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## **ANNUAL MASS DRUG ADMINISTRATION TO ELIMINATE LYMPHATIC FILARIASIS: A STUDY IN PURBA MEDINIPUR DISTRICT OF WEST BENGAL, INDIA**

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### **ABSTRACT**

Background: Filariasis is still a major socioeconomic and public health problem in India. Filaria elimination depends on people's knowledge and acceptance of annual mass drug administration (MDA) strategy. Objective: The present study intends to assess people's knowledge of filariasis and MDA, their compliance of MDA and the efficiency of the MDA delivery system. Method: Multistage sampling design was adopted for this cross-sectional observational descriptive study. Senior-most member present in each of the 30 households selected in each of 3 rural and 1 urban clusters was interviewed. The schedules were analyzed by standard statistical methods. Results: 93.5% individuals were eligible for MDA. 73.7% of them consumed the drugs during last MDA round. 85.1% respondents were aware of filaria and 38% knew its mode of transmission. 28.9% respondents recommended anti-mosquito measures for prevention of filaria, but 8.3% stated that prevention is impossible. 57% families were sensitized about MDA by health workers. Health workers distributed MDA drugs to 9.1% families. 36.8% of the urban eligible were defaulters. The differences of defaulter rates between rural and urban clusters as well as between old (>60 years) and others are statistically significant ( $p < 0.05$ ). Most important reason for non-compliance is 'fear of side effects' (41.5%). 2.0% complained of minor side effects. Conclusion: There is a need for appropriate tools, procedures and criteria for monitoring the quality of reporting and for evaluating the impact of the program. Tracking of defaulters should be incorporated in the program to improve coverage.

**Key Words:** *Filaria Elimination, Mass Drug Administration, Non-compliance*

### **INTRODUCTION.**

In spite of the National Filaria Control Program since 1955 filariasis is still a major public health problem in India. The disease was recorded in India as early as 6<sup>th</sup> century B.C. by Susruta in his book 'Susruta Samhita'. Currently indigenous cases have been reported from about 250 districts in 20 states/ Union Territories. (Government of India, 2007). Purba Medinipur district of West Bengal is one of them.

Elimination of Lymphatic Filariasis by 2015 is the 'National Goal'. The main control measures are mass diethylcarbamazine (DEC) administration, antilarval measures in urban areas and indoor residual spray in rural areas. Annual Mass Drug Administration (MDA) with single dose of DEC was taken up as a pilot project in 1996-97. During 2004 about 400 million populations were brought under MDA. This strategy has been continued for 5 years or more to the population excluding children below two years, pregnant women and seriously ill persons to interrupt transmission of the disease. (Government of India, 2007).

In 2009, the strategy of co-administration of DEC and Albendazole was taken up in all endemic districts in stead of DEC alone. West Bengal observed MDA on 6<sup>th</sup> May 2010. (Government of India, 2010). Global Program to Eliminate Lymphatic Filariasis proposed the administration of a single dose regimen of diethylcarbamazine and albendazole in endemic areas. (Krentel *et al.*, 2006). Annual single-dose co-administration of two drugs reduces blood microfilariae by 99% for a full year while a single annual dose

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of DEC can result in 90% reduction. (Agrawal and Sashindran, 2006). Field studies confirm that such reduction can interrupt transmission. (Ottesen *et al.*, 1997). Mass drug administration to eliminate filariasis is already in place in 32 of the 83 endemic countries. (Ramaih and Das, 2004).

The overall coverage of MDA in 16 states/UTs of India in 2009-10 round is 88.29 %.( Government of India, 2010). The total population and target population (80%) of Purba Medinipur district are 5013789 and 4011013 respectively. The district has achieved 90.05% coverage of MDA in 2010. But the coverage of about 10% urban population of the district was as low as 53.8% of the target. The side-effects of MDA, mostly minor, are negligible at 0.009%. Filariasis prevalence of the district is 0.05%. (Government of West Bengal, 2010).

The success of MDA depends on people's knowledge which is responsible for the acceptance or rejection of such strategy. It also depends on the program delivery system. Hence, the present study intends to assess people's knowledge of filariasis and MDA, their compliance of MDA and the efficiency of the MDA delivery system at the field level.

### **METHODS**

This cross-sectional observational descriptive study through interview was undertaken in August 2010 by a team of faculty members of the Department of Community Medicine of Institute of Post Graduate Medical Education and Research, Kolkata.

A semi-structured schedule designed by the Department of Health, Government of West Bengal was used as the study tool. As provided in the government protocol the study was conducted in 4 clusters of 30 families each in the district of Purba Medinipur.

Since 90% of the population of the district reside in the rural area having high MDA coverage the rural blocks were stratified into high (>95%), medium (85-95%) and low (<85%) reported coverage categories. Then multistage sampling design was adopted. Using random sampling technique Chandipur block, Nandakumar Block and Shahid Matangini block were selected from high, medium and low coverage areas. In the second stage Erasal PHC was selected from Chandipur block by simple random sampling. Then Khandapasara sub-centre and finally Mograjpur village was picked up randomly. Similarly Sitalpur and Narayandari villages were selected from Nandakumar and Shahid Matangini blocks respectively.

Of five municipalities Tamluk followed by ward no.9 amongst its 18 wards was randomly selected. Each of these four clusters was surveyed by two faculty members. Standing at the centre of the cluster the paths were numbered. Two paths were selected randomly for house to house visit by two surveyors. The number of households along each path was estimated. Then the first house was chosen randomly. (Government of India, 1990). 15 households were covered by each faculty member. Senior-most member present in each household was interviewed.

After the schedules were administered analysis of data was done by standard statistical methods. Percentages were calculated for descriptive statistics. Suitable statistical test (z-test) was employed whenever required.

### **RESULTS**

Total population of 121 households in 3 rural and 1 urban clusters was 648. Based on National Vector Borne Disease Control Program exclusion criteria (Government of India, 2007). 606 (93.5%) individuals were eligible for MDA.

From 'Table 1' it is evident that though 103 (85.1%) respondents were aware of filaria only 46 (38%) knew the mode of transmission of the disease. 74 (61.2%) and 31 (25.6%) persons stated 'swelling of leg' and 'fever' respectively as sign or symptom. 35 (28.9%) persons mentioned different anti-mosquito measures for prevention of the disease; 21 (17.4%) recommended 'drugs' for filarial prevention. 10 (8.3%) respondents stated that filaria prevention is not possible. 98 (81%) had knowledge of last MDA round. 69 (57%) and 46 (38%) persons came to know about the last round of MDA by 'personal

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communication' and 'Mike announcement' respectively. Anganwadi workers (AWW) topped the list by contacting 30 (24.8%) families. Anganwadi workers are community-based workers of 'Integrated Child

**Table 1: Distribution of respondents according to their knowledge of Filariasis and Mass Drug Administration.**

| <b>Knowledge items</b>                 | <b>Mograjpur</b>           | <b>Sitalpur</b>            | <b>Narayandari</b>         | <b>Tamluk Wd. 9</b> |
|--|----------------------------|----------------------------|----------------------------|---------------------|
| <b>Total (%)</b>                       | <b>(n<sub>1</sub>= 30)</b> | <b>(n<sub>2</sub>= 30)</b> | <b>(n<sub>3</sub>= 31)</b> | <b>(N=</b>          |
| <b>121)</b>                            |                            |                            |                            |                     |
| <b>Heard the name 'Filariasis':</b>    | 27                         | 25                         | 23                         | 28                  |
| 103(85.1)                              |                            |                            |                            |                     |
| <b>Signs/ Symptoms of Filariasis*:</b> |                            |                            |                            |                     |
| Fever                                  | 4                          | 2                          | 13                         | 12                  |
| 31(25.6)                               |                            |                            |                            |                     |
| Swelling of leg                        | 22                         | 18                         | 16                         | 18                  |
| 74(61.2)                               |                            |                            |                            |                     |
| Pain                                   | 3                          | 1                          |                            | 4                   |
| (3.3)                                  |                            |                            |                            |                     |
| Swelling of genitalia                  | 3                          |                            | 2                          | 5                   |
| (4.1)                                  |                            |                            |                            |                     |
| <b>Transmission of Filariasis:</b>     |                            |                            |                            |                     |
| Mosquito-bite                          | 8                          | 12                         | 9                          | 17                  |
| 46(38.0)                               |                            |                            |                            |                     |
| Direct contact                         | 2                          | 1                          |                            | 3                   |
| (2.5)                                  |                            |                            |                            |                     |
| Air-borne                              |                            |                            | 1                          | 1                   |
| (1.7)                                  |                            |                            |                            |                     |
| Water-borne                            |                            |                            | 1                          | 1                   |
| (0.8)                                  |                            |                            |                            |                     |
| <b>Prevention of Filariasis:</b>       |                            |                            |                            |                     |
| Anti-mosquito measures                 | 3                          | 6                          | 9                          | 17                  |
| (28.9)                                 |                            |                            |                            |                     |
| Drug consumption                       | 5                          | 9                          | 1                          | 6                   |
| 21(17.4)                               |                            |                            |                            |                     |
| Others**                               |                            | 1                          | 2                          | 3                   |
| (2.5)                                  |                            |                            |                            |                     |
| Not possible                           | 2                          | 4                          |                            | 4                   |
| (8.3)                                  |                            |                            |                            |                     |
| <b>Prior knowledge of</b>              |                            |                            |                            |                     |
| <b>Last MDA round:</b>                 | 26                         | 19                         | 30                         | 23                  |
| 98(81.0)                               |                            |                            |                            |                     |

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**Media of knowledge of MDA**

|                                    |    |    |    |    |
|------------------------------------|----|----|----|----|
| Leaflet<br>26(21.5)                |    |    | 24 | 2  |
| Mike announcement<br>46(38.0)      | 11 | 5  | 15 | 15 |
| Television and Radio<br>20(16.5)   |    | 8  | 4  | 8  |
| Poster<br>(5.8)                    | 7  |    |    | 7  |
| Personal communication<br>69(57.0) | 14 | 18 | 16 | 21 |

**Source of personal communication of MDA**

|                                |   |    |    |    |
|--------------------------------|---|----|----|----|
| Health worker<br>27(22.3)      |   | 13 | 12 | 2  |
| Anganwadi worker<br>30(24.8)   |   | 1  | 18 | 11 |
| Volunteer<br>22(18.2)          |   | 8  |    | 14 |
| Health Supervisor<br>21(17.4)  |   |    |    | 21 |
| Others <sup>***</sup><br>(5.8) | 1 | 2  | 4  | 7  |

\* Multiple responses were considered; \*\* includes 'drinking boiled water' and 'avoiding direct contact';  
\*\*\* includes relative, doctor and neighbor.

Development Services'– India's response to the challenge of providing package of services in a convergent manner for the holistic development of the child.

Table 2 suggests that, though 98 (81%) had knowledge of last MDA round, 69 (57%) families were sensitized about MDA by health workers prior to 'filaria day'.

**Table 2: Performance of health workers in respect of Mass Drug Administration.**

|  | Mograjpur<br>(n <sub>1</sub> = 30) | Sitalpur<br>(n <sub>2</sub> = 30) | Narayandari<br>(n <sub>3</sub> = 31) | Tamluk<br>(n <sub>4</sub> = 30) | Wd.9<br>(N= 121) | Total(%) |
|--|------------------------------------|-----------------------------------|--------------------------------------|---------------------------------|------------------|----------|
| <b>No. of families received prior information about MDA:</b>                     | 26                                 | 19                                | 30                                   | 23                              |                  | 98 (81)  |
| <b>No. of families received prior information about MDA from health workers:</b> | 14                                 | 18                                | 16                                   | 21                              |                  | 69 (57)  |
| <b>Health worker who distributed drugs for MDA:</b>                              |                                    |                                   |                                      |                                 |                  |          |
| <b>Anganwadi worker</b>  | 02                                 | 30                                | 10                                   |                                 |                  | 42(34.7) |
| <b>Health worker</b>   | 11                                 |                                   |                                      |                                 |                  | 11(9.1)  |
| <b>Volunteer/ Mobiliser</b>  | 17                                 |                                   | 21                                   |                                 |                  | 38(31.4) |
| <b>First tier supervisor</b>   |                                    |                                   |                                      | 30                              |                  | 30(24.8) |

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Drugs for MDA were distributed to all 30 urban families by first level supervisor. AWW and other volunteers distributed MDA drugs to 42 (34.7%) and 38 (31.4%) families, all in the rural areas. Health workers distributed MDA drugs to only 11 (9.1%) families.

Table 3 shows that 159 (26.3%) persons among the 606 MDA eligible were left out of MDA net for various reasons. They were termed 'defaulters'. 28 (17.6%) of them were of '>60 years' age group which comprises of 10.6% of the eligible population. Of the reasons for non-compliance of MDA drugs the most important was 'fear of side effects' (41.5%). 54 (34.0%) respondents did not feel the need to consume a number of tablets when they are healthy.

**Table 3: Distribution of the eligible study population who were left out in the last round of Mass Drug Administration.**

|                                   | Number of Mass Drug Administration Defaulters |           |          |             |              | Total(%)   |
|-----------------------------------|---|-----------|----------|-------------|--------------|------------|
|                                   | MDA Eligible (%)                              | Mograjpur | Sitalpur | Narayandari | Tamluk Wd. 9 |            |
| <b>Age Distribution:</b>          |   |           |          |             |              |            |
| 2- 4 years                        | 34 (5.6)                                      |           | 02       | 03          |              | 005 (03.1) |
| 5- 14 years                       | 98 (16.2)                                     | 01        | 01       | 12          | 10           | 024 (15.1) |
| 15-29 years                       | 183 (30.1)                                    | 08        | 12       | 11          | 13           | 044 (27.7) |
| 30- 60 years                      | 227 (37.5)                                    | 04        | 09       | 22          | 23           | 058 (36.5) |
| >60 years                         | 064 (10.6)                                    | 07        | 06       | 05          | 10           | 028 (17.6) |
| <b>Total:</b>                     | 606 (100)                                     | 20        | 30       | 53          | 56           | 059 (100)  |
| <b>Reasons of Non-compliance:</b> |   |           |          |             |              |            |
| Sick                              |   | 03        | 01       |             | 01           | 05 (3.1)   |
| Absent                            |   | 04        | 03       | 05          |              | 12 (7.6)   |
| Did not feel the need             |   | 07        | 08       | 03          | 36           | 54 (34.0)  |
| No faith                          |   | 02        |          | 03          | 03           | 08 (5.0)   |
| Fear of side effects              |   | 03        | 12       | 42          | 09           | 66 (41.5)  |
| Others*                           |   | 01        | 06       |             | 07           | 14 (8.8)   |
| <b>Total:</b>                     |   | 20        | 30       | 53          | 56           | 159 (100)  |

\* includes 'old age' and 'refusal to take allopathic medicine'

Table 4 indicates that 28 (43.8%) of 64 '>60 years' eligible persons were defaulters against 131 (24.2%) of 542 eligible persons up to 60 years of age and this difference is statistically significant (p< 0.05).

**Table 4: Summary of defaulters by age, sex and residence**

|                   | MDA Eligible | MDA Defaulter | Percentage | z-Test Result |
|-------------------|--------------|---------------|------------|---------------|
| <b>Age:</b>       |              |               |            |               |
| Up to 60 years    | 542          | 131           | 24.2       | p< 0.05       |
| >60 years         | 064          | 028           | 43.8       | significant   |
| <b>Sex:</b>       |              |               |            |               |
| Male              | 312          | 078           | 25         | not           |
| Female            | 294          | 081           | 27.5       | significant   |
| <b>Residence:</b> |              |               |            |               |
| Rural             | 454          | 103           | 22.7       | p< 0.05       |
| Urban             | 152          | 056           | 36.8       | significant   |

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Similarly the difference of defaulter rates between rural and urban population is also statistically significant ( $p < 0.05$ ). But the difference of defaulter rates between males and females is not statistically significant 9 (2.0%) of the 447 individuals who consumed anti-filarial medications in the last annual MDA round reported minor side effects like dizziness, vomiting and skin rash. 8 of them consulted none and the other reported to the AWW and was locally managed.

### **DISCUSSION**

The estimates in 2001 indicate that about 125 million urban and about 348 million rural people in India are exposed to the risk of bancroftian infection. About 31 million people are estimated to be harbouring microfilaria (mf) and over 23 million are having filaria disease manifestations. (Agrawal and Sashindran 2006).

According to the 'Performance Report of the National Filaria Day- 2010' the Purba Medinipur district has achieved 90.05% coverage of MDA in 2010. (Government of West Bengal 2010). But the present study shows that 73.7% persons among the MDA eligible consumed the drugs during last MDA round. This difference is, to a great extent, due to different denominators. Taking 80% of the total population as target population the coverage in this study could have been 86.3%. Even then the coverage is lower than the reported coverage. Since 93.5% individuals were eligible for MDA in this study the practice of taking 80% of total population as target population should be revised to elicit true coverage. Krentel et al stated that, in order to interrupt parasite transmission, MDA has to be sustained for a period of 6 years provided that a significant proportion of the community complies with treatment. (Krentel *et al.*, 2006). However, five to ten rounds of treatment with 75-80% MDA compliance could possibly eradicate the disease by reducing transmission to very low levels. (Rath *et al.*, 2006). There is a need for appropriate tools, procedures and criteria for monitoring the quality of reporting and for evaluating the impact of the program, particularly in the poor performing areas. Tracking of the defaulters may be incorporated in the program to improve coverage.

It is evident from this study that 38% knew the mode of transmission of the disease. Though 28.9% respondents mentioned different anti-mosquito measures for prevention of filaria, 8.3% stated that filaria prevention is not possible. Rath et al observed that majority of people linked filaria with heredity. There is no significant increase in knowledge even after MDA. Many people from the lower economic strata did not think that the disease is transmitted by mosquito bite. It was also revealed in their study that many people think that the disease cannot be eliminated. (Rath *et al.*, 2006).

The present study revealed that though 81% respondents had prior knowledge of last MDA round, 57% families were sensitized about MDA by health workers before drug distribution. Thus additional 24% families came to know about MDA from other sources. The data in the study of Rath et al indicated that only 14% respondents were aware of MDA before MDA. (Rath *et al.*, 2006). In our study no category of health functionaries could inform even 25% beneficiaries about MDA. Anganwadi workers and Health workers reached 24.8% and 22.3% families respectively and their activities were restricted to rural areas. Drugs for MDA were distributed to 100% urban families by the first level supervisor. This may be due to poorly developed urban primary health care infrastructure in the country. However, the opportunities of home visits, outreach immunization sessions and 'Village Health Nutrition Day' programs must not be lost to disseminate information regarding 'Filaria Day'.

In this study proportional defaulter rate is more than the proportional population in the '>60 years' age-group. Hence, this group needs more attention. The misconception that old age is a contra-indication of MDA should be removed by counseling. Similarly 36.8% of the urban eligible were defaulters; so customized motivation drive should be organized for urban area. The urban primary health care infrastructure needs to be strengthened and urban local bodies need to be more sensitized. Of the reasons for non-compliance of MDA the most important is 'fear of side effects' (41.5%). 34.0% respondents did not feel the need to consume a number of tablets when they are healthy. But these people did not object

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when their family members consumed the drugs. This indicates that the resistance is not rigid and they can be motivated, if their worries and reservations are adequately addressed.

In this study 2.0% individuals who consumed anti-filarial medications during MDA complained of minor side effects like dizziness, vomiting and skin rash. In the past, adverse reactions have hindered the progress of filaria elimination in Indonesia and resulted in initial hesitancy to use single dose MDA Program. (Krentel *et al.*, 2006). Adverse reactions following single dose treatment with DEC alone or combined with albendazole have been shown to be more severe for those individuals infected with *B. timori* than for those with *W. bancrofti*. (Supali *et al.*, 2002). In mainland India, *Wuchereria bancrofti* transmitted by *Culex quinquefasciatus*, has been the most predominant infection contributing to 99.4% of the problem in the country. (Agrawal and Sashindran, 2006). However, the official figure of side-effects due to MDA is negligible at 0.009% in the Purba Medinipur district. (Government of West Bengal, 2010). The single dose mass therapy (Filaria Day) has been found to be as 'easy to do', inexpensive, pro-poor and effective as 12 day therapy, as a public health measure, with lesser side effects, enhanced public compliance and decreased delivery costs. (Ramaiah *et al.*, 2001). It can be integrated with the existing primary health care system. Single dose mass therapy (Filaria Day) in combination with other strategies has already eliminated lymphatic filariasis from China, Japan, Thailand, Korea and other countries. (Molyneux, 2003)

India contributes to 41 % of global lymphatic filariasis. Very high coverage (probably > 85%) of single dose mass therapy is required to achieve interruption of transmission and elimination of the disease. Hence, there is an urgent need for more effective drug delivery strategies and more treatment compliance. As a signatory to global elimination of lymphatic filariasis resolution (1997), India must strengthen the annual single dose mass therapy (Filaria Day) program. (Agrawal and Sashindran, 2006).

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