

Bancroftian filariasis among the Mbembe people of Cross River state, Nigeria

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Abstract

Background & objective: Bancroftian filariasis is a major public health and socioeconomic problems in the humid tropical and subtropical regions of the world. A study was undertaken to investigate the status of the disease in some rural communities of Cross River State, Nigeria, with a view to enriching the epidemiological baseline data of the disease in Nigeria.

Methods: A total of 897 Mbembe people living in six major villages of Obubra Local Government Area of Cross River State, Nigeria were examined between December 2008 and June 2009 for lymphatic filariasis due to *Wuchereria bancrofti*.

Results: Out of the 897 persons examined, 139 (15.5%) were positive for microfilariae in their blood smear. Infection varied significantly among villages ($p < 0.05$) but was not sex-specific ($p > 0.05$). The overall mean microfilarial density among the total population was 9.9 mf/50 μ l. The occurrence of microfilaria in the peripheral blood of the infected persons was neither age nor sex specific ($p > 0.05$). The most important clinical manifestations were hydrocele (9.7%) and lymphoedema (2.3%). Overall disease prevalence was (6.8%).

Conclusion: Government effort on the Community Directed Treatment with Ivermectin (CDTI) project should be complimented with albendazole distribution to the endemic communities. Environmental sanitation should also be intensified to eliminate the breeding sites of the mosquito vectors.

Key words Lymphatic filariasis; Mbembe people; microfilaria prevalence; south-eastern Nigeria; *Wuchereria bancrofti*

Introduction

One of the most neglected tropical diseases is Lymphatic filariasis (LF). It is caused by the parasitic filarial nematode worms *Wuchereria bancrofti*, *Brugia malayi* and *B. timori*. Over 120 million people in at least 80 countries of the world are infected with lymphatic filariasis and it is estimated that 1.2 billion (20% of the world population) are at risk of acquiring the infection^{1–3}. The third most endemic country in the world after India and Indonesia is Nigeria and 22.1% of the population is thought to be infected^{4–7}. Although, mortality from lymphatic filariasis is low, the disease is the fourth leading cause of permanent

disability-adjusted life years⁴. In most parts of Africa, *W. bancrofti* is responsible for lymphatic filariasis infection. The natural vector of lymphatic filariasis is mosquito of the *Anopheles* and *Culex* species^{3,8}.

The visible manifestations of the disease are severe and disfiguring lymphoedema and elephantiasis of the limbs or genitalia, hydrocele and scrotal pathology in men, recurrent infections associated with damaged lymphatic abnormalities of the renal functions occur in an estimated 44 million people⁹.

The strategy of the global LF-elimination initiative

is based upon mass distribution of a combined drug regimen in endemic communities to interrupt the transmission of *W. bancrofti*. As Nigeria begins to implement the Lymphatic Filariasis Elimination Programme (LFEP), a basic problem envisaged is the dearth of information on the distribution of LF in most endemic states of the country¹⁰. Interestingly, there are recent documented reports on the prevalence of the disease in Nigeria^{11,12}. Despite these works, most areas in the country are unidentified and/or not studied. The main objective of this study was to investigate the status of the disease in some rural communities of Cross River State, Nigeria, with a view to enriching the epidemiological baseline data of the disease in Nigeria. This will strengthen the control intervention to be initiated.

Material & Methods

Study area: The study was carried out among the Mbembe people of the Obubra Local Government Area of Cross River State, Nigeria located in the south-eastern Nigeria. This area is situated between latitudes 5°45' and 6°20' N latitude and 8°3' and 8°32' E longitude. Six villages were selected from the Mbembe settlement for the study: Eja, Iyamitet, Iyamoyong, Ochon, Ofumbongha and Ogada. The Mbembe people are mainly farmers and specialized in the cultivation of Cassava, yams, rice and maize. This area is located in the tropical rainforest belt with high annual rainfall, high relative humidity and high mean annual temperature¹³. A detailed description of the study area is given by Udoidung *et al*⁷.

Ethical consideration: Prior to the commencement of this study, ethical clearance and permission was obtained from the Centre for Clinical Governance of the Ministry of Health, Cross River State, Nigeria. Permission was also obtained from the Paramount Ruler and the respective Village Heads of the Obubra Local Government where the investigation was undertaken. They were educated about the rationale behind the project and the need for peripheral night blood collection from their subjects. Individuals were allowed voluntary participation.

Sample collection: The respective village heads mobilized their subjects to gather in the respective Community Health Centres between 2300 and 0300 hrs. Information on each individual was obtained for age, sex, and duration of stay within the village on a standard form. Blood samples were collected during night due to the nocturnal periodicity of *W. bancrofti* microfilariae. A total of 897 finger prick blood samples were collected from six villages. The survey was conducted between December 2008 and June 2009.

Parasitological examination: Geimsa stained thick blood smear was used for the identification of microfilariae using binocular microscope. Microfilariae of *W. bancrofti* were identified based on specific morphological features and sizes as described by Cheesbrough¹⁴. They were counted in each of the infected persons to determine the microfilarial density and recorded on the standard individual forms. The keys of Cheesbrough¹⁴ identified and distinguished microfilariae of *W. bancrofti* from microfilariae of *Mansonella perstans* and *Loa-loa* if present.

Clinical examination: Persons of all age groups who presented themselves for the survey were examined by trained medical personnel (recruited for this study) for clinical examinations of LF. All males and females were examined for signs of limbs and breast elephantiasis. Males had their genitals examined for hydrocele and scrotal elephantiasis. Clinical manifestation were staged as described by McMahon *et al*¹⁵.

Statistical analysis: The differences in infection rate in the communities, age and sex were analysed using chi-square test. The comparison of intensity was tested by student's *t*-test. All data were analysed using SPSS for windows version 10.0 (SPSS Inc Chicago, IL).

Results

The overall percentage LF prevalence was 139 (15.5%) among the 897 samples tested, while the mean microfilarial density was 9.9 mf/50 μ l (Table

Table 1. Prevalence and mean intensity of lymphatic filariasis (LF) due to *Wuchereria bancrofti* per village among Mbembe people of Cross River State

Villages sampled	No. of individuals examined	No. positive for LF (%)	Mean mf/50 µl
Eja	188	57 (30.3)	8.8
Iyamitet	178	36 (20.2)	9.9
Iyamoyong	154	16 (10.4)	10.9
Ochon	101	12 (11.9)	10.8
Ofumbongha	120	16 (13.3)	9.7
Ogada	156	2 (1.3)	9.5
Total	897	139 (15.5)	9.9

1). The percentage prevalence of LF varied significantly ($p < 0.05$) within the villages and ranged from 1.38% in Ogada to 30.3% in Eja village (Table 1). Mean microfilarial density ranged from 8.8 mf/50 µl in Eja to 10.9 mf/50 µl in Iyamoyong (Table 1). The overall percentage prevalence for both male and female subjects was equal (15.5%) (Table 2). Mean microfilarial density for male and female subjects were 8.7 mf/50 µl and 9.7 mf/50 µl respectively ($p > 0.05$). Age wise prevalence of LF is shown in Table 3. There was no significant ($p > 0.05$) difference in the percentage prevalence among various age groups. The prevalence of clinical manifestation of lymphatic filariasis is shown in Fig.1. Of the 897 subjects examined for clinical manifestations, 61 (6.80%) had various degrees of clinical signs. The overall prevalence of hy-

Table 3. Prevalence (%) of *W. bancrofti* infection by age in Mbembe, Cross River State (6 communities combined)

Age range	No. of individuals examined	No. positive for LF (%)
1 – 20	201	19 (9.5)
21 – 40	419	72 (17.2)
41 – 60	341	42 (17.4)
61 – 80	36	6 (16.7)
Total	897	139 (15.5)

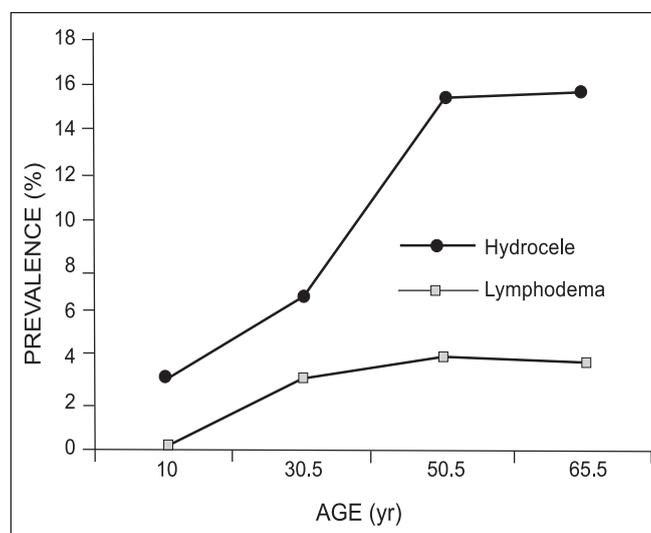


Fig. 1: Prevalence of hydrocele and lymphoedema by age (6 communities combined)

drocele was (9.7%). Sizes of hydrocele ranged from 4 to 30 cm with an average of 12.08 cm. Prevalence of lymphoedema was 2.3% (range 1.95–2.97%).

Table 2. Prevalence and mean intensity of lymphatic filariasis (LF) due to *W. bancrofti* microfilariaemia with relation to sex and village among Mbembe people of Cross River State, Nigeria

Villages sampled	Total number of individuals examined		Number (%) infected		Mean microfilarial density mf/50 µl	
	Male	Female	Male	Female	Male	Female
Eja	73	115	20 (27.4)	37 (32.2)	9.8	8.3
Iyamitet	82	96	21 (25.6)	15 (15.6)	9.6	9.8
Iyamoyong	86	68	6 (6.9)	10 (14.7)	12.1	10.2
Ochon	48	53	8 (16.7)	4 (7.6)	10.5	11.5
Ofumbongha	65	55	9 (13.9)	7 (12.7)	10.1	9.0
Ogada	58	98	0 (0.00)	2 (2.0)	0.0	9.5
Total	412	485	64 (15.5)	75 (15.5)	8.7	9.7

Discussion

In order to initiate any disease control programme based on mass drug distribution one needs to understand the geographical distribution of the disease in the affected countries, in order to know where to target mass treatment¹⁶. The present study showed that lymphatic filariasis due to *W. bancrofti* is endemic amongst Mbembe people. The overall prevalence of 15.49% reported in this study is consistent with 16.9% recorded by Anosike¹⁷ in Ebonyi State, 16.7% obtained by Badaki and Akogun¹⁸ in Taraba State and 18.8% observed by Mba and Njoku¹⁹ in Anambra State of Nigeria. These prevalences are likely to be underestimates, in view of the fact that the thick blood smear technique based on 45 ml of peripheral blood is not highly sensitive^{20,21}. However, the high prevalence of LF observed among the Mbembe people could be due to their occupational dispositions. In addition, the living conditions of the people, as most houses in the area have mud walls and thatched roofs. The houses are not ceiled and the eaves are large to permit movement of insects in and out⁷. Furthermore, their proximity to various breeding sites of the vectors due to their environmental and unhygienic conditions might have accounted for the prevalence. All these activities and environmental conditions increase man-vector contact.

Prevalence was observed to vary between the communities in this study, the socioeconomic status and the local environmental conditions of the communities could be responsible for these variations. Similar observations have been made by Anosike *et al*¹⁷ and Prakash *et al*²². Understanding differences in disease rates between men and women might be helpful in understanding the pathogenesis of the disease²³.

There was no significant association between LF prevalence and sex. This may be a reflection of the fact that both males and females engage equally in the activities involving exposure risks and common behavioural practices. In the study area men, women

and children are scantily dressed and hence sustain more mosquito bites. In contrast, in few related studies^{7,24}, females were more infected than males.

Age-wise prevalence is consistent with previous studies^{7,17,25,26} which showed that prevalence rises with age. The high prevalence recorded in 21–60 yr age group, which incidentally is the most productive age group in African traditional settings, calls for concern. The low prevalence of LF in 61–80 yr age group might be due to resistance to new infection²⁷. The age-wise differences may also reveal that the initially very light infections are difficult to detect with available parasitological techniques²⁶.

The estimation of microfilarial density (mfd) is very essential in the evaluation of control programme. The mean intensity recorded in this investigation is similar to those recorded by Anosike *et al*¹⁷ and Udoidung *et al*⁷. This varied significantly within the communities. The factors responsible for variation in microfilarial prevalence might have also contributed to the variation in intensity. There was a significant variation in the clinical presentation of filariasis within the communities. Different ecogeographical settings have different clinical presentations of the disease²⁸. Hydrocele is the predominant clinical manifestation observed in this study. It has been reported by Pani *et al*²⁹ that in *W. bancrofti* infections, genital involvement is the most common manifestations. These observations could explain the high prevalence of hydrocele recorded in this study.

In view of the public health importance of LF among the farming population of Mbembe people of Cross River State, Nigeria, urgent chemotherapy intervention is highly recommended.

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