

# Epidemiology of Malaria and Lymphatic Filariasis; Prevention and Control under Single Disease Control Program in Rural Nasarawa State, Nigeria

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## Abstract

Poor sanitary conditions are responsible for changes in patterns of diseases. The poor standard of living with its attendant poor sanitary conditions has reached an unprecedented level in Nasarawa State communities. The impact of these ecological and environmental changes, including the proliferation of water-holding containers (breeding sites for mosquitoes vectors of yellow fever, filariasis and malaria fever is exacerbating the problems of diseases. This paper highlight these deteriorating conditions and their implications for disease epidemiology. The link between Geographical distribution, vector population, symptoms, impact and control is tressed. The control under one program is discussed with the view to alert communities of a looming outbreak in rural and urban communities in Nasarawa State.

## INTRODUCTION

Malaria and lymphatic filariasis are diseases transmitted by species of mosquitoes. While the causative agent of malaria is plasmodium, species that of lymphatic filariasis are species of microfilaria parasites which include, wuchereria bancrofti, Brugia malayi, and Brugia timori. Plasmodium species which cause malaria include plasmodium falciparum, P. vivax, P.ovale, P. malariae.

Mosquitoes act as vectors of many parasitic diseases, including malaria and lymphatic filariasis (Ajayi *et al.*, 2010). Both malaria and lymphatic filariasis have been reported in one and the same communities, and that mosquitoes are responsible for their transmission (Inyama *et al.*, 2003) whereas malaria, a life threatening disease, is transmitted to man by female anopheles Mosquitoes (Aigbodion *et al.*, 2008), lymphatic filariasis is spread both by Anopheles and culex mosquitoes (Nwoke *et al.*, 2010).

It has been estimated by WHO (2005) that approximately 40% of the world population, mostly those living in the world poorest countries are at risk of malaria. Each year, more than 500 million people become severely ill with malaria, with most cases and death being in sub-sahara Africa (WHO, 2005; Oyewole *et al.*, 2006). Bancroftian filariasis affects over 90 million people in 76 nations and more than 905 million people in endemic areas (Oladimiji *et al.*, 2010). Filariasis is responsible for considerable disability and disfigurement due to acute adenolymphangitis and chronic lesions; elephantiasis and hydrocoele (Inyama *et al.*, 2003).

In Nigeria, lymphatic filariasis has been reported in rural communities in the lower Cross River Basin (Udoidung *et al.*, 2008, Okon *et al.*, 2010), Ezza in Ebonyi State (Anosike *et al.*, 2005), Igwun basin of Rivers State and parts of the Niger Delta (Udonsi, 1988, Agi and Ebenezer, 2009) as well as parts of central Nigeria including rural communities in Plateau and Nasarawa States (Eigege *et al.*, 2003). This paper is intended to alert policy makers and health workers of the need to control and prevent malaria and lymphatic filarial under one control program.

The first two species of plasmodium cause the most infections worldwide. Plasmodium falciparum is the agent of severe, potential fatal malaria, causing an estimated 700,000 – 2.7 million deaths annually, most of them in Young children in Africa making it the leading killer disease worldwide (ZVED, 2004).

The risk population for contraction of lymphatic filariasis includes 1.2 billion people. Currently, more than 120 million people are affected by lymphatic filariasis, including 25 million men who suffer from the genital swellings associated with the disease and 15 million people who suffer from severe lymphodems or elephantiasis (CDC, 2008). Infection of malaria and lymphatic filariasis spread from person to person by mosquito bites.

## Geographical Distribution of Malaria and Lymphatic Filariasis

The highest transmission of malaria is found in Africa south of the sahara. In cooler region, transmission is less and more seasonal, plasmodium vivax is more prevalent in this area. In temperate areas such as Western Europe and the United States, malaria is no more endemic because of programs that have controlled the disease. Malaria remains the leading cause of death and disease in many developing countries.

At the end of 2004, some 3.2 billion people live in areas at risk of malaria transmission in 107 countries and territories. Between 350 and 500 million clinical episodes of malaria occur every year. At least one million death occur every year due to malaria, while about 60% of cases of malaria are reported worldwide and more

than 80% of malaria deaths occur worldwide in African South of the Sahara WHO, 2005.

Malaria occurs mostly in poor, tropical and sub-tropical areas of the World. The area most affected is Africa South of Sahara where an estimated 90% of the deaths due to malaria occur.

Although lymphatic filariasis very rarely cause death, it is associated with clinical suffering and handicap. More than 1.3 million people in 83 countries and territories approximately 18% of the world's population live in areas at risk of infection with lymphatic filarial parasites. One third of those at risk live in India, one third in Africa and the remainder Asia, Pacific and the Americas. Bangladesh, Democratic Republic of Congo, Indonesia, Madagascar, Nigeria and Philippines are among the most highly endemic countries WHO, 2008.

About 25 million men suffer from genital disease (hydrocoele) due to lymphatic filariasis while estimated 1.5 million people have lymphoedema or elephantiasis of the leg. Most infections appear to be acquired in childhood which progress – into the overt clinical presentations of adults.

### **Factors that Determine Level of Transmission**

Like most other parasitic diseases a number of factors determine the level of transmission. These include:

1. Factors relating to the parasite, e.g species and strain of plasmodium and their degree of infectivity to the mosquitoes and man in the area.
2. Factors relating to the vector, such as the susceptibility of the local species and strains of Anopheles to infection with the local strain of plasmodium and their capacity to transmit the parasite to man as well as their general ecology, breeding feeding, and resting behavior, and population structure etc
3. Environmental and climatic factors
4. Human factors, including susceptibility, immunity and behavior, including malariogenic activities. All these factors act in concert to define the epidemiology of the diseases.

### **Symptoms of Malaria and Filariasis**

Both malaria and filariasis cause severe public health problems persons most vulnerable to these diseases are these with little or no protective immunity against the disease. Vulnerable groups include young children who have not yet developed immunity to malaria; pregnant women, whose immunity is decreased by pregnancy, especially during the first and second pregnancies; travelers or migrants coming from areas with little or no malaria or filarial transmission, who lack immunity.

Malaria causes fever, chills, headache, muscle ache, vomiting, malaise, and other flu-like symptoms. Brain disease (cerebral malaria) may occur, severe malaria and kidney failure, severe anemia can expose the young ones to HIV and other blood borne diseases due to blood transfusion. Other symptoms of malaria include mild jaundice, Enlargement of liver (splenomegally), increase respiratory rates, hyper-parasitemia, metabolic acidosis; hypoglycemia etc ZVED, 2008.

Lymphatic filariasis results in symptoms from *Wuchereria bancrofti* which include, abscess; lymphangitis, arthritis; synovitis, lymph scrotum, chyluria, elephantiasis of the leg, peitonitis, varicose groin-glands, thickened lymphatic trunk, chylous dropsy of the tunica vaginalis, and filarial orchitis Calabar swellings of the eye caused by loa loa, itching, creeping sensations, neuralgia, irritation and congestion of the cornea as well as elephant 8km of onchocerciasis etc

### **Impact of Malaria and Filariasis on Population**

At least about one million death occur every year from malaria and filariasis 60% of malaria cases are reported worldwide and about 80% of the malaria deaths worldwide occur in Africa South of Sahara. In foci areas, infection with malaria and filariasis lead to lost days of work, absence from school, expenses for preventive measures, expenses for burial in case of death, lost opportunities for joint economic ventures, reduce economic growth due to the diseases. Disfigure of skin retard growth in infant, loss or reduction in agricultural labour input resulting in food shortage and scarcity etc

### **Prevention and Control**

The prevention and control of malaria and lymphatic filariasis have become necessary because of their great socio-economic impact in a population, community or nation. The parasite responsible for these diseases are transmitted by mosquito species. It therefore became necessary to prevent and control these diseases by means which will disrupt the life cycle of the vector and parasite in question.

Preventive methods for these diseases should aim at

- i. Preventing infection by avoiding bites by parasite carrying mosquitoes
- ii. Preventing diseases by using anti-malarial/anti-filaria drug prophylactically. The drugs do not prevent initial infection through a mosquito bite, but they prevent the development of malaria parasites in the blood, which are the forms that cause diseases. Filarial parasites are also prevented from

developing in this way.

Prevention is an important measure to controlling malaria in endemic areas. This is achieved through

- i. Vector control
- ii. Personal protective measure such as insecticides treated bed nets
- iii. Preventive treatment with anti-malaria/antifilaria drugs of vulnerable groups such as pregnant women, who receive intermittent preventive treatment.

The use of insecticide treated bed net (ITN) in proper way prevent mosquito bites and thus decreases transmission of the disease. Insecticide treated net should be distributed to every household such that members of such household sleep under the net thereby avoiding mosquito bites.

Residential areas should be sprayed with insecticides. Insecticides kill the parasite vector mosquito. There is therefore the need to distribute insecticides to household and direct them on how to carry out the spray. Spraying should be done ones in two months.

Efforts should be made in providing antimalaria/antifilaria drugs to the entire communities. These drugs should be able to kill plasmodium as well as microscopic worms of lymphatic filariasis. The treatment should be done annually so as to reduce the level of malaria and filarial, thus diminishing transmission of infection.

The combination of these program if properly harmonized will help eliminate the diseases in a community/nation and alleviate the suffering caused by the parasites.

The community under control should be examined periodically to ascertain the effectiveness of these control and to be assured that population density of the vector is reduced.

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