Evaluation of the Current Status of Lymphatic Filariasis in Four Previously Endemic Communities of Nasarawa State, Nigeria

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Abstract. Lymphatic Filariasis (LF) is one of the neglected tropical diseases caused by filarial worms transmitted by female mosquitoes. The presence of LF was earlier reported in 4 communities in Nasarawa state and transmission was said to have been interruption in 2009. This study was conducted to evaluating the current status of the disease in the communities after ten years of interruption. Three hundred and eigthy-two (382) night blood samples were randomly collected from members of the communities of all ages and sex. The samples were examined for LF using miscroscopy and serology. Clinical examination for symptoms of LF was also carried out on all participants. The results of microscopy and antigen detection showed 0 (0.00%) and 50 (13.1%) infection rates respectively. Forty-seven (79.7%) of the symptomatic participants were positive for LF antigens only. The presence of LF antigens did not show any significant difference with respect to gender and age (P>0.05). The outcome of this study indicates the absence microfilariae in blood circulation of individuals in the studied communities suggesting that the disease has been interrupted. This shows that there is good prospect for elimination of LF in the stuyd area and Nigeria subject to commitment.

Key words: Lymphatic Filariasis, Evaluation, Endemic, Interruption. Elimination

Introduction

Lympahtic Filariasis (LF) is a debilitating disease caused by the filarial worms: *Wuchereria bacrofti, Brugia malayi and Brugia timori* (WHO, 1994). These filarids live in the lymphatic vessels and lymph nodes and can be found in the blood at night. The microfilariae of LF are transmitted by female mosquitoes (*Anopheles, Culex, Aedes and Mansonia*). Infection occurs when infective larvae are deposited on human skin during blood meals by the vector mosquito. Development of the larvae takes place in the lymphatics. Matured worms can live in the body of an infected person for many years (WHO, 1992).

Three stages of the manifestation of LF infection have been identified to include the asymptomatic stage where there are no obvious clinical symptoms, but microfilariae are present in blood circulation (Adams and Maegraith, 1978, Cheesbrough, 2005). This is followed by the acute stage of the disease which is characterized by recurrent attacks of fever (filarial fever), painful inflammation of the lymph nodes (lymphadenitis) and lymphducts (lymphangitis), distended scrotal sac (hydrocele) and lymphedema (lymph fluids in surrounding tissues) are common features. The last stage is the chronic lymphatic filariasis with the obvious features including hydrocele, lymphedema and elephantiasis (swellings of the limbs).

The Disease is transmitted by infected female mosquito (same vector as malaria). It is characterized by chronic and painful swelling of limbs and genital organs, associated with kidneys damage in children. LF is potentially eradicable in Nigeria as there are no known animal reservoirs of the parasite (Miri, 2016). Approximately 120 million people are infected by lymphatic filariasis, and 1.1 billion are at risk of infection. The endemicity profile of the WHO/AFRO region and Sudan, as of 2013 showed that 1163 district were endemic for LF (WHO, 1998).

Baseline survey report showed the presence of LF microfilaria and antigenemia in 4 Villages in Nasarawa state. In 2009, interruption in transmission was reported (Miri, 2016). By

2011, no infected (L3) mosquito was detected. LF Integrated control programme using Mass Administration of Medicines (MAM) and distribution of Long Lasting Insecticides Nets (LLNs) between 2000 and 2012 showed a reduction in transmission rate from 3.1% to 0.0% (Molyneux, 2004; Jonathan, *et a.*, 2012).

Parasitological examination conducted in 13 LGAs from Nasarawa between 2007 and 2008 showed that three LGAs were qualified to stop LF mass administration of medicines. Jonathan *et al.* (2012) published evidence for stopping MAM for LF in all LGAs in Nasarawa State, Nigeria. This report was verified and ascertained (Miri, 2016). The implication of these reports is that LF has been successfully controlled in Nasarawa State, Nigeria.

To sustain the successes achieved in interrupting the transmission and control of LF in Nasarawa State, surveillance through periodic investigation is required. This study aims at evaluating the current status of LF in four previously endemic communities in Nasarawa State and to ensure the basic strategies for L F interventions are in place after four years of interruption.

Methods

This study was conducted in four previousely endemic communities of Nasarawa State (Gbuwhen in Akwanga Local Government Area, Maiganaga in Wanba LGA, Akwete and Azara in Awe LGA). Nasarawa State is located in North central Nigeria and has a tropical weather suitable mosquiotes breeding. Its proximity to Abuja, the nation's capital (about 65 KM) raising public health concerns on matters of infectious diseases such as lymphatic filariasis.

Each of the four communities was visited and surveyd in all aspects of the study. The initial field phase involved antigenemia detection using ICT kits on volunteers from each community. This was followed by the laboratory phase of microfilaria detection by microscopy on 50% of individuals tested for antigenemia. A questionniare was administered to collect the demographic and health information of the participants.

About 3ml of venus blood sample was collected from participant (of both sexes) aged 5 years and above. All blood samples were collected in the night between the hours of 20:00 to 24:00. The blood samples were carefully preserved in EDTA containers and transported in ice packs for microfilariae detection at the Innovative Biotech Ltd. Clinical examination for the physical signs and symptoms of the disease was conducted by a trained health personnel.

A drop of the blood samples was used for antigenemia screening in the field before preservation in EDTA containers using ICT kit (Alere^{TM} Filariasis Test Strip) according to the manufacturers' instruction. Microscopy for detection of microfilariae in blood was done following the procedure of Cheesbrough (2005). All laboratory analysis were carried out at Innovative Biotech Laboratory Ltd by qualified and registered Laboaratory Scientists. The result was properly documented in standard laboratory forms and was later transcribed on individual questionnaires earlier completed for each participant.

The questionnaires bearing the field and laboratory data were arranged according to the locations of collection. Information on each questionnaire was coded on microsoft excell, interpreted and transferred to SPSS statistical package for data analysis. The Results generated from this study were presented on relevant tables for ease of discussion and inferences. Conclusions and recommendations were drawn from the findings of the study.

Ethical clearance for this study was obtained from Federal Medical Center, Keffi, Nasarawa State Nigeria. Ethical permission for the use of Healthcare Facilities in the state for this study was obtained from Nasarawa State Agency for Primary Healthcare Development. Mobilization of the communities was done through advocy visits to the community leaders. Ethical consent was obtained from individuals by making participation voluntary. Participants or their relations were also required to complete an ethical consent form.

Results and Discussion

Table 1. Prevalence of Lymphatic Filariasis in four communities

Name of Community	No. Examined	No. (%) Positive ICT kit	Microscopy
Akwete	95	16 (16.8)	0 (0.0)
Azara	90	12 (13.3)	0 (0.0)
Gbuwhen	97	8 (8.3)	0 (0.0)
Maiganga	100	14 (14.0)	0 (0.0)
Total	382	50 (13.1)	0 (0.0)

A total of 382 individuals were examined for the presence of lymphatic filariasis using ICT kits and microscopy in four communities known to be previousely endemic for the disease. Table 1 shows that the blood of 50 (13.1%) individuals tested positive for the antigens of the parasite but no microfilariae were seen using microscopy (0.0%). The presence of antigens was more among individuals at Akwete 16 (16.8%) followed by those at Maiganga 14 (14.0%) and Azara 12 (13.3%). The least record of the presence of antigens in blood was found in Gbuwhen (8.3%).

Table 2. Presence of LF antigens in relation to gender

Gender	No. Examined	No. (%) Positive (ICT kit)
Male	149	14 (9.4)
Female	233	36 (15.5)
Total	382	50 (13.1)

The prevalence of antigens of lymphatic filariasis in the study area in relation to gender of participants (Table 2) shows that 36 females (15.5%) had antigens in their blood compared to 14 males (9.4%). It was observed that more females (233) than males (149) volunteered to participate in the study.

Table 3. Presence of LF antigens in communities by age groups

Age Group (yrs)	No. Examined	No. (%) Positive (ICT kit)
> 15	56	3 (5.4)
15 - 24	71	5 (7.0)
25 - 34	106	19 (17.9)
35 - 44	82	16 (19.5)
< 44	67	7 (10.4)
Total	**382**	**50 (13.1)**

Table 3 shows the presence of LF antigens among participants in relation to their age groups. The result shows a gradual increase in the prevalence of antigens with corresponding increase in age untill it attained a peak among individuals of the age group 35 - 44 years (79.7%). A gradual decline was then noticed towards old age**.** The least number of individuals with LF antigens intheir blood was found in individuals that were less than 15 years old (5.4%).

Table 4. Presence of LF antigens among symptomatic and non-symptomatic individuals

Status of Individuals	No. Examined	No. (%) Positive (ICT kit)
Symptomatic	59	47 (79.7)
Non-Symptomatic	323	3 (0.9)
Total	**382**	**50 (13.1)**

Table 4 shows that majority of the participants (323) in this study did not have LF symptoms (they were asymptomatic) compared to those who were symptomatic (59). The result of the presence of LF antigens among symptomatic and asymptomatic participants was 47 (79.7%) and 3 (0.9%) respectively.

This study presents the current status of lymphatic filariasis in Nasarawa state, Northcentral Nigeria after ten years of successful interruption of transmission of the disease. The result shows that lymphatic filariasis is no more endemic in any of the four communities studied. This is confirmed by the complete absence of microfilariae in night blood samples collected from individuals in the area. The presence of antigenemia in periferal blood circulation is only indicative of previous infection (Elkanah, *et al.*, 2018). The findings of this study corroborate the report of Amaechi (2014) and Elkanah, *et al.* (2017).The general pattern of the distribution of LF antigens among individuals from different communities shows no significant variation. This is a further confirmation that there is no likelihood of ongoing LF trasnmission in the area.

Although the prevalence of LF antigns was high among females than males, this was not statistically significant, suggesting that members of both gender are equally susceptable to infection by the disease. Simialr observations were made with respect to gender by Akogun and Onwuliri (1991) and Elkanah, *et al.* (2018).

The prevalence of infection in this study was seen to increase proportionately with increase in age until a steady decline was observed towards old age. This observation is consistent with the findings of Anosike *et al.* (2005) and Amaechi (2014). The decline at old age has been attributed to gradual deterioration of the immune system at this age (Okon, *et al.* 2010).

The status of lymphatic filariasis among symptomatic and asymptomatic individuals showed high prevalence among those that had the symtptoms of the disease. This has been attributed to the non-reversable nature of the signs and symptoms of the disease, even when the parasites are no more found in the blood (Elkanah *et al.*, 2018).

Conclusion

The outcome of this study is a confirmation of the claims by Miri (2016) that LF has been successfully controlled in endemic areas of Nasarawa State. This suggests that the lessons of these successes can be applied to other endemic areas in the country for total control of the disease. The right environment, commitment and attitudes is however required for effective control of the disease in Nigeria leading to its elimination.

Acknowledgement

The authors gratefully acknowledge Tetfund for providing the grant for this study. We equally acknowledge the management of Nasarawa State University Keffi for providing the enabling environment for this study to be completed. All the participants are hereby acknowledged for accepting to take part in the study.

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