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# Elimination of lymphatic filariasis – India: Updates and way forward

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Lymphatic Filariasis (LF) is caused by filarial nematodes and transmitted by mosquitoes. LF is one of the neglected tropical diseases (NTD), which is still a public health problem in India.<sup>1</sup> History of LF is very old as in 600 BCE *Susruta* mentioned about this disease while *Madhavkara*, a pathologist described the sign and symptom of LF later in 700 CE. Clerk in 1709 described the elephantoid legs in Cochin as ‘Malabar Legs’.<sup>2</sup> Demarquay, in 1863 made the first record of microfilaria in humans. He found microfilariae in hydrocele liquid of a Cuban patient in Paris. In 1866, Otto Wucherer discovered the micro-filaria in chyluria and the female adult worm was discovered by Joseph Bancroft in 1876 in the ulcer of lymph node of the arm. Patrick Manson in 1878 found microfilariae in the stomach of blood sucked mosquito and in 1879, he discovered the nocturnal periodicity of microfilaria. Sibthorpe found male adult worms in 1888. The discovery of microfilariae (mf) in the peripheral blood was first made by Timothy Lewis in 1872 in Calcutta (Kolkata). In 1921, the name *Wuchereria bancrofti* was accepted.<sup>3-4</sup>

The adult parasite worms, male and female, live in the lymph vessels and lymph nodes by making nest in the dilated lymphatics. The adult worms survive for about 5–8 years and sometimes for as long as 15 years. The disease spectrum of LF ranges from the initial phase of asymptomatic microfilaraemia to the later stage of acute, chronic and occult clinical

manifestations. The secondary bacterial infection causes acute dermato-ado-lymphangitis (ADLA) attacks and aggravates chronic disease condition, leading to the development of elephantiasis. LF is a disfiguring and debilitating disease and cause of stigma, shame, social and economic deprivation and psychological problems. Chronic manifestations are irreversible and affected individuals and families suffer from consequences of loss of work and employment opportunities and treatment costs.<sup>1,5</sup>

Currently, 856 million people in 52 countries require preventive chemotherapy to interrupt the spread of infection. The global baseline estimate of people suffered by LF was 25 million men with hydrocele and more than 15 million people with lymphoedema. Eliminating LF can prevent unnecessary suffering and contribute to the reduction of disability and poverty.<sup>6</sup> LF is endemic in nine countries including India in South-East Asia region (SEAR) and SEAR is the largest endemic region and accounted for 54% of the global burden of LF prior to launching the Global Program to Eliminate Lymphatic Filariasis (GPELF). The region made impressive progress since the inception of the GPELF and by 2017 three countries – Maldives, Sri Lanka, and Thailand have successfully completed Mass Drug Administration (MDA) and post-MDA surveillance and eliminated LF as a public health problem. Bangladesh has met the criteria to stop MDA in all endemic districts and is now in the phase of post-MDA surveillance.

Indonesia is yet to scale up MDA to cover all endemic districts, but steps are being taken to achieve 100% geographic coverage.<sup>5,7</sup> Timor Leste and Myanmar achieved 100% geographical coverage in each implementation unit effectively. In Nepal 60% of endemic districts no longer require MDA.<sup>8</sup>

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As a result of the impressive performance of the program, the share of the SEAR in the global population requiring MDA has declined from 63% in the year 2000 to 52% in 2016 and the share in the global burden of disease has declined to 32% in 2013, from 54% in 2000.<sup>9</sup>

In India, the disease is prevalent in rural and urban areas of 256 districts of 16 states and 5 union territories. LF in India is caused by the species of filarial parasites – *Wuchereria bancrofti*, *Brugia malayi*. *Brugia timori* has not yet reported. 98% of the infections are due to infection with *W. bancrofti*.<sup>5</sup> *Brugia malayi* infection has been reported earlier from some rural areas in seven states i.e. Kerala, Orissa, Andhra Pradesh, Tamil Nadu, Assam, Madhya Pradesh and West Bengal. However, its prevalence is now reportedly restricted to rural areas of Kerala.<sup>1,10</sup> *Wuchereria bancrofti* is transmitted by the *Culex quinquefasciatus*. *Mansonia (Mansonioides) annulifera* is the principal vector while *Mansonia uniformis* is the secondary vector for transmission of *B. malayi*.<sup>5,10</sup>

A National Filaria Control Program (NFCP) was launched in 1955, but the success was limited due to operational problems and resource constraints. In World Health Assembly (WHA 50.29) it has been decided that LF can be eliminated as a public health problem. Consequent to this, India has targeted the LF Elimination as per National Health Policy (NHP – 2002) by 2015, which has been later extended to 2017.

India launched a National Filaria Campaign to eliminate LF in 2004 following the launch of the GPELF and the target to achieve the elimination is as per GPELF target i.e. 2020. The program is based on twin pillars recommended by WHO i.e. interruption of transmission through annual mass drug administration as a preventive chemotherapy to all eligible population residing at risk in the endemic areas. The second pillar i.e. MMDP (Morbidity Management and Disability Prevention) by providing care for those with disease.<sup>5</sup> Initially MDA was started with annual single dose of Diethylcarbamazine citrate (DEC) only and later on from 2007 Albendazole has been included and co-administration of annual DEC and Albendazole started for MDA.

The program has made good progress in many states and has contributed in the reduction of the disease burden with the twin pillar strategies. Till now 39% (99/256) districts have stopped MDA after validation through Transmission Assessment Survey (TAS) and they are now on post MDA surveillance. There are five states/UTs numerator and denominator (XX/YY) have stopped the MDA, the preliminary goal of elimination and now in the phase of post-MDA surveillance i.e. Assam, Tamilnadu, Goa, Puducherry, and Daman and Diu. Presently (up to September 2018), 99 districts have been stopped MDA after successful validation through TAS and 149 districts are still continuing with MDA. Remaining eight districts have proposed for their TAS. There are 8,77,455 Lymphodema cases and 3,87,726 cases of Hydrocele reported in the country. Around 1.4 Lakh Hydrocelectomy has been conducted till September 2018.

In view of approaching LF elimination target, there is a need to explore new strategies to augment LF elimination efforts in the country. As per new guideline of WHO, triple drug therapy is proven to be highly effective in reducing mf rate drastically. Government of India has recommended and decided to roll out triple-drug therapy i.e. Ivermectin, DEC and Albendazole (IDA) in five states (one district in each state) in upcoming months viz. Nagpur (Maharashtra), Arwal (Bihar), Simdega (Jharkhand), Varanasi (Uttar Pradesh) and Yadgiri (Karnataka). Another option for use of DEC fortified salt as an adjunct to MDA is under consideration as fortification of common table salt with DEC has been adopted as an adjunct to MDA in Brazil, Haiti, and the United Republic of Tanzania.<sup>11</sup> There are also many studies with promising result conducted in India.

However, the desired effect could not be attained for which faster effective strategies are required to interrupt transmission in all endemic districts and achieve the elimination target date of 2020. Hence, an accelerated plan to eliminate LF has been launched and disseminated in 2018.<sup>5</sup> As per accelerated plan, the program should be revamped and implemented in a mission mode to reach the goal of elimination by 2020. Also, the program needs to be strengthened to improve its overall performance and quality, with focus on the following:

- Constitution of a high-level inter-ministerial committee to monitor the progress of the program
- Confirmatory mapping of uncertain areas using mini-Transmission Assessment Survey
- Improved advocacy, social mobilization, training and supervision in all program activities
- Implementation of enhanced MDA with emphasis on micro-planning and directly observed treatment, supported by adequate human and financial resources and supplementary intervention measures
- Introduction and expansion of triple-drug therapy (Diethylcarbamazine + Ivermectin + Albendazole) in districts with persistent transmission and/or poor implementation of MDA
- Strengthening of monitoring, evaluation and surveillance system and robust assessment of chronic disease burden
- Development and implementation of plans for delivery of a minimum package of care for all chronic disease patients and
- Improved data collection, reporting, consolidation and data management using integrated NTD database.

Though there are many challenges, the newer initiative and strategies as per the accelerated plan together with focused on well-planned quality MDA, community participation, increase compliance, intensive surveillance and timely care of Lymphodoma and Hydrocele cases with MMDP and hydrocelectomy would help India in reaching the elimination goal by 2020.

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