



ISSN: 2348-5906

CODEN: IJMRK2

IJMR 2024; 11(1): 86-88

© 2024 IJMR

<https://www.dipterajournal.com>

Received: 11-10-2023

Accepted: 19-11-2023

Dr. Divya KM

Associate Professor, Department of Agadatantra, Sri Sairam Ayurveda Medical College, Chennai, Tamil Nadu, India

Dr. Balasundar S

Associate Professor, Department of Dravyaguna, Sri Sairam Ayurveda Medical College, Chennai, Tamil Nadu, India

Dr. Ramakrishna Allam

Associate Professor, Department of Dravyaguna, Sri Sairam Ayurveda Medical College, Chennai, Tamil Nadu, India

Dr. Sethulekshmi S

Assistant Professor, Department of Kaya Chikitsa, Sri Sairam Ayurveda Medical College, Chennai, Tamil Nadu, India

Dr. Govardhan Sahani

Associate Professor, Department of Shalya Tantra, Sri Sairam Ayurveda Medical College, Chennai, Tamil Nadu, India

Corresponding Author:**Dr. Divya KM**

Associate Professor, Department of Agadatantra, Sri Sairam Ayurveda Medical College, Chennai, Tamil Nadu, India

Understanding the progress and challenges of vector control strategies W.S.R.T. filariasis: A review

Dr. Divya KM, Dr. Balasundar S, Dr. Ramakrishna Allam, Dr. Sethulekshmi S and Dr. Govardhan Sahani

DOI: <https://doi.org/10.22271/23487941.2024.v11.i1b.746>

Abstract

Vector borne disorders are major health problem faced by developing countries and mosquitoes play a key role in the transmission of such diseases which include Malaria, Dengue fever, Yellow fever, Zika virus, West Nile virus, Chikungunya and Filariasis. Among these Lymphatic Filariasis is a disorder which results in permanent disability of the extremities which results in compromising the health and living standard of any individual contacting it? To prevent the spread of this disease stringent measures to control the breeding and the prevalence of a mosquito bite, is to be adopted. India has adopted various vector control strategies for controlling the spread of mosquito borne disorders. This article gives an insight about the disease Filariasis, the various vector control strategies and techniques recommended for preventing it and the challenges faced to implement those measures.

Keywords: Vector borne disease, mosquito, control strategies, Filariasis, health

Introduction

Filariasis or lymphatic filariasis is an infective tropical disorder which is classified as a major vector born disease in the developing countries, caused by mosquito and black flies bite, resulting in severe deformity of the extremities and various other systemic disorders. Next to leprosy, it is the leading cause of permanent deformity along with disability in humans [1]. The disease is caused by the infection of roundworm parasites known as nematodes belonging to family Filariodidea. There are namely 2 types of filarial worms: *Wuchereria bancrofti* or *Brugia malayi* respectively. Out of the two, *Wuchereria bancrofti* is responsible for the majority of cases, mounting to 90 percent of the incidence [2]. Out of the numerous types of filariasis worms, only 8 or 9 species develop diseases in human beings.

Pathogenesis of the disease [3]

When a mosquito bites an infected person, followed by a healthy individual, the larva of the filarial parasite enters into the human bloodstream and undergoes multiplication. The lymphatic system, acts as the host system for the complete metamorphosis of the larva into adult filarial worms which in due course release the next generation of larval forms known as microfilariae. These microfilariae enters into the mosquito during bite, and the cycle continues.

Types of Filariasis

Filariasis is classified mainly into 3 based on the part effected [4]

- Lymphatic filariasis which affects the lymphatic system.
- Subcutaneous filariasis which affects the skin and white part of the eyes.
- Serous cavity filariasis causes infection of the serous cavity of the abdomen.

Wuchereria bancrofti mainly affect the extremities, vulva, breasts, and scrotum (resulting in the formation of hydrocele), while *Brugia timori* affects the genitals.

Lymphatic filariasis is transmitted by the *Culex* mosquito across urban and semi-urban areas, by *Anopheles* in rural areas, and *Aedes* in endemic regions [5].

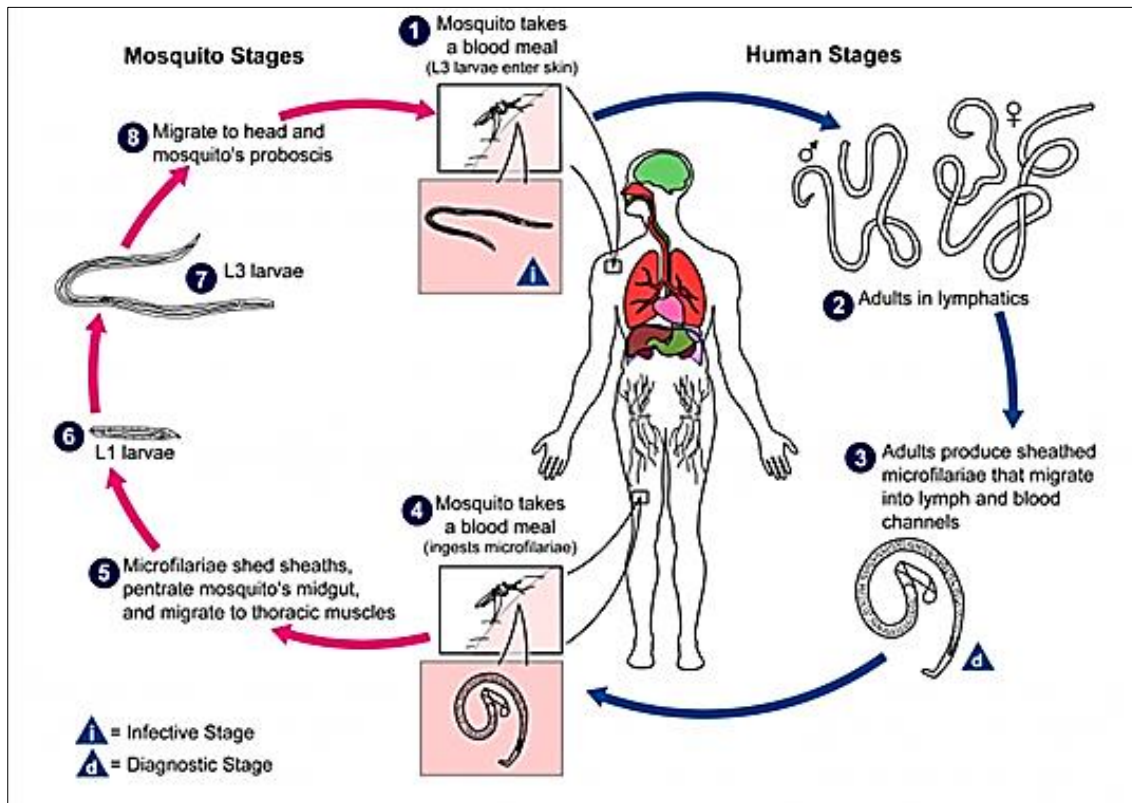


Fig 1: life cycle of *Wuchereria bancrofti*

Signs and symptoms of the disease [6]

An individual infected with filarial parasite may experience, fever along with chills, severe headache and skin lesions which appear after an incubation period of 3 to 9 months. As the condition progresses, the microfilariae causes obstruction in the normal circulation of the lymphatic system resulting in lymphedema of various grades, associated with tenderness and erythema of the extremities. There may be a collection of pus due to the debris collection of the worms or due to secondary infections caused by bacteria. Vision may be effected due to damage to optic nerve and if not promptly treated, the disease results in a condition named elephantiasis which is characterised by massive swelling of the limbs and genitalia [7].



Fig 2: Elephantiasis characterised by massive swelling of the extremities

Prevention and management of Filariasis

In India, the National Filaria Control Programme was launched in 1955 [8] to preside over the control of the spread and prevention of the disease. The programme consists of mainly 3 components namely, operational, training and research wing. Under this programme, 3 strategies were highlighted which include [9, 10].

- Vector control.
- Detection and treatment of filarial cases.
- Delimitation of endemic areas.

The strategies are being put into action by various control units, night clinics and survey teams.

Vector control strategies in India [11]

The vector control measures in India for mosquito control is basically divided into 6 categories namely

1. Personal Prophylactic Measures.
2. Biological Control.
3. Chemical Control.
4. Environmental Management & Source Reduction Methods.
5. Health Education.
6. Community Participation.

The personal prophylactic measures include usage of mosquito repellent creams, liquids, coils, mats etc., wearing of full sleeve shirts and full pants with socks to prevent bite in the commonly exposed parts and use of bed nets especially for sleeping infants and young children during day time to prevent mosquito bite. Cultivation of growing larvivorous fishes in ornamental tanks and fountains, and other water reservoirs along with the use of biocides constitute the biological control techniques. Using chemicals which are

larvicide such as abate and spraying aerosol especially during daytime forms the Chemical control methods.

An environmental management & source reduction method is been recommended for mosquito control which include detection & elimination of major breeding sources of mosquitos, cleaning and preventing water logging in sunshades, rooftops and car porches, maintaining a water supply which is reliable and advocating weekly one day to be observed as dry day to prevent water stagnation in the premises.

Public awareness and health education are also included under the strategies as it plays a major part in disease control. The awareness regarding disease, its vector spreading capacity etc. is made known to the layman through various media sources like television, radio, documentary films etc. Community participation also plays a lion's share in the detection of potential breeding areas and elimination of *Aedes* mosquitos which play a major role in disease spread.

For the proper implementation of these control strategies, it is necessary to take into account the integrated vector management, which is proposed and promoted by the WHO, while taking into account the local need ^[12].

Current status of Vector control measures in India

In India, 17% of all infectious diseases, consist of vector borne diseases. On the occurrence of COVID-19, the World Health Organization (WHO) declared COVID-19 as a global pandemic ^[13]. Subsequently, in India there was aftermath from the global pandemic. Long-standing challenges of urbanization, globalization, changes in climate, and insecticide resistance, The occurrence of the pandemic caused unexpected and unprecedented difficulties in the mosquito vector control process. This in turn highlighted the significance of the need for new control strategies along with updated techniques to control mosquitos and other vectors.

Conclusion

India, being a highly populated and developing country suffers from various vector borne diseases including Filariasis spread by mosquitoes, the prognosis which is bad. In order to safeguard the society from these vector borne diseases, vector control strategies including mosquito control needs to be strictly monitored and implemented. As the incidence of vector born diseases remains to stay high, a time bound change in strategies and updating in technologies are advised to maintain a better health condition of the people and the country.

References

1. Newman TE, Juergens AL. Filariasis. Aug 8. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; c2023 Jan. PMID: 32310472.
2. <https://www.who.int/news-room/fact-sheets/detail/lymphatic-filariasis>
3. <https://ncvbdc.mohfw.gov.in/index4.php?lang=1&level=0&linkid=454&lid=3731#:~:text=In%20the%20human%20host%2C%20the,as%2015%20years%20or%20more.>
4. <https://www.news-medical.net/health/What-is-Filariasis.aspx#:~:text=Serous%20cavity%20filariasis%20may%20cause,a%20stain%20called%20Geimsa%20stain.>
5. World Health Organization. Lymphatic filariasis. [https://www.who.int/news-room/fact-](https://www.who.int/news-room/fact-sheets/detail/lymphatic-filariasis#:~:text=Lymphatic%20filariasis%20is%20transmitted%20by,endemic%20islands%20in%20the%20Pacific)

6. World Health Organization. Lymphatic filariasis. Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire. 2001;76(20):149-54. <https://my.clevelandclinic.org/health/diseases/21925-filariasis>
7. Bertwistle AP, Gregg AL. Elephantiasis. Brit. J Surgery. 1928, 16(62). <https://rarediseases.org/rare-diseases/elephantiasis/>
8. Ramakrishnan SP. National Filaria Control Programme in India: a review (1955-59). Indian Journal of Malariology. 1960;14(4):457-94. <https://ncvbdc.mohfw.gov.in/index4.php?lang=1&level=0&linkid=456&lid=3734#:~:text=After%20pilot%20project%20in%20Orissa,personnel%20to%20man%20the%20programme>
9. Ministry of Health and Family Welfare. Filaria Control Programmes. 21 MAR 2017 <https://pib.gov.in/PressReleasePage.aspx?PRID=1485024>
10. Filariasis Control in India & Its Elimination <https://ncvbdc.mohfw.gov.in/WriteReadData/1892s/43461824631532409675.pdf> - (Accessed on November 05, 2022).
11. <https://ncvbdc.mohfw.gov.in/index4.php?lang=1&level=0&linkid=448&lid=3722>
12. Wilber Gómez-Vargas and Giovanni Esteban Zapata-Úsuga. Vector Control Strategies. <https://www.intechopen.com/chapters/81929> 28 May 2022
13. Harapan H, Itoh N, Yufika A, Winardi W, Keam S, Te H, *et al.* Coronavirus disease 2019 (COVID-19): A literature review. J Infect Public Health. 2020;13:667-73.
14. Lu HZ, Sui Y, Lobo NF, Fouque F, Gao C, Lu S, *et al.* Challenge and opportunity for vector control strategies on key mosquito-borne diseases during the COVID-19 pandemic. Front Public Health. 2023 Jul 24;11:1207293.