



## **Filarial Elimination in India Missing Its Deadline— Evidence from a Cross Sectional Study of Four Districts of Uttar Pradesh**

**S. K. Singh<sup>1</sup>, Monica Agarwal<sup>1</sup>, Uday Mohan<sup>1</sup> and Pavan Pandey<sup>2\*</sup>**

<sup>1</sup>*Department of Community Medicine, King George Medical University, Lucknow City,  
U.P. State, India.*

<sup>2</sup>*Department of Community Medicine, RKDF Medical College, Bhopal City,  
Madhya Pradesh State, India.*

### **Authors' contributions**

*This work was carried out in collaboration between all authors. Authors SKS, MA and UM designed the study, designed questionnaire, trained data collection team, correction and proof reading of manuscript. Author PP was leader of data collection team, data entry, analysis and preparation of the manuscript. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/IJTDH/2016/21628

#### Editor(s):

- (1) Nicolas Padilla-Raygoza, Department of Nursing and Obstetrics, Division of Health Sciences and Engineering, Campus Celaya Salvatierra, Mexico.  
(2) Giuseppe Murdaca, Clinical Immunology Unit, Department of Internal Medicine, University of Genoa, Italy.

#### Reviewers:

- (1) Puneet Aggarwal, All India Institute of Medical Sciences, New Delhi, India.  
(2) Zaid O. Ibraheem, Universiti Putra Malaysia, Malaysia.  
(3) R. Sivasamy, Bharathiar University, India.  
(4) María Serrano, Universidad Miguel Hernández, Spain.

Complete Peer review History: <http://sciencedomain.org/review-history/12531>

**Original Research Article**

**Received 26<sup>th</sup> August 2015  
Accepted 4<sup>th</sup> November 2015  
Published 2<sup>nd</sup> December 2015**

### **ABSTRACT**

**Objective:** India in its national health policy-2002 proposed to eliminate filaria from India by 2015. For this India started Mass Drug Administration in year 2004. Since then few states has already achieved zero micro filarial rate, but filaria is still endemic in many states and districts of India. By looking at recent trends of Mass Drug Administration coverage it seems that target of eliminating filaria will miss its proposed deadline.

**Materials and Methods:** A cross sectional study was conducted in *Lucknow, Sitapur, Rae-Bareilly* and *Hardoi* districts of Uttar Pradesh in the month of May 2014 to assess the coverage of Mass

\*Corresponding author: Email: [dnameispaone@gmail.com](mailto:dnameispaone@gmail.com);

Drug Administration conducted earlier in 2014. A total of 480 houses in the four districts were covered and the eligible population living in these household were interviewed regarding various aspects of the Mass Drug Administration programme.

**Results:** A total of 2,455 individuals residing in 480 houses were covered. The overall drug coverage of Mass Drug Administration in selected four district for Lymphatic Filariasis was 64.8%. Out of 1,592 person to whom drug was given only 1,154 (72.5%) actually consumed drug hence the net effective coverage of the Mass Drug Administration against LF in all four district was just 47.0%.

**Conclusion:** The net effective coverage rate was much below the recommended rate of 85.0%. The relative compliance was also below the recommended coverage rate.

*Keywords: Filaria; elimination; mass drug administration.*

## 1. INTRODUCTION

It is estimated that about 120 million people are infected with filariasis in around 83 countries throughout the tropics and sub-tropics [1]. LF is an important cause of disability, social stigmatization, psycho-social and economic reductions in life opportunities and a major burden on health and hospital resources, especially on account of cost for surgical intervention needed [2,3]. More than one and half decade ago filaria was identified as one of the diseases to be eliminated globally [4]. World Health Organisation (WHO) has envisaged through a resolution for global elimination of this lymphatic filarial by the year 2020. Government of India being a signatory to this resolution is bound to be an active partner in the task for Global Elimination of filarial [3]. Keeping its commitment towards global filaria elimination government of India in its National Health Policy 2002 has targeted to eliminate lymphatic filariasis from India by 2015 [5].

In mainland India, *Wuchereria bancrofti*, transmitted by the ubiquitous vector *Culex quinquefasciatus*, contributes to 99.4% of the all cases of infections [6]. The infection is prevalent in both urban and rural areas. All ages and genders are susceptible to infection [6].

In India the disease is prevalent in about 250 districts of 20 states and Union Territories and it has been estimated that about 500 million population of the country are at the risk of acquiring infection [6]. Although this disease is the one of most prevalent tropical disease, but it is rarely fatal rather it causes long term disability and thus in the developing countries like India attention has been diverted away from filaria towards the killer diseases like HIV/AIDS, TB and Malaria. The strategy of lymphatic filariasis elimination is through: Annual Mass Drug Administration (MDA) of single dose of

Diethylcarbamazine Citrate (DEC) tablets for 5 years or more to the eligible population to interrupt transmission of the disease [7].

In pursuit to achieve the goal, Government of India launched nation wide MDA in 2004. Since the inception of the MDA campaign some states such Goa have achieved Zero microfilaria rate and MDA had been stopped there since last two years [5]. The coverage of MDA in Uttar Pradesh has been reported to be 80.45%, 83.15% and 70.69% for the year 2011, 2012 and 2013 respectively [5]. But there is always a need for the independent assessment of reported figures by an external agency so as to give a clear picture of ground reality [8-11].

### 1.1 Objectives

The present study was conducted with the primary objective of assessing/evaluating the MDA programme in terms of coverage and compliance of mass drug administration against filariasis among eligible population of four filaria endemic district of Uttar Pradesh.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The present study was conducted in four of the filaria endemic district of Uttar Pradesh namely district *Lucknow* the capital of state, and nearby three districts viz. *Sitapur*, *Hardoi*, and *Rae Bareli*.

### 2.2 Study Design

This was a community based cross-sectional survey. The study was conducted as per the standard guidelines on Elimination of Lymphatic Filariasis issued by Directorate, National Vector Borne Disease Control Programme (NVBDCP) [7].

### 2.3 Study Period

MDA campaign was undertaken from in all the four districts at the same time i.e., from 9<sup>th</sup> January -11 January, 2014. The present study to assess the coverage and compliance of MDA among eligible population was conducted during the month of May 2014.

### 2.4 Study Teams

The faculty members and postgraduate students of Department of Community Medicine, King George's Medical University UP, Lucknow were part of the study team.

### 2.5 Study Tool

A questionnaire was developed which was based on the guidelines issued by directorate, NVBDCP was used to collect data on all aspect of programme evaluation. The study instrument was pre-tested and was translated to the local language by translator. All members of the study team were trained regarding purpose of study, method of conducting interview and data collection.

### 2.6 Sampling for House to House Survey

In each of the four district same sampling strategy was used. From each district, four clusters (three rural and one urban) of 30 households each were selected. For selection of rural sites, three Primary Health Centres (PHC)/Community Health Centres (CHC) from the district were selected, on the basis of reported MDA coverage. All Primary Health Centers (PHCs)/Community Health Centre (CHCs) in the district were stratified into three groups: (i) PHC/CHC with coverage <65.0% (ii) PHC/CHC with coverage between 65.0% and 80.0% and (iii) PHC/CHC with coverage >80.0 percent. Thereafter in each category of the CHC/PHCs, one village was selected randomly. In case, no PHC was found in a particular category, two PHCs from the next higher category were selected. The household survey in each selected village was conducted covering 30 households using study instrument. MDA registers/lists are maintained by village health worker (ASHA) of selected PHC/CHC for each village. 30 Household were then randomly selected then from the register for the purpose of survey.

In urban area, the list of wards was used for selection of the cluster. Thereafter, one ward was selected randomly for household survey. In that selected ward 30 households were selected. In this way from each of the district, 120 households were selected for survey to assess coverage of MDA programme.

### 2.7 Study Participants

It included all the resident of the selected household who were eligible for mass drug administration against filaria at the time of campaign (those not eligible were pregnant & lactating women at the time of MDA, children below two years of age and seriously ill persons at the time of campaign). The house-hold members present at the time of survey were interviewed to collect information regarding MDA with the help of study instrument. The questions included whether person received DEC and Albendazole, whether they consumed, reasons for not receiving DEC and Albendazole, reasons for not consuming DEC and Albendazole if received, side effect/s of drug etc. The study team also observed Inter sectoral co-ordination, availability of action plan, baseline indices, and IEC activities in selected district. The data was computed in Microsoft Excel and analysed thereafter.

### 2.8 Ethical Clearance

The study was approved by ethical committee.

## 3. RESULTS

Table 1 details the household and eligible population covered in present study. A total of 480 (120 from each district) households were surveyed in the present study. During the MDA campaign not all house hold of every village or urban ward received drugs, some houses were left out for one reason or other. The overall coverage rate of households for MDA for Lymphatic filariasis was 91.0%. Household coverage rate was highest in district *Sitapur* (94.2%) and it was lowest (89.2%) in district *Rae-Bareilly*.

A total of 2,571 individuals resided in these 480 households. Out of these individuals a total of 95.5% individuals were eligible for Mass Drug Administration. Highest numbers of eligible person were from the *Sitapur* district. Average number of eligible person living per house was 5.11 (Not shown in Table 1).

**Table 1. Distribution of study population in studied districts**

District	Households surveyed	Household received drugs during MDA		Total no. of individuals in surveyed houses	Individual eligible for MDA	
		n	%		n	%
lucknow	120	109	90.8	645	636	98.6
Rae-Bareli	120	107	89.2	561	532	94.8
Hardoi	120	108	90.0	658	632	96.0
Sitapur	120	113	94.2	707	655	92.6
<b>Total</b>	<b>480</b>	<b>437</b>	<b>91.0</b>	<b>2571</b>	<b>2455</b>	<b>95.5</b>

Under MDA, doses of drugs are different for different age groups so we have to have a thorough knowledge about the number of eligible population in every age group. Table 2 details the two demographic variables of study population viz. age and gender. Among the eligible respondents 52.8% were males. Of the total eligible population 9.8% were in age group 2-5 years, 25.3% were in 6- 14 years age group and maximum 64.9% were aged 15 years and above.

Table 3 details the various aspect of the drug distribution during MDA campaign. On being asked whether they (eligible population) received drug (Tab DEC & Albendazole in correct dose) during the MDA campaign 64.8% of eligible population responded positively. This was maximum (81.1%) in district Sitapur, followed by district Rae-bareli and it was the lowest (30.4%) in district Hardoi.

On further asking it was found that of the total 1592 person to whom drug was given only 1154 (72.5%) actually consumed drug, hence the net effective coverage of the MDA for LF for all four district was just 47.0%. On this aspect as well district Rae-Bareli out performed others with 66.6% effective coverage rate beating even the capital city of Lucknow and the poorest coverage was found in district Hardoi with mere 13.3% net effective coverage rate.

Table 4 details the consumption pattern of drug by eligible population. Of the 1154 who actually consumed drugs only 56.21% eligible respondent consumed drugs in presence of drug distributor and 16.26% consumed drug even in the absence of drug distributor and 27.51% of eligible population did not consumed drug at all. So 27.51% of drug was wasted due to poor compliance on the part of eligible population. Among those who did not consumed drug most were children between 2- 5 years of age followed

by children in 6-15 years of age (Not shown in Table 4).

Table 5 shows that among all person who actually consumed drugs only 3.7% reported any kind of side effects, out of which most common side effect was abdominal pain (46.5%) followed by vomiting (41.9%).

#### 4. DISCUSSION

A high coverage rate (>85%) in all the endemic areas, which if sustained rigorously for a period of 5-7 years (life cycle of adult worm), is required to interrupt the transmission to low levels so as to eliminate filaria from a region/country. Among many known cause of programme failure, some are unplanned approach, lack of funding, improper monitoring and poor implementation. The present study evaluated only the implementation aspect of the MDA programme for the year 2014. We conducted a household survey of 480 houses of 4 districts of Uttar Pradesh and covered 2,455 eligible persons residing in those houses. In our study the effective household coverage was 91.0%.

The average coverage rate as provided by Chief Medical Officers for all four district was 75.65%. Whereas as per our independent evaluation the net population coverage rate for MDA for all the four district combined was 64.8% and net effective drug coverage was 47.0%, both of which were much below from what were officially reported.

The coverage rates as provided by the Chief Medical Officer for the individual district were as follow: 60.93% for Lucknow, 87.90% for Sitapur, 90.71% for Rae-bareli and 63.06% for Hardoi. Whereas as per our independent evaluation the net effective coverage rate for Lucknow was 48.9%, for Hardoi was 13.3%, for Sitapur was

66.6% and for Rae-bareli was 60.7%. Independent evaluation such as our study coupled with independent microfilaria rate estimation and line listing of all hydrocele cases is necessary to know the actual filarial case load in India and impact of MDA.

An important observation made in our study was that even the relative compliance (defined as person who actually consumed among all eligible individual to whom the drug was given) was also below (72.48%) the target of 85.0%. This value provides a scope for improvement during the future rounds of MDA.

Of the total person who consumed drug 16.26% consumed drug even in the absence of drug distributor. There can be many reason for consuming drug even in the absence of drug

distributor and these should be further investigated as it may help in further improving programme outcome. Although side effects are unavoidable but it must be taken care that fear of side effect should not prevent persons from consuming drugs. In our study 43 (3.7%) of all those who consumed drug experienced one or more type of side effects. Every type of apprehension about drug should be addressed properly by the means of health education so as to increase relative compliance.

A point of concern which we found in our study was that more than one quarter (27.51%) of eligible population did not consume even when the drug was given to them. Reason for such negative health behavior should be further investigated in order to implement MDA programme in a better way. Thus from this study

**Table 2. Distribution of study population by age and sex under MDA for lymphatic filariasis in studied districts**

Age group (years)	District	Male		Female		Total	
		No.	%	No.	%	No.	%
2-5	Lucknow	35	-	26	-	61	-
	Rae-bareli	20	-	19	-	39	-
	Hardoi	30	-	18	-	48	-
	Sitapur	50	-	42	-	92	-
	<b>Total</b>	<b>135</b>	<b>5.5</b>	<b>105</b>	<b>4.3</b>	<b>240</b>	<b>9.8</b>
6-14	Lucknow	83	-	74	-	157	-
	Rae-bareli	70	-	67	-	137	-
	Hardoi	88	-	70	-	158	-
	Sitapur	97	-	72	-	169	-
	<b>Total</b>	<b>338</b>	<b>13.8</b>	<b>283</b>	<b>11.5</b>	<b>621</b>	<b>25.3</b>
15 and above	Lucknow	212	-	206	-	418	-
	Rae-bareli	170	-	186	-	356	-
	Hardoi	223	-	203	-	426	-
	Sitapur	218	-	176	-	394	-
	<b>Total</b>	<b>823</b>	<b>33.5</b>	<b>771</b>	<b>31.4</b>	<b>1594</b>	<b>64.9</b>
<b>Grand total</b>		<b>1296</b>	<b>52.8</b>	<b>1159</b>	<b>47.2</b>	<b>2455</b>	<b>100.0</b>

**Table 3. Coverage and compliance of mass drug administration for lymphatic filariasis in selected district (n= 2455)**

Coverage and compliance	Lucknow n=636		Hardoi n=632		Sitapur n=655		Rae- Bareli n=532		Total (n =2455)	
	n	%	n	%	n	%	n	%	n	%
<b>Number of eligible persons to whom drugs were distributed</b>										
DEC + Albendazole in correct dose	463	72.7	192	30.4	531	81.1	406	76.3	1592	<b>64.8</b>
<b>Relative compliance (Eligible persons who actually consumed drugs/eligible persons to whom drugs was distributed) (n= 1592)</b>										
DEC + Albendazole	311	67.2	84	43.8	436	82.1	323	79.6	1154	<b>72.47</b>
<b>Effective coverage rate (Eligible person who consumed drugs/Total eligible persons) (n=2455)</b>										
DEC+Albendazole in correct dose	311	48.9	84	13.3	436	66.6	323	60.7	1154	<b>47.0</b>

**Table 4. Consumption and non-consumption of drug among eligible population (n=1592)**

S no.	Survey features	Result (n=1592)		
		No.	%	
1.	Consumed drug In presence of drug distributor	Lucknow (Eligible population = 463)	264	-
		Rae-bareli (Eligible population = 406)	256	-
		Hardoi (Eligible population =192)	67	-
		Sitapur (Eligible population = 531)	308	-
<b>Total</b>		<b>895</b>	<b>56.21</b>	
2.	Consumed drug but Not in presence of drug Distributor	Lucknow (Eligible population = 463)	47	-
		Rae-bareli (Eligible population = 406)	67	-
		Hardoi (Eligible population =192)	17	-
		Sitapur (Eligible population = 531)	128	-
<b>Total</b>		<b>259</b>	<b>16.26</b>	
3	Did not consumed drug even when drug was given by drug distributor.	Lucknow (Eligible population = 463)	152	-
		Rae-bareli (Eligible population = 406)	83	-
		Hardoi (Eligible population =192)	108	-
		Sitapur (Eligible population = 531)	95	-
<b>Total</b>		<b>438</b>	<b>27.51</b>	

**Table 5. Common side effect/s perceived due to MDA drugs (n= 1154)**

S No	Survey feature	Result		
		No.	%	
1.	Person reporting any kind of side effect	Lucknow	0	0.0
		Rae-bareli	19	1.6
		Hardoi	7	0.6
		Sitapur	17	1.5
<b>Total</b>		<b>43</b>	<b>3.7</b>	
<b>Common type of side effects reported (n= 43)</b>				
1.	Vomiting	18	41.9	
2.	Abdominal pain	20	46.5	
3.	Others	5	11.6	

we have concluded that there are three key challenges for the health administration to overcome in order to implement MDA programme in a better way. First is to make household coverage 100.0%, second is to increase the net effective coverage rate to at least 85.0% of whole eligible population and last is to ensure that when an eligible person receives drugs he/she should consume it, if possible then in presence of drug distributor.

Reason for not receiving drugs and not consuming drugs varied greatly from village to village and from district to district. Thus a locally developed multipronged strategy must be chopped out in order overcome these local hurdles.

An important aspect which came to light during our study was that many person didn't consumed drug just because they were not told what significance does the drug holds for the individual and for his/her community. Among the many reasons due to which people didn't consumed drug was that they did not felt sick at the time

when drug was given. Hence the relative compliance was not 100.0%. For this health education campaign must be done a few days too few weeks before the actual day of MDA. Health education should be imparted to all school children via school teacher and to the women of the village by ASHA/ANM of the village.

In our study we made an important observation that many person living in surveyed household do seasonal migration to other cities and states in search of jobs. These people were missed during MDA rounds and they might act as a carrier to the non-endemic states. So a strategy should be designed for identifying and covering such populations. In the end we would like to add that all these such effort should be sustained for a period of 5-7 years in order to be effective and bring any positive change.

## 5. CONCLUSION

The population coverage and the net effective drug coverage both were much below the target level of 85.0%. It is now known that India will not

be able to eliminate filarial by 2015 but, if the same trend continues in years to come the target of eliminating filaria would not be achievable in the near future.

## 6. LIMITATION

This study was conducted 3-4 months after the annual MDA round so there was a chance of recall bias in responses from the study participant.

## CONSENT

All study participants gave valid consent for the study. Where the study participants were less than 18 years consent was obtained from parents/guardians.

## ACKNOWLEDGEMENTS

The authors are grateful to CMO and their supporting staff of all four selected Districts. We are also thankful to the Medical officer and ASHA of respective village for their patience and sincere effort in the fight against filaria.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. WHO. Lymphatic filariasis: Progress of disability prevention activities. Wkly Epidemiol Rec. 2004;79:417-24.
2. World Health Organization. Life in the 21<sup>st</sup> century: A vision for all. The World Health Report; 1998. Available:[http://www.who.int/whr/1998/en/whr98\\_en.pdf](http://www.who.int/whr/1998/en/whr98_en.pdf) [Last accessed on 2015 Apr 15].
3. World Health Organization Lymphatic Filariasis Monitoring and epidemiological assessment of the programme to eliminate lymphatic filariasis at implementation unit level. Available:[http://whqlibdoc.who.int/hq/2005/WHO\\_CDS\\_CPE\\_CEE\\_2005.50.pdf](http://whqlibdoc.who.int/hq/2005/WHO_CDS_CPE_CEE_2005.50.pdf) [Last accessed on 2015 Apr 18].
4. World Health Organization. Preparing and Implementing National Plan to Eliminate Lymphatic filariasis in countries where Onchocerciasis is not co-endemic. Available:[http://whqlibdoc.who.int/hq/2000/WHO\\_CDS\\_CPE\\_CEE\\_2000.15.pdf](http://whqlibdoc.who.int/hq/2000/WHO_CDS_CPE_CEE_2000.15.pdf) [Last accessed on 2015 Apr 15].
5. Government of India. National health policy. New Delhi: Department of Health, Ministry of Health and Family Welfare; 2002.
6. Fact sheet lymphatic filariasis in India. Available:[www.nvbdc.gov.in/filariasis-newhtml](http://www.nvbdc.gov.in/filariasis-newhtml) [Last accessed on 2015 May 5].
7. Government of India Operational guidelines on elimination of lymphatic filariasis. Directorate NVBDCP, 22 Sharnath Marg, Delhi 110 054; 2005. Available:[http://www.nvbdc.gov.in/Doc/LF%20manual\\_final.doc](http://www.nvbdc.gov.in/Doc/LF%20manual_final.doc) [Last accessed on 2014 April 29].
8. Patel PK. Mass drug administration coverage evaluation survey for lymphatic Filariasis in Bagalkot and Gulbarga districts. Indian J Community Med 2012; 37:101-06.
9. Ranganath BG. Coverage survey for assessing mass drug administration against lymphatic filariasis in Gulbarga district, Karnataka, India. J Vector Borne Dis. 2010;47:61-4.
10. Aswathy S, Beteena K, Leelamoni K. Mass drug administration against filariasis in India: Perceptions and practices in a rural community in Kerala. Ann Trop Med Parasitol. 2009;103:617-24.
11. Lahariya C, Mishra A. Strengthening of mass drug administration implementation is required to eliminate lymphatic filariasis from India: An evaluation study. J Vector Borne Dis. 2008;45:313-20.

© 2016 Singh et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:  
The peer review history for this paper can be accessed here:  
<http://sciedomain.org/review-history/12531>