulbarga district actually experienced side effects. The fear of side effects [OR - 18.2 (8.6–38.1)], fear to give drugs to children [OR - 1.4 (0.5–3.8)], and other reasons [OR - 1.6 (0.6–4.4)] were significantly higher in Gulbarga district when compared to Bagalkot district.

Among the people who had the knowledge of MDA programme (33.8% in Bagalkot district and 24.3% in

Gulbarga district), majority of them got the information from health workers (61.5% in Bagalkot district and 74.3% in Gulbarga district). Table 4 depicts the compliance among study subjects according to age, sex, and area-wise. The overall compliance rate in Bagalkot district was 78.6%, while in Gulbarga district it was only 38.8%. There was a significant difference in the compliance between the two districts ( $\chi^2=194.12$ ,  $P<00001$ ). Compliance was marginally better among older people (statistically significant only in Gulbarga district  $\chi^2=9.23$ ,  $df - 3$ ,  $P=0.02$ ). The main reason for noncompliance among <15 years children was did not receive tablets (74.2%) and fear of giving drugs to children (3.6%) in Bagalkot district and did not receive tablets (30.7%), fear of side effects (31.3%), and fear of giving drugs to children (10.6%) in Gulbarga district.

The compliance was significantly better in among rural area compared to urban ward in both the districts (Bagalkot -  $\chi^2=23.36$ ,  $P<0.001$  and Gulbarga -  $\chi^2=52.04$ ,  $P<0.001$ ) and the compliance among men and women was almost similar in both the districts ( $P>0.05$ ).

## Discussion

A high coverage (>85%) in endemic areas, which is sustained for 5 years, is required to achieve the interruption of transmission and elimination of disease in India.<sup>(11)</sup> The 78.6% compliance in Bagalkot district and 38.8% compliance in Gulbarga district observed by us were below the expected target. In previous studies of MDA in India, reported similar lower compliance rates comparable to Gulbarga district in our study, which was ranging from 38.8 to 41.6%.<sup>(12–14)</sup> A better compliance rate observed in our study in Bagalkot district is comparable to studies conducted in Pondicherry and Madhya Pradesh.<sup>(15–17)</sup>

In much of India, compliance appears to have not changed much between 2000 and 2007.<sup>(12–17)</sup> Similar to other studies in India, the main reason for noncompliance was either the drug was not given or individual not at home in both the districts.<sup>(10,18)</sup> Hence, there is an urgent need for more effective drug delivery strategies. Fear

**Table 1: Sociodemographic characteristics of the respondents**

Variables	Bagalkot district (N=616)		Gulbarga district (N=612)	
	Number	Percentage	Number	Percentage
Age (years)				
<2*	7	1.1	10	1.6
2–5	57	9.3	64	10.5
6–14	105	17.0	105	17.2
15–59	386	62.7	391	63.9
≥60	61	9.9	42	6.9
Sex				
Male	305	49.5	287	46.9
Female	311	50.5	325	53.1
Education				
Illiterate	195	31.7	221	36.1
Primary	182	29.5	161	26.3
Secondary	123	20.0	101	16.5
Graduate	29	4.7	34	5.6
Postgraduate	5	0.8	8	1.3
Preschool children	82	13.3	87	14.2
Occupation				
Unskilled	113	18.3	179	29.2
Skilled	57	9.3	40	6.5
Professionals	30	4.9	14	2.3
Unemployed	1	0.2	2	0.3
Housewives	174	28.2	105	17.2
Students	207	33.6	227	37.1
Self-employed	34	5.5	45	7.4

\*Though belong to exclusion group still given MDA tablets for consumption

**Table 2: Distribution of study population based on consumption of tablets**

Tablet consumed	Bagalkot district (N=597)		Gulbarga district (N=595)	
	Frequency	Percent	Frequency	Percent
DEC+albendazole	469	78.6	231	38.8
DEC only	10	1.6	0	0.0
DEC incomplete dosage	6	1.0	74	12.4
Albendazole only	0	0.0	0	0.0
No tablets	112	18.8	290	48.8
Total	597*	100	595*	100

\*Note: Study subjects excluding <2 years, pregnant, lactating, and seriously ill, DEC: Diethylcarbamazine

**Table 3: Distribution of study population according to the reason for not consuming tablets**

Reason for nonconsumption	Bagalkot district (N=147)		Gulbarga district (N=381)		Difference between proportions (odd ratio-CI)*
	Frequency	Percent	Frequency	Percent	
Did not receive tablets	41	27.9	58	15.2	-
Not present at home	27	18.4	38	10.0	-
Drug given at home but no information	14	9.5	14	3.7	-
Too small to take drugs	13	8.8	14	3.7	-
Too many tablets	9	6.1	0	0	-
Fear of side effects	8	5.4	195	51.2	18.2 (8.6-38.1)
Forgot to take	6	4.1	6	1.6	-
Fear to give drugs to children	5	3.4	18	4.7	1.4 (0.5-3.8)
Other reasons**	5	3.5	21	5.5	1.6 (0.6-4.4)
Exclusion criteria***	19	12.9	17	4.4	-
Total	147*	100	381*	100	5.2 (4.1-6.7)

\*Note: Study subjects who consumed inadequate dosage and who did not consume at all. \*\*Include too old to take drug, chronic disease, I am healthy, felt unnecessary, no reason. \*\*\*Given tablets for consumption but the patients themselves did not consume tablets because of Pregnancy, <2 years old, seriously ill (exclusion criteria). \*Only odds ratio (OR) >1 are mentioned

**Table 4: Distribution of study subjects according to compliance (DEC+albendazole)**

Category	Eligible population	Actually consumed	Compliance	Chi-square test ( $\chi^2$ )
Age (years)				
2-5	57	39	68.4	5.03
6-14	105	80	76.2	df-3
15-59	376	301	80.1	P=0.17*
≥60	59	49	83.1	
Sex				
Male	298	238	79.9	0.60
Female	299	231	77.3	P=0.43*
Area				
Rural area (Benal, Pattadkal, and Girisagar Village)	440	357	81.1	23.36
Urban ward	157	102	65.0	P<0.001**
Bagalkot district total	597***	469	78.6	
Age (years)				
2-5	64	26	40.6	9.23
6-14	105	30	28.6	df-3
15-59	384	152	39.6	P=0.02**
≥60	42	23	54.8	
Sex				
Male	279	103	36.9	0.80
Female	316	128	40.5	P=0.37*
Area				
Rural area (Bindal, Shabad, and Kattisengai Village)	445	210	47.2	52.04
Urban ward	150	21	14.0	P<0.001**
Gulbarga district total	595***	231	38.8	

\*Statistically not significant. \*\*Statistically significant. \*\*\*Note: Study subjects excluding <2 years, pregnant, lactating and seriously ill. Compliance: Bagalkot district vs. Gulbarga district -  $\chi^2 = 194.12$ , P<0.00001

of side effects was much higher in Gulbarga district when compared to Bagalkot district (51.2 and 5.4%, respectively) even though, Only 8% of people who consumed tablets in Bagalkot district and 2.3% in Gulbarga district actually experienced side effects. The probable reason was some rumor spread during the last year MDA campaign regarding the side effects in Gulbarga district.

Similar to other studies, the coverage and compliance were better in rural areas when compared to urban areas in our study.<sup>(10,17,18)</sup> Hence, need special attention

in urban areas during the MDA in our districts. The following recommendations have been suggested for better compliance in the near future MDA programmes in the two evaluated districts based on the observations made by the investigator in the field:

1. In most of the MDA evaluation studies reported till today including the present study, there is a major difference in the reported coverage (drugs distributed) and compliance (actually consumed drugs).<sup>(12-15,17)</sup> Compliance should be considered as the major criterion during the MDA campaign rather than drug distributed because drug coverage is defined



as the proportion of eligible individuals who are actually ingested the drugs. Hence, it is necessary to accentuate "On the spot" drug consumption.<sup>(17,19)</sup>

2. Drug distribution in phases instead of a one day affair. Because one of the operational problems faced during the MDA in our districts over the years was shortage of health care manpower to cover the entire district on a single day. If taluk-wise drug distribution is done on consecutive days so as to cover the entire district within a week utilizing the same available staff in the district may help in achieving better compliance.
3. Health workers as drug distributors instead of student volunteers. One such example is anganwadi workers (AWW's) as drug distributors in Pondicherry showed an increase in compliance from 52.9 to 78.8%. It was also observed that 33.2% of the respondents who accepted the drug did so based on the trust on the AWW's as a government representative.<sup>(15)</sup>
4. At least three mandatory field visits by the health workers during MDA programme. First visit to create complete awareness among the public about the MDA programme. Second visit for drug distribution ("On the spot") and 3<sup>rd</sup> visit (post-MDA follow-up) for redistribution of drugs to missing persons ("On the spot") and attend adverse effects if any.
5. The field staff especially the drug distributors may perhaps be paid better for their motivated and difficult field job.
6. Proper training of drug distributors is necessary because 1% in Bagalkot and 12.4% in Gulbarga districts gave inadequate dosage of MDA drugs; 1.4 and 8.8% in Bagalkot and 0.5 and 3.7% in Gulbarga districts surveyed eligible population were not given drugs because the drug distributors felt that they are too small or too old to get tablets, respectively. Similar observations were made in Gujarat MDA evaluation survey.<sup>(17)</sup>
7. Vector control would be used as an adjuvant to MDA to prevent resurgences. The gains of the MDA's were sustained in combined treatment group (Group B), while resurgences occurred in Group A (only MDA).<sup>(20,21)</sup>
8. Use of appropriate mode of MDA awareness for wide coverage and MDA acceptance. Only 33.8 (148/438) and 24.3% (105/432) were aware of the MDA program in Bagalkot and Gulbarga districts, respectively. Where literacy is high mass media plays an important role as seen in Kerala but in areas with low literacy rates, health personnel play an important role in creating awareness among the public as demonstrated in our study and in Andhra Pradesh.<sup>(13,22)</sup>
9. Some of the health system/policy-related issues like supplies and processes, involvement of midlevel health staff, separate strategies in urban areas, and community-related issues like comprehensive and

timely IEC and community participation will help in achieving the desired coverage and compliance.<sup>(18)</sup>

## Conclusion

The MDA coverage and compliance should be given at most importance because, six rounds of MDA, even with 54–75% treatment coverage, can reduce LF transmission very appreciably and better treatment coverage and a few more rounds of MDA may achieve total interruption of transmission.<sup>(23)</sup>

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