



## Viewpoint

### **Lymphatic filariasis elimination programme in Assam, India, needs change in mass drug administration strategy to target the focus of infection**

In spite of commendable progress made by India towards the elimination of lymphatic filariasis (LF), the envisaged target 2015 could not be achieved. In 2004, LF elimination programme was launched in 255 endemic districts of 16 States and five Union Territories of India. Initially diethylcarbamazine (DEC) was given under MDA and later on in 2006 albendazole was added with DEC in MDA. In December 2015, of the 255 endemic districts under MDA, 222 districts have reported microfilaria (mf) rate below one per cent, and in 53 districts, MDA was stopped as they reported a break in the transmission cycle of the parasite successfully and passed Transmission Assessment Survey (TAS)<sup>1</sup>. Sixty eight endemic districts are ready to enter into TAS, whereas others are still tackling with poor drug compliance and other operational issues<sup>2</sup>.

LF is endemic in the State of Assam<sup>3</sup>. The situation of LF in the remaining seven northeastern States (Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura) is not known. No LF survey has been carried out except in some parts of Tripura and Sikkim. Although limited survey report of Tripura could not confirm indigenous transmission, findings of Sikkim confirmed LF prevalence and possibility of local transmission in the eastern district of the State<sup>4</sup>.

Earlier reports reveal the presence of bancroftian as well as brugian filariasis in Assam<sup>5-8</sup>. Several studies on LF prevalence, intervention, transmission, drug trial and mf periodicity have been conducted by the ICMR-Regional Medical Research Centre, Dibrugarh, at Assam, and have documented the problem of LF in the State<sup>9-16</sup>. Findings indicated that LF was mostly confined amongst tea garden workers of Assam.

As per national guidelines of lymphatic filariasis elimination programme<sup>17</sup>, site selection process for MDA is based on line listing (*i.e.* searching for elephantiasis, lymphoedema and hydrocele cases by trained health

workers) from each district. Normally, this is done on the basis of feedback received from health workers of each Community Health Centres (CHC)/Primary Health Centres (PHCs)/ mini PHCs of the district. Based on the finding/reporting of the clinical cases, district will be declared as endemic or non-endemic for LF. From each endemic district, accordingly, four sentinel sites (where clinical cases were reported) and four spot check (random) sites without consideration of clinical cases of LF are chosen.

On the basis of the line listing, initially, five districts (Dibrugarh, Sivasagar, Dhemaji, Darrang and Kamrup Metro) of Assam were reported as endemic and were included under MDA Programme in 2004<sup>18</sup>. Later on, in 2007, two more districts (Nalbari and Dhubri) were added on the basis of reporting of clinical cases of LF and thus making a total of seven districts under MDA. In 2015, two new districts (Udalguri and Charaideo) were created, and as a result, now nine districts are under MDA.

In Assam, drug coverage in MDA was poor (25.42%, 2004) initially but improved in subsequent rounds (90.66%, 2014)<sup>19</sup>. The reported drug coverage includes drugs given directly to the people during the visit of drug distributor and also drugs given to the family members for those who were not present at the time of drug distribution. In this process, it is difficult to estimate the actual intake/consumption of drug at the community level. However, drug compliance survey on post-MDA done has reported improvement in the actual drug compliance<sup>20</sup>. Drug distribution, supply of quality drug in time, information education and communication activities before MDA, drug administration approaches either booth or house-to-house visit, covering of hotspot areas, number of mop-up rounds, monitoring of drug distribution and actual drug consumption are some

of the important key factors for the success of LF elimination programme<sup>21,22</sup>.

In Assam, mf rate is low (below 1%) in urban population. Moreover, rural population other than the tea garden workers also shows low mf rate (<1%) similar to the urban population. However, tea garden workers' population accounts for 96.39 per cent of total mf positive cases, whereas non-tea garden rural population contributes only 3.61 per cent<sup>23</sup>. This situation creates two important issues to LF elimination programme of Assam. Initially, what could be the implementation unit of MDA? Then how the actual target population can be enumerated and ensured for MDA coverage?

As per the national guidelines of LF elimination<sup>2</sup>, district is the implementation unit of MDA. A district will only be considered eligible for MDA if it records mf rate >1 per cent in night blood survey in any of the selected sites (four sentinel and four random sites covering 500 participants for each site making a total of 4000 blood smears). The selection of sentinel sites is done on the basis of clinical cases reported during the line listing of filariasis cases (elephantiasis and hydrocele) and will not be changed throughout the monitoring, whereas random sites are chosen without consideration of the presence of clinical case from the study locations and will be changed at each time of survey. The chance of inclusion of tea garden workers in the process of selection of random site is fifty per cent.

Let us look at this approach taking an example of a district of Assam which has typical urban and rural population. In urban population (negligible tea worker population), situation of LF prevalence is very low (<1%). The rural population is comprised of people of mixed communities including local people and tea worker community. The tea garden workers which are a part of rural population account for a maximum number of mf carriers<sup>23,24</sup>. This tea garden population which is scattered in the district constitutes hotspot locations often remained undetected during the filaria survey. Therefore, while considering the eligibility of a district for MDA, this tea garden worker population (hotspot) is a vital factor. In this regard, during the selection process for night blood survey, if tea garden workers do not fall in the selected sites (eight locations), and as a result, a district may report quite low mf rate (below 1%) and will not be eligible for MDA. However, tea garden worker population of the same district was found to possess as high as 7.41 per cent mf rate even

after six rounds of MDA<sup>24</sup>. Now, the point of concern is that, though such a district will not qualify for MDA, a sizeable population (22.88%) of the district such as Tinsukia (not under MDA) will require MDA<sup>25</sup>.

This situation is unlike of the LF hotspot areas of other States of India where a few places report such a situation and can be dealt with focal MDA<sup>26,27</sup>. Districts such as Tinsukia, Dibrugarh, Charaideo, Sivasagar, Jorhat, Biswanath, Golaghat and Sonitpur are the main tea cultivating districts of upper Assam and possess plenty of tea gardens which deploy more than 10 lakhs of tea garden workers in tea industry. In Assam, a total number of big tea gardens are over 767, and if small tea gardens (84577) are also included, total workforce engaged in tea industry will be over 30 lakhs<sup>28</sup>. This distribution of tea garden population (15-20%) is not confined to a particular geographical area of the State, but it is scattered in the districts, and as such, all these areas may not be included in the mf survey. Thus, it may not contribute significantly to keep the mf rate above one per cent at district level although many tea gardens may continue to harbour mf rate more than one per cent<sup>24</sup>. Instead of geographically defining focus of LF hotspot in Assam, we intend to consider the high-risk tea garden population as foci irrespective to their distribution in the State.

The currently available data from the State Government of Assam as well as Government of India may depict that LF elimination programme in Assam is in the state of completion as out of nine districts under MDA only two have shown mf rate >1 per cent during 2014<sup>18</sup>. Moreover, in a recent TAS, these two districts may also report low antigenemia level in 6-7 yr old children, and thus MDA might have been discontinued. However, real situation may differ from these observations because of heterogeneous distribution of LF in tea garden and non-tea garden populations. In case TAS was conducted in non-tea garden population, it may pass the TAS, but infection may remain >one per cent in tea garden worker population. Therefore, it is high time to target whole tea garden population irrespective of endemicity status. Almost all the big tea estates possess hospital facility for their workers. Utilization of this facility for MDA programme will not incur any drug distribution cost. Mop-up rounds may also be effectively tackled by the tea garden management that will not only reduce the cost of the drug distribution but also ensure high drug compliance rate amongst tea garden workers. A quick decision on site-specific strategy is required for tea garden worker

population of Assam, and if it is found successful, this could be advocated in similar situations elsewhere in the country for successful LF elimination programme.

In conclusion, the following strategy may be adapted for successful elimination of LF in Assam: (i) Instead of district as implementation unit, PHCs may be regarded as implementation unit for LF elimination; (ii) Involvement of tea estate owners and worker community in the MDA programme; (iii) Programme managers must ensure covering of all tea garden worker population under MDA irrespective to the endemicity status of the PHC; and (iv) Biannual dose of MDA with DEC and albendazole may be adapted as it has shown better compliance and will also reduce the span of MDA<sup>29</sup>.

**Financial support & sponsorship:** None.

**Conflicts of Interest:** None.

Author's personal viewpoint, without any link with the institutions the author was/is associated with earlier/now.

**Abdul Mabood Khan**

ICMR-Regional Medical Research Centre,  
NE Region, Dibrugarh 786 001, Assam, India  
abdulmaboodkhan@gmail.com

Received November 14, 2016

## References

- Dhariwal AC, Srivastava PK, Bhattacharjee J. Elimination of lymphatic filariasis in India: An update. *J Indian Med Assoc (Vector Borne Dis Spec)* 2015; *113* : 189-90.
- Directorate of National Vector Borne Disease Control Programme (NVBDCP). Ministry of Health & Family Welfare, Mass Drug Administration, Government of India. Available from: <http://nvbdcp.gov.in/mda.html>, accessed on January 16, 2018.
- Khan AM, Mahanta J. Lymphatic filariasis eradication programme. *Curr Sci* 2005; *88* : 1718-9.
- Singh S, Bora D, Lal S. Lymphatic filariasis in East district, Sikkim. *J Commun Dis* 2010; *42* : 33-7.
- Basu PC. Filariasis in Assam state. *Indian J Malariol* 1957; *11* : 293-308.
- Sasa M, editor. *Human filariasis: A global survey of epidemiology and control*. Tokyo: University of Tokyo Press; 1976.
- Rahman NM, Bhattacharyya MN. A preliminary survey of filarial infection in a group of labour population at Maijan tea estate in Lakhimpur district, Assam. *J Indian Med Assoc* 1971; *56* : 363-6.
- Raina VK, Tripathi VC, Das PB, Kumar AJ. Declining trend of Brugia malayi filariasis in district Cachar, Assam state-India. *J Commun Dis* 1993; *25* : 107-11.
- Dutta P, Gogoi BK, Chelleng PK, Bhattacharyya DR, Khan SA, Goswami BK, et al. Filariasis in the labour population of a tea estate in upper Assam. *Indian J Med Res* 1995; *101* : 245-6.
- Khan AM, Dutta P, Khan SA, Baruah NK, Sarma CK, Mahanta J, et al. Long-term effect of diethylcarbamazine citrate on microfilaraemia status in treated individuals. *Indian J Med Res* 1998; *108* : 134-8.
- Prakash A, Mohapatra PK, Das HK, Sharma RK, Mahanta J. Bancroftian filariasis in Namrup tea estate, district Dibrugarh, Assam. *Indian J Public Health* 1998; *42* : 103-7, 112.
- Khan AM, Dutta P, Khan SA, Baruah NK, Sarma CK, Mahanta J, et al. Prevalence of bancroftian filariasis in a foot-hill tea garden of upper Assam. *J Commun Dis* 1999; *31* : 145-6.
- Khan AM, Dutta P, Khan SA, Baruah NK, Sharma CK, Mahanta J, et al. Bancroftian filariasis in a weaving community of lower Assam. *J Commun Dis* 1999; *31* : 61-2.
- Mahanta B, Handique R, Narain K, Dutta P, Mahanta J. Transmission of bancroftian filariasis in tea agro-ecosystem of Assam, India. *Southeast Asian J Trop Med Public Health* 2001; *32* : 581-4.
- Khan AM, Dutta P, Khan SA, Mahanta J. A focus of lymphatic filariasis in a tea garden worker community of central Assam. *J Environ Biol* 2004; *25* : 437-40.
- Khan AM, Dutta P, Das S, Pathak AK, Sarmah P, Hussain ME, et al. Microfilarial periodicity of *Wuchereria bancrofti* in Assam, Northeast India. *J Vector Borne Dis* 2015; *52* : 208-12.
- Directorate of National Vector Borne Disease Control Programme (NVBDCP). *Elimination of Lymphatic Filariasis Training Manual On Mass Drug Administration & Morbidity Management*. New Delhi: Ministry of Health & Family Welfare, Mass Drug Administration, Government of India; 2004. p. 5.
- Directorate of National Vector Borne Disease Control Programme (NVBDCP). Ministry of Health & Family Welfare, Mass Drug Administration, Government of India. Available from: <http://nvbdcp.gov.in/Doc/Lf-Endemic-Districts.pdf>, accessed on January 16, 2018.
- Directorate of National Vector Borne Disease Control Programme (NVBDCP). Ministry of Health & Family Welfare, Mass Drug Administration, Government of India. Available from: <http://nvbdcp.gov.in/fil-md.html>, accessed on January 16, 2018.
- Khan AM, Dutta P. Evaluation/mid term assessment of DEC coverage and compliance under MDA Programme for elimination of lymphatic filariasis on Assam. *Annual Report (Miscellaneous Studies)*. Dibrugarh: ICMR-Regional Medical Research Centre, NE Region; 2009-2010. p. 55.
- Lemoine JF, Desormeaux AM, Monestime F, Fayette CR, Desir L, Direny AN, et al. Controlling neglected tropical diseases (NTDs) in Haiti: Implementation strategies and evidence of their success. *PLoS Negl Trop Dis* 2016; *10* : e0004954.
- Jambulingam P, Subramanian S, de Vlas SJ, Vinubala C, Stolk WA. Mathematical modelling of lymphatic filariasis

- elimination programmes in India: Required duration of mass drug administration and post-treatment level of infection indicators. *Parasit Vectors* 2016; 9 : 501.
23. Khan AM, Dutta P, Khan SA, Mohapatra PK, Baruah NK, Sharma CK, *et al.* Lymphatic filariasis in two distinct communities of upper Assam. *J Commun Dis* 1999; 31 : 101-6.
  24. Khan AM, Dutta P, Sarmah CK, Baruah NK, Das S, Pathak AK, *et al.* Prevalence of lymphatic filariasis in a tea garden worker population of Dibrugarh (Assam), India after six rounds of mass drug administration. *J Vector Borne Dis* 2015; 52 : 314-20.
  25. Census of India. Village and Town Wise Primary Census Abstract (PCA). In: *District Census Handbook, Tinsukia*. Series-19, Part XII-B. Guwahati: Directorate of Census Operations, Assam; 2011. p. 60-240.
  26. Chand G, Kaushal LS, Choudhari NK, Singh N. Mapping is a prerequisite for elimination of filariasis and effective targeting of filarial 'hot spots'. *Pathog Glob Health* 2016; 110 : 157-63.
  27. Sabesan S. Need for site-specific change in strategy towards lymphatic filariasis elimination in India. *Indian J Med Res* 2008; 127 : 10-1.
  28. Directorate of Economics and Statistics. Table-15.03. Number of tea gardens, area and production of tea according to size of the gardens in Assam. In: *Statistical hand book of Assam*. Guwahati: Government of Assam; 2016. p. 240.
  29. Kar SK, Dwibedi B, Kerketa AS, Maharana A, Panda SS, Mohanty PC, *et al.* A randomized controlled trial of increased dose and frequency of albendazole with standard dose DEC for treatment of *Wuchereria bancrofti* microfilaremics in Odisha, India. *PLoS Negl Trop Dis* 2015; 9 : e0003583.