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Coverage and Compliance of Mass Drug Administration in Lymphatic Filariasis: A Comparative Analysis in a District of West Bengal, India

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Original Article

A B S T R A C T

Background: Despite several rounds of Mass Drug Administration (MDA) as an elimination strategy of Lymphatic Filariasis (LF) from India, still the coverage is far behind the required level of 85%.

Objectives: The present study was carried out with the objectives to assess the coverage and compliance of MDA and their possible determinants.

Methods: A cross-sectional community based study was conducted in Paschim Midnapur district of West Bengal, India for consecutive two years following MDA. Study participants were chosen by 30-cluster sampling technique. Data was collected by using pre-tested semi-structured proforma to assess the coverage and compliance of MDA along with possible determinants for non-attaining the expected coverage.

Results: In the year 2009, coverage, compliance, coverage compliance gap (CCG) and effective coverage was seen to be 84.1%, 70.5%, 29.5% and 59.3% respectively. In 2010, the results further deteriorated to 78.5%, 66.9%, 33.3% and 57% respectively. The poor coverage and compliance were attributed to improper training of service providers and lack of community awareness regarding MDA.

Conclusion: The study emphasized supervised consumption, retraining of service providers before MDA activities, strengthening behaviour change communication strategy for community awareness. Advocacy by the program managers and policy makers towards prioritization of MDA program will make the story of filaria elimination a success.

Keywords: Lymphatic Filariasis, Mass Drug Administration (MDA), Coverage, Compliance, Coverage- Compliance Gap (CCG), Effective Coverage (EC).

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Introduction:

Several decades of research and the availability of new diagnostic and effective control tools have led to the development of a strategy to eliminate Lymphatic Filariasis. The newer strategy for elimination of Lymphatic Filariasis aims at breaking the chain of transmission through annual single-dose Mass Drug Administration (MDA) which reduces blood microfilaria by 99% while two drugs [Ivermectin + Diethyl Carbamazine Citrate (DEC) or Albendazole] co-administered and 90% when single drug (Ivermectin or DEC) used.[1] Accordingly, India's National Vector Borne Disease Control Program had scaled-up mass drug administration (MDA) strategy nationwide through administration of single dose of DEC by observing "National filarial Day" (NFD) since 2004. A high coverage of MDA (>85%) in endemic areas sustained for consecutive five years is the

prerequisite for the interruption of transmission and elimination of Filariasis in India.[2]

Despite several rounds of MDA, still the coverage and compliance are far behind the required coverage as reported by several studies in few states of India viz. Orissa and Andhra Pradesh.[3] West Bengal, another state of India was also implementing MDA since 2004 and coverage had gradually increased from 39.58% in 2004 to 77.79% in 2008. Though microfilaria rate was reported as zero for consecutive two years in Paschim Midnapur district, a study from adjacent district revealed microfilaria rate as 9.06%, mean microfilaria density 8.63% and disease rate as 7.72%. [4, 5]

Keeping these facts in mind, Government of West Bengal had decided to evaluate district wise coverage and compliance of MDA along with extent of Information Education and Communication (IEC) activities. Department of Community Medicine of Midnapur Medical College was entrusted to evaluate the situation in the district of Paschim Midnapur.

The study hypothesis was whether effective coverage of MDA was thought to be sufficient to achieve the elimination level of LF in the district of Paschim Midnapur of West Bengal? The main challenge of the study was to find out the outcomes of MDA programme with an aim to overcome the possible bottlenecks in future for success in elimination of Lymphatic Filariasis.

The objectives of the study were to assess the coverage and compliance of Mass Drug Administration (MDA) and possible reasons for noncompliance; to document the side effects of MDA if any and to assess the knowledge of the community regarding Lymphatic Filariasis and MDA.

Methods

Study Setting and Study Design: The largest district of West Bengal, Paschim Midnapur is situated 139 km away from Kolkata with a population of 5.94 million with tribal predominance. The district is noted for its great geographical diversity. The district experienced insufficient both public and private health care delivery system.[6] A cross-sectional descriptive community based study had been conducted consecutively in 2009 and 2010 in the district of Paschim Midnapur of West Bengal, India. The present study was conducted in two phases. The first phase comprised of quantitative survey. The second phase comprised of post-survey qualitative study (mainly FGDs: Focus Group Discussions) to bridge the identified gaps in the information gathered from the survey and also to identify the possible obstacles for achieving the desired coverage along with possible reasons for non-compliance.[7]

Sample Size and Sampling Method: Considering the previous MDA coverage of 77.8% in West Bengal,[8] 5% alpha error; 5% absolute precision and design effect of 2; the minimum required sample size was estimated 526. Considering the 5% non-response rate, the final sample size estimated to be 553.[9] Multi-stage 30-cluster sampling technique was used for selection of the study participants.[10] According to the reported coverage of previous MDA activities by the district health authority, three areas; one from each chosen randomly as the study units from the list of high (> 80% coverage of MDA), medium (50-80% MDA coverage) and low coverage (< 50% MDA coverage) areas by simple random sampling to ensure equal representation. The study sample was drawn from the three different reported coverage areas by 30-cluster sampling technique, where the number of clusters was proportional to the population. From each cluster, 19 study participants were chosen by systematic randomization. A total 630 and 754 population were covered in 2009 and 2010 respectively.

Ethical Issues: The study was approved by the Institutional Ethical Committee of Midnapur Medical College and informed written consent obtained from the each respondent prior to the data collection.

Data Collection: The head of the household or any responsible adult member was considered as the respondent. Prior information was given to some responsible community leaders for sustained co-operation. A group of trained interviewers collected data by using a pre-tested semi-structured proforma undertaking house-to-house visits within two weeks of the MDA campaign over a period of seven days in both the years. The whole activities were supervised and 20% of the proforma were cross-checked on the field by the trained faculty members of the department of community medicine. Data editing and cleaning were done by trained data manager before data entry. Quality control measures were taken in each stage of data collection, collation, compilation and analysis. Information collected on number of eligible members in the family; coverage and consumption of MDA; possible reasons for not consumption; side effects, if any; perception of the respondent about Lymphatic Filariasis & MDA and sources of knowledge. Eligible persons in the family were determined by excluding the children less than 2 years, pregnant women and severely ill persons from the family members. Correct dose received was determined who received the recommended DEC dosage i.e one tablet (100 mg) to children of age 2-5 yr, two tablets for 6-14 yr age group, and three tablets for those > 14 yrs of age.

A total six focus group discussions (FGDs) both with the health care providers as well as with the responsible community members (Two in each of the three reported coverage areas; one with health care providers and other with responsible community members) were also carried out to find out the possible obstacles for desired coverage and reasons for non-compliance. After obtaining informed consent, a group of trained faculty members from the department of Community Medicine, Midnapur Medical College, and West Bengal facilitated FGDs following structured guidelines in local *Bengali* language and a recorder carefully recorded the discussions.

The main evaluation criteria for the study were to assess the coverage and compliance of MDA programme and possible correlates for noncompliance along with the impact of BCC (Behavioral Change communication) strategies delivered by the government for successful implementation of the MDA programme.

Statistical Analysis:

The data was analyzed by using Epi_info 6.04 software package. Simple proportions were used for interpretation and expressed as coverage, compliance, effective coverage (EC: proportion of compliance in respect to eligible population) and coverage compliance gap (CCG: proportion of covered people not consuming the drugs). Z tests were used for comparisons between two proportions and $P < 0.05$ was taken as the level of significance. A content analysis of the qualitative data was undertaken.

Results

A total 630 and 754 population was covered in 2009 and 2010 by undertaken survey among 131 and 135 households respectively in Paschim Midnapur district. Total 592 and 659 eligible populations were found respectively in the two successive years respectively. Males and females were of almost equally distributed in both the years. According to age groups, 7.1% and 5.5% belonged to 2-5 years, 16.6% and 18.6% to 6-14 years and 76.3% and 75.9% above 14 years in 2009 and 2010 respectively. Majority of the respondents were above 18 years and females in both the years with the median age of 34 and 35 respectively.

In the year 2009, 84.1% eligible members received DEC and among those who received DEC, 70.5% consumed with a coverage compliance gap of 29.5% and effective coverage being 59.3% [Table 1]. In the year 2009, among 29.5% who had not complied, 15.9% had not received the drugs and remaining 13.6% had not consumed them [Figure 1]. Distribution of Albendazole tablets was not included in the program in that year. In 2010, 78.5% received DEC and among those received, 66.9% consumed DEC with the coverage-compliance gap and effective coverage were 33.3% and 57% respectively. In 2010, a total of 33.3% of the respondents had not complied MDA, out of which 21.5% had not received the drugs and 11.8% did not consume [Figure 1]. In that year 76.9% received Albendazole tablets, of which 65.1% consumed them. The difference of coverage and compliance of MDA between 2009 and 2010 were seen statistically significant (Coverage: z= 11.25, p= 0.008 and Compliance: z= 14.00, p= 0.007). The data was calculated based on correct doses of DEC received and correct doses consumed. While considering the age wise compliance of MDA in 2009 and 2010, compliance was also significantly less in 2- 5 years (71.4% vs. 58.6%, p=0.006) and above 14 years age groups (70.6% vs. 66.2%, p= 0.006) in 2010 compared to 2009. While comparing sex and residence wise, compliance was also significantly lower in both sexes (p= 0.006) and both rural and urban population (p= 0.006) in 2010 compared to 2009 [Table 1].

Table 1: Coverage compliance gap (CCG) and Effective coverage (EC) according to Selected demographic characteristics

Demographic Characteristic	2009					2010				
	Eligible popln. (n=592)	Coverage (n=498)	Compliance (n=351)	CCG* (%)	EC** (%)	Eligible popln. (n=754)	Coverage (n=717)	Compliance (n=377)	CCG* (%)	EC** (%)
Age (Years) :										
2 - 5	42	35	25	28.6	59.5	37	29	17	41.4	45.9
6 - 14	98	82	57	30.5	58.2	122	90	65	27.8	50.2
>14	412	381	269	29.4	59.5	500	444	294	33.8	61.4
Sex:										

Male	289	243	170	30.0	58.8	328	287	191	33.4	58.2
Female	303	255	181	29.0	59.7	331	276	185	33.0	55.9
Residence:										
Rural	429	360	259	30.0	58.7	498	428	285	33.4	57.2
Urban	163	138	99	28.3	60.7	161	135	91	32.6	56.5
Total	592	498	351	29.5	59.3	754	717	377	33.3	57.0

* CCG: Coverage Compliance gap; ** EC: Effective Coverage

In 2010, drugs were distributed by community volunteers (48.8%), Auxiliary Nurse Mid-wives i.e. ANMs (34.4%), followed by Anganwadi Workers i.e. AWWs (6.4%) and Accredited Social Health Activists i.e. ASHAs (5.4%). But in no case, it was found supervised. In 2009, drugs were mainly distributed by ANMs and local volunteers, but no workers persuaded the defaulters to take drugs and no persons swallowed drugs in front of the workers as they were instructed to take the tablets after meals.

Fear of side effects was the most frequent cause of non-consumption of DEC in both the years - 69.4% (102 out of 147) in 2009 and 72.6% (135 out of 186) in 2010, followed by unawareness and lack of faith. In 11 households, 24 (5.7%) persons had side effects in 2010, of which 21 i.e 87.9% had dizziness. Other side effects were fever and vomiting. All these side effects were reported from only one rural block. Most of the side effects occurred within 24 hours (95.8%), out of which 45.8% of the side effects were reported to occur within one hour of consuming the drugs. Although 79% didn't consult, 16.4% consulted ANM for side effects. No side effects were reported in 2009.

Among the respondents, the knowledge about lymphatic Filariasis, symptoms, mosquito as important element behind filaria and anti mosquito and MDA as preventive measures were significantly lower in 2010 than 2009, but knowledge about MDA was seen significantly better in 2010 compared to 2009 [Table 2]. Regarding symptoms of filaria, majority perceived swelling of legs (>95%) and fever (about 45%) as the symptoms. While assessing the source of information, in 2010, majority got the information from ANM (66.7%) followed by relatives and ASHA. Regarding the communication channels, 33.3% received the information through Inter Personal Communication followed by 15% from television. 97% respondents told that health workers didn't talk with them about MDA in last fortnight. In 2009, 64.9% of the respondents heard first time about MDA on the day of drug administration; 76.3% were explained about the disease and its transmission and only 28.2% could know about MDA from miking and hand bills.

Table **2: Knowledge regarding Lymphatic Filariasis and MDA programme**

Knowledge	**2009** No. (%)	**2010** No. (%)	p value
Heard about L.F	83/131 (63.4)	78/135 (57.8)	0.006
Correctly told 1or 2 symptoms	64/83 (77.1)	54/78 (69.2)	0.007
Mode of transmission of L.F :			
Mosquito	41/83 (49.4)	32/78 (41.0)	0.0045
Wrong/ no knowledge	42/83 (50.6)	46/78 (59.0)	0.0047
Disease can be prevented	41/83 (49.4)	35/78 (44.9)	0.005
Modes of prevention :*			
Anti-mosquito measures	20/41 (48.1)	20/35 (58.4)	0.005
M.D.A	07/41 (17.1)	08/35 (22.8)	0.001
Wrong or No knowledge	16/41 (39.0)	16/35 (45.7)	
Heard about M.D.A	54/131(41.2)	60/135(44.4)	0.004

* Multiple responses

Focus group discussion of the health care providers revealed that in many cases drugs could not be distributed to the beneficiaries as the family was out of station on the 'Filaria' day, shortage of drugs or manpower, lack of interest among drug distributers due to poor incentive. It was also evident that the health

care providers had misconception about eligibility and correct doses of MDA for different age groups. The reasons for non- compliance as revealed from in depth interview of community members were drug distributors not visiting the households, lack of confidence upon some drug distributors, people not feeling the necessity for consumption of MDA as they were healthy or did not have any symptoms, forget to The present study revealed MDA coverage of 84.1% and 78.5% in 2009 and 2010 respectively in the studied areas of Paschim Midnapur district, which was less than the national coverage as well as the desired coverage level for elimination of Lymphatic Filariasis.[2] Similar coverage was reported by two other studies from India.[11,12] Several studies across the India reported even lower coverage ranged from 32.7% to 76.2%.[3, 13-15] Though a study from Sri Lanka also reported a more or less similar (79.6%) coverage, lesser coverage (58%) reported from Indonesia.[16,17]

The success of elimination mainly depends on the actual consumption or compliance with MDA rather than the MDA coverage. Published estimates reporting MDA coverage often overestimated the actual consumption.[18, 19]

The present study revealed that actual MDA compliance was 70.5% and 66.9% in 2009 and 2010 respectively which corroborates with the findings of few other studies.[3,13,16] But, several other studies across India revealed varied MDA compliance ranged from 42% to 89%. [11,12,14,15]

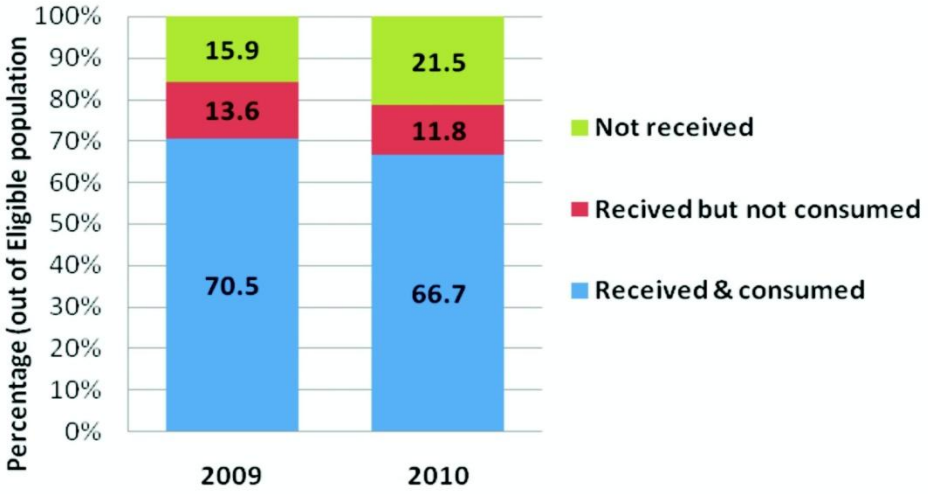
consume, too many tablets to be taken at a time, fear of side effects especially in case of children and poor awareness regarding the benefits of MDA.

Discussion Lymphatic Filariasis (LF) is a major public health problem in India. The disease remains a major impediment to socio-economic development the country.

Coverage compliance gap (CCG) is a better indicator for assessing the effectiveness of MDA program among programme managers. It actually reflects the proportion of covered people not consuming the drugs and explores the possible determinants for non-consumption. The present study revealed a CCG of 29.5% and 33.3% in 2009 and 2010 respectively. No significant differences in CCG were observed in respect to gender, area of residence and age except in 2010, where CCG was found significantly more in the age group of 2-5 years, probably due to fear of side effects among children. Surprisingly, even 3.8% increase of CCG in 2010 was probably due to lesser IEC activities in that year as compared to previous year (2009) as reflected from our study findings. Lesser proportion of CCG (11%) was reported from a study conducted in Gujrat.[12] The difference might be due to different study setting. The CCG may be bridged up by giving enormous effort on BCC strategies to an aim to motivate the people for drug consumption and stressed on supervised dosage.

Effective coverage is one of the most valuable indicators because it reflects both coverage and compliance. It actually denotes the compliance by the

Figure-1: Year wise Coverage and Consumption of DEC



community in respect to the eligible population. The effective coverage of MDA in successive two years (57% and 59.3% in 2009 and 2010 respectively) were far behind the recommended level (≥85%) in the present study. Here also, the observed effective coverage (EC) found less in 2010. Some studies from India though reported better effective coverage of MDA, but still not up to the desired level.[12,3,15]

From the focus group discussion of the health care providers and in depth interview of the beneficiaries, it was evident that the poor coverage was either due to drug distributors not visiting the households or the family was out of station on the date of drug distribution. Desired coverage could not be achieved due to shortage of drugs or manpower for drug distribution, lack of adequate monetary incentives and the only one day time limit for the distribution of MDA. Lack of proper knowledge regarding eligibility, misclassification of the eligible population and distribution of incorrect dosage of drugs by some drug distributors ultimately affected the coverage as reflected from the present study. Kumar et al. had similar observations in Gujrat.[12] It warrants the proper selection of the drug distributors, periodic retraining of them with emphasis on communication skills and correct knowledge regarding LF and MDA including its side effects. In this regard, Nandha et al. recommended that Anganwari workers (AWWs) could be a better service provider/distributor to achieve the optimal level of coverage of MDA if they could be equipped with current knowledge and skills.[11] It is also crucial to monitor the quality of the performance of grass root level health care providers on a regular basis.

Reported side effects (only 5.7% in 2010 and none in 2009) after consumption of DEC were found minimal in the present study and all of them were mild in nature, which indicated low endemicity of filaria in the study district. The finding corroborated with the prevailing data from the government of West Bengal.[8] Similar lower incidences of side effects were reported from endemic areas of Gujrat and rural West Bengal of India.[12, 20]

For the compliance of MDA, awareness of the community is an important issue. The study revealed poor knowledge of the community regarding "Lymphatic Filariasis" and annual "Mass drug administration" (MDA) even after six rounds of the Desired coverage level of MDA which is necessary for elimination of lymphatic filariasis was not observed in the present study in-spite of several rounds of MDA activities since 2004 in the district of Paschim Midnapur. From the programme point of view, the two important outcome indicators such as coverage MDA program. Only around 1/5th of the respondents knew that MDA was an important tool for the prevention of LF and 3/5th of them had not even heard the name of MDA. A great number of respondents told that they heard first time about MDA on the day of drug distribution. In the years (2009 and 2010), the knowledge regarding LF and MDA were found unsatisfactory and the picture further worsened in 2010. Mukhopadhyay et al. also demonstrated similar observations in from rural areas of Andhra Pradesh, India.[3] Regarding the channels of behavioral change communication, both inter-personal and mass media communication strategy were found inadequate for awareness generation among the community, which necessitates the strengthening of BCC activities. The success of elimination would not be possible without the generation of felt need of the community/people, which must not be ignored.

Reasons for the failure of compliance as evident from the present study were people not feeling the necessity for consumption because they were healthy or did not have any symptoms, forget to consume, too many tablets to be taken at a time, fear of side effects especially in case of children, poor awareness regarding the benefits of MDA and lack of confidence upon the drug distributors. The present study revealed that drug distributors neither sensitized the community well in advance regarding the importance of the "Mass Drug Administration" nor the conducted MDA activities were found supervised in both the years. A study from Gujrat, India also reported similar observations.[12] Basically the MDA program was found only restricted to the distribution of DEC and Albendazole tablets and issues like adherence to the drug schedule, knowledge of the community regarding Lymphatic Filariasis and it's common preventive and control measures including MDA and also the fear of side effects were not comprehensively addressed as evidenced from this study. Similar findings were observed by several other studies across India. [19,21] In-spite of remarkable social burden and amenable for eradication, Lymphatic Filariasis has not got priority from the policy makers and program managers and thus making the success story of elimination a remote possibility. There is ample scope for advocacy especially from the public health personals for transforming this issue as a public health agenda

Conclusions

compliance gap (CCG) and effective coverage (EC) which actually reflects the effectiveness of the MDA activities were also not up to the recommended level. The indicators rather detoriated with passage of time as evidenced from the study which necessitates the importance of supervised DEC consumption, retraining

of service providers before MDA activities, strengthening behaviour change communication strategy for community awareness. The community should be sensitized and boostered repeatedly though-out the year by means of inter-personal communication by motivated front line health workers as well as mass media communication strategy regarding the LF and MDA. Advocacy by the program managers and policy makers towards prioritization of MDA program will make the story of filaria elimination a success.

However, the limitation of the study should be kept in mind. The study was carried out in a small geographical area (in a district of West Bengal), and the findings should be validated by carrying out large scale studies involving large geographical areas so that the findings can be generalized to larger population group.

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