

**Mini Review****LYMPHATIC FILARIASIS IN AFRICA: A MINI REVIEW**\*Shinkafi T.S.<sup>1,2,3</sup> and Dahiru M.<sup>3,4</sup><sup>1</sup>Faculty of Chemical and Life Science, Usmanu Danfodiyo University Sokoto, PMB 2346, Sokoto, Nigeria<sup>2</sup>Faculty of Biomedical Sciences, Kampala International University, Western Campus, Ishak, Bushenyi District, Uganda<sup>3</sup>Faculty of Science and Technology, Cavendish University, Kampala, Uganda<sup>4</sup>Biological Sciences, Federal University of Kashere, Kashere, Gombe State, Nigeria**ABSTRACT**

Lymphatic filariasis is a neglected parasitic helminth or zoonotic nematode infection that constitutes a public health problem, particularly in the tropical region. People who live in tropical regions in remote rural villages near rivers and streams are mostly affected by filariasis. The vector of filariasis is the mosquito. It transmits the worm it took from the blood of an infected person to another person. The nematode act by suppressing the immune system of the host. Despite the efforts to eliminate lymphatic filariasis targeted in 2020, the disease still affects the majority of tropical countries. There have been a lot of efforts to eliminate lymphatic filariasis however the effort is not enough as there are increasing cases of the disease. Only a few countries from the African region like Togo were able to eliminate lymphatic filariasis. Mass Drug Administration apart from the use of mosquito nets or wearing globes is an effective control measure to eliminate the debilitating zoonotic disease. Because of the morbidity associated with the disease, there is a need to eliminate it.

**Keywords:** Microfilariae, Lymphatic filariasis, Zoonotic disease, Neglected Tropical Disease**\*Corresponding Author**

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## INTRODUCTION

Unlike Africa which is dealing with a dual burden of communicable and non-communicable diseases, the developed world is only dealing with non-communicable diseases (Boutayeb, 2006; Konkor, 2023). The main factors contributing to the high prevalence and burden of communicable diseases (also called infectious diseases) in Africa are poverty, and poor sanitary and hygiene conditions (Alsan et al., 2011). Communicable diseases are illnesses or diseases that spread from one person to another, from animals to humans, or vice versa (Tulchinsky & Varavikova, 2014). Communicable diseases otherwise called infectious diseases or transmissible diseases are caused by pathogenic (disease-causing) biological agents being infected, present, and growing in a single human or another animal host (van Seventer & Hochberg, 2017). Some of the communicable diseases Africa is battling with include cholera, hepatitis and some neglected tropical diseases such as lymphatic filariasis and onchocerciasis (Hoerauf et al., 2011; Yadav, 2023)

### Epidemiology and risk factors

Lymphatic filariasis is a parasitic nematode infection believed to have been neglected (Simpson, 2023). It causes a burden to most developing countries including Africa, Asia and the Pacific islands. People who live in tropical regions in remote rural villages near rivers and streams are mostly affected by this disease. The flies breed in

the fast-flowing water and transmit the infection (river blindness) to humans (Yadav, 2023). There are three types of filarial species that transmit filarial disease to humans: *Wuchereria bancrofti*, *Brugia malayi*, and *Brugia timori*. *W. bancrofti* is found in tropical Africa and is responsible for 90% of the infection in 120 million people affected in 83 countries while *Brugia malayi* is more common in Central and South America, and South-East Asia. *Brugia malayi* and *Brugia timori* are found in Southeast Asia and Indonesia's Lesser Sunda Islands, respectively (Remme et al., 2006).

The agent that spreads filarial disease or river blindness from person to person is a mosquito (Remme et al., 2006). Adult filariasis worm lives in the lymph vessels of the infected person where they mate and produce millions of microfilariae (Dietrich et al., 2019). The microfilariae are taken by a mosquito after biting the infected person where it grows inside the mosquito before the larva is transmitted to humans. The larval worm in the mosquito is transmitted to another person after a bite and it is taken to lymph vessels for maturation which usually takes a minimum of six months (Adinarayanan et al., 2007). The infected person develops disease response after the transmission which is such as lymphoedema and hydrocoele as seen in lymphatic filariasis while ocular inflammation is seen in onchocerciasis (Taylor et al., 2010)

### Diagnosis

The conventional method of lymphatic filariasis is the detection of microfilariae. The microfilariae are examined microscopically by preparing a blood smear.

Blood for smear is collected at night because lymphatic microfilariae circulate in the blood at night. When preparing a smear, the following three dyes namely Giemsa or hematoxylin and eosin are used. Another method used in the diagnosis is the serological method. Antifilarial IgG4 is usually high in individuals infected by lymphatic filariasis (Araújo, 2023)

### **Distribution of lymphatic filariasis**

Lymphatic filariasis is a tropical disease. It affects many countries in the world however it is commonly seen in Africa, Asia and the Pacific countries. The World Health Organization has estimated that 863 million people in at least 47 countries are affected by lymphatic filariasis (WHO, 2022)

In Table 1, the African region has the highest number of countries affected by lymphatic filariasis. For example, there are 34 African countries followed by the Pacific which has 13 countries with South America and the Middle East having 2 and 1 countries affected Fig 1. Filariasis is not a major disease of public health concern in regions such as the Caribbean, South America, and the Middle East. The disease is yet to be eradicated in Africa, Asia and the Pacific hence the high number of countries affected by the disease in these regions Fig 2.

### **Prevention, Control and Treatment**

A program launched in 2000 called global alliance for the elimination of lymphatic filariasis (GPELF)

in 2020 to break the chain of transmission of filariasis from mosquito to man through mass drug administration (MDA) of diethylcarbamazine or ivermectin combined with albendazole. MDA has contributed to the elimination of filariasis in some countries such as China and South Korea. Ghana is implementing MDA for the last 16 years to eliminate filariasis (Pi-Bansa et al., 2019). It is among the countries implementing MDA with 100% geographical coverage in Africa. Other countries include Benin, Burkina Faso, Chad, Comoros, Congo, Côte d'Ivoire, Eritrea, Ethiopia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mozambique, Niger, Senegal, Sao Tome and Principe, Sierra Leone, Uganda, United Republic of Tanzania, Zambia and Zimbabwe. While Angola, the Central African Republic, the Democratic Republic of the Congo, Madagascar, Nigeria and South Sudan are only implementing MDA in the regions considered to be of need. So far Malawi and Togo are believed to be eradicating filariasis from their countries while Cameroon has stopped MDA completely. The Gambia is the only African country reclassified as not requiring MDA (Deribe et al., 2021)

Since lymphatic filariasis is transmitted via mosquito bites from one person to another, the best prevention method is to avoid mosquito bites, especially in tropical regions. Different countries use different strategies for the elimination of filariasis however some of the measures that can be taken to prevent the disease spread are to sleep under a net, sleep in an air-conditioned room, ear globes, use mosquito repellent, give the community drugs that kill the worm (Mass Drug

Administration). Ivermectin 200 – 400µg/kg with albendazole 400mg can be given where the filariasis is endemic along with other helminthic diseases such as onchocerciasis while diethylcarbamazine 6 mg/kg with albendazole 400 mg can be given in region without endemicity (Ukatu, 2023).

### Conclusion

Despite the efforts to eliminate lymphatic filariasis in 2020, the disease still affects the majority of developing countries in Africa and Asia. Only a few countries from the African region like Togo were able to eliminate lymphatic filariasis. Mass Drug Administration apart from the use of mosquito nets or wearing globes is an effective control measure to eliminate the debilitating zoonotic disease. Because of the morbidity associated with the disease, there is a need to eliminate it.

### Recommendation

Since mass drug administration (MDA) is effective in breaking the chain of transmission of filariasis from mosquito to man, there is the need for the countries with the cases of filariasis to implement it. This will ensure that the filariasis global elimination strategy is achieved.

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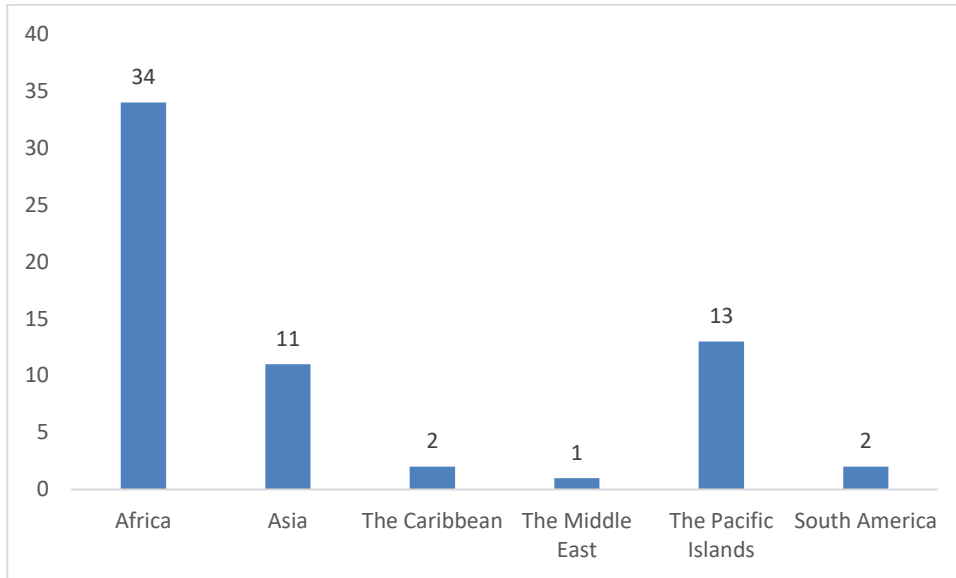
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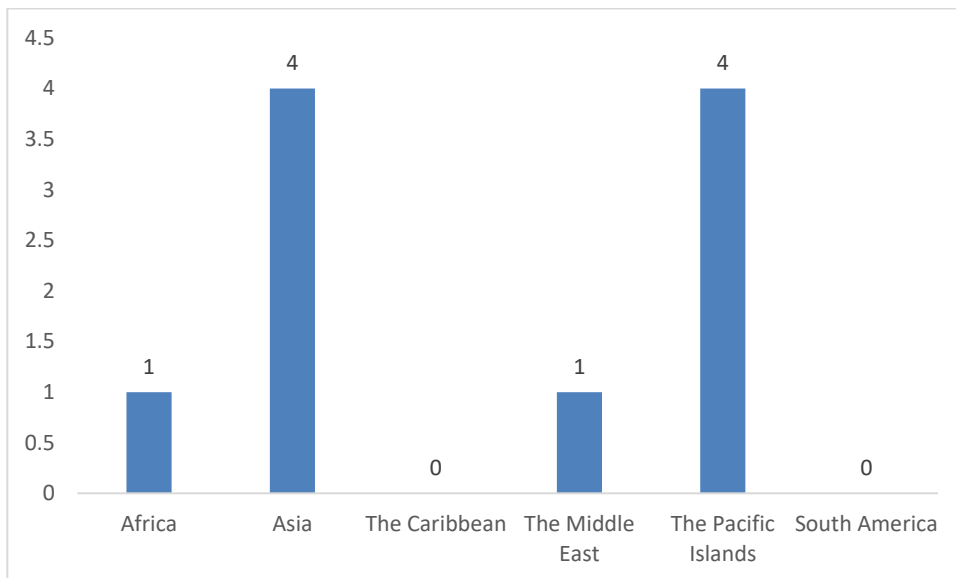
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**Table 1:** Distribution of lymphatic filariasis in the world

<b>Region</b>	<b>Countries affected</b>	<b>Countries eliminated</b>
Africa	Angola, Benin, Burkina-Faso, Cameroon, Central African Republic, Chad, Comoros, Congo (Brazzaville), Côte d'Ivoire, the Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Sao tome and Principe, Senegal, Sierra Leone, South Sudan, Sudan, Tanzania, Uganda, Zambia, Zimbabwe	Togo
Asia	Bangladesh, Brunei Darussalam, Burma (Myanmar), India, Indonesia, Laos, Malaysia, Nepal, Philippines, Timor-Leste (East Timor), Vietnam	Cambodia, Sri Lanka, Thailand and Maldives
<b>The Caribbean</b>	Dominican Republic, Haiti	-
<b>The Middle East</b>	Yemen	Egypt
<b>The Pacific Islands</b>	American Samoa (a U.S. Territory), Federated States of Micronesia, Fiji, French Polynesia, Kiribati, Marshall Islands, New Caledonia, Palau, Papua New Guinea, Samoa, Tuvalu, Wallis, Futuna	Cook Islands, Niue, Tonga and Vanuatu
<b>South America</b>	Brazil, Guyana	-



**Fig 1.** Number of countries affected by filariasis



**Fig 2.** Number of countries per region where filariasis has been eliminated as validated by WHO