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Prevalence Rate And Detection Of*WuchereriaBancrofti* Wb123 Antigen Using IgG4 Antibodies In Bakassi Local Government Area, Cross River State.

By

MbahMaurice ;IquoOtu-bassey ;Akpan Samuel; ImeobongIgnang&Eba Felicia

ABSTRACT: *Lymphatic filairasis has remained a public health problem,especially in tropical countries of the world. Despite several efforts over the years to eliminate it both by the World Health Organization (WHO) and Non-governmental organizations(NGOs). The prevalence of lymphatic filairiasis was carried out among 400 subjects aged 18 years and above in Ekpri-Ikang, Ikang and Ebot-20 Communities in Bakassi Local Government Area, Cross River State. Of the 400 samples collected 184 (46%) were males while 216(54%) were females. Structured questionnaires were administered to all the participants and their informed consents was also sought and obtained. Two millilitres of venous blood was obtained from each of the consented participants between the hours of 9pm and 10 pm daily. The presence of WuchereriabancroftiWb 123 antigen in the blood was determined using SD bioline IgG4 antigen kit while the presence of micro filaria was determined using knott's concentration method and microscopy. Out of the 400 samples collected from the participants, 68(17%) were positive for Wb123 antigen while 14(3.5%) had microfilaria of Wuchereriabancrofti in their blood. Of the three locations studied, Ikang had the highest number of infected persons with (8.9%) while Ebot-20 had the least (4%). There was no statistically significant difference in the prevalence of Wuchereriabancrofti Wb123 antigen and presence of microfilaria in the study by location (X^2 = 0.99; P>0.05). Female subjects (18.5%) were more infected than males (15.2%). There was no statistically significant difference in the occurrence of Wb123 antigen by gender (X^2 =1.39P< 0.05). Subjects aged 36-41 years had the highest number of infections 20 (41.7%) while those between the age bracket 42-72 years had the least number of infected subjects (9.1%). The result of the prevalence of lymphatic filariasis by occupation revealed that fishermen were more infected 10(13.3%) than the farmers 16(11.4%). This finding suggests that acquisition of infection is dependent upon the timing and location of the subjects. The fishermen are more exposed to mosquito bites in the night and around the coastal areas more than farmersIn conclusion this study has revealed the presence of lymphatic filariasis in Bakassi Local Government Area and should be treated as a public health problem*

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I. Introduction

Lymphatic filariasis is one of the neglected tropical diseases caused by infection with the filarial parasites, *Wuchereriabancrofti*in Africa or Brugiatimori and Brugiamalayi within the pacific islands. The filarial nematodes that cause this disease are transmitted by mosquitoes and produce chronic and long-term infection through suppression of host's immunity.

Lymphatic filariasis is a human disease caused by parasitic worms known as filarial worms. Most cases of the disease have no symptoms. Some people, however, develop a syndrome called elephantiasis which is marked by severe swelling of the arms, legs, or genitals. The skin may become thicker, and pain may occur. The changes to the body can cause social and economic problems for the affected person (Anosike*et al.*, 2005). Of the 73 countries where lymphatic filariasis is known to occur, 38 are in Africa and in these regions infection is exclusively caused by *Wuchereriabancrofti* (Mbah and Njoku, 2002). The thirdmost endemic country for the disease (after India and Indonesia) is Nigeria where the prevalence ofBancroftianfilariasis. The disease causes severe morbidity which is the second most important cause of permanent disability (WHO, 2010). Acute symptoms such asadenolymphangitis cause severe physical suffering while chronic conditions such as lymphoedema and hydrocoele cause permanent psycho-social problems.

Of the three parasitic worms(*Wuchereriabancrofti*, *Brugiamalayi*, and *Brugiatimori*)causing lymphatic filariasis,*Wuchereriabancrofti* is responsible for 90% of the cases, affecting over 120 million people, primarily in central Africa, Nile Delta, South and Central America, the Tropical region of Asia including China and the Pacific Islands (WHO,2000). Infection occurs when filarial parasites are transmitted to humans through mosquitoes bites. The infection is usually acquired in childhood causing hidden damage to the lymph. If left untreated the infection can develop into the chronic disease known as elephantiasis. The worms are spread by the bites of infected mosquitoes. These worms damage the lymphatic system. The disease is diagnosed by microscopic examination of blood collected during the night. Prevention can be achieved by treating entire groups in which the disease exists, known as mass deworming. This is done every year for about six years, in an effort to rid a population of the disease entirely. Medications used include antiparasitics such as albendazole with ivermectin, or albendazole with diethylcarbamazine. The medications do not kill the adult worms but prevent further spread of the disease until the worms die on their own. Efforts to prevent mosquito bites are also recommended, including reducing the number of mosquitoes and promoting the use of insecticide-treated bed nets, (Shiferaw*et al.*, 2009).

Lymphatic filariasis is known to cause health problems in Africa and rural communities in Nigeria. This study is aimed at determining the prevalence of lymphatic filariasis using the SD bioline rapid diagnostic test kits *Wuchereriabancrofti*Wb 123 antigen in Bakassi Local Government Area of Cross River State ,Nigeria

II. Materials and Methods

The study was carried out in Ekpri-Ikang, Ikang and Ebot20 in Bakassi Local Government Area of Cross River State.The ethical clearance was obtained from the Cross River State Ministry of Health**.** A total of 418questionnaires and were administered to Participants from various communities and only 400 participants gave consent to participate in the study

Sample collection :Two millilitres of blood sample were collected from prospective participants through vein puncture between 10-11pm each day to test for *Wuchereriabancrofit*Wb 123 antigens. The samples were analysed usingthe Knott concentration method to detect the presence of microfilaria while SD bioline wb123 was used to detect *Wuchereriabancrofti* antigen

Method: Immunochromatographic method using SD Bioline Lymphatic Filariasis IgG4 test kit

Principle :SDbioline LF test cassette contains a membrane strip which is pre-coated with a monoclonal antibody. The test line is pre-coated with a monoclonal antibody specific for the*Wuchereriabancrofti*Wb 123 antigens in human serum, plasma or whole blood. The test utilizes the principle of immunochromatography as the specimen flows through the membrane after the addition of the assay diluent. The colored colloidal gold conjugates anti Wb123 move to the test region where they are immobilized by the monoclonal anti WB123 which indicates a reactive (positive) test result. The absence of a coloured band in the test region indicates a non reactive (negative) test result. The control line is used for procedural control and should appear when blood is added to the test device and the test reagent are stable.

III. Results

A total number of 400 participants from Ekpri-Ikang, Ikang and Ebot 20 communities in Bakassi Local Government Area of Cross River State, Nigeria were examined for lymphatic filiariasis using the SD biolinefilariasis kit. It was observed that 68(15%) and 14(3.5%) persons out of the 400 participants tested positive for *Wuchereriabancrofti* Wb123 and had microfilaria worms respectively.

Table 1 shows the prevalence of *Wuchereriabancrofti* Wb123 detected according to the sample locations. Of the 68(15%) positive cases for*Wuchereriabancrofti*Wb123antigen ,Ikang had 18%,Ekpri-Ikang 16.7% 16% while Ebot20 had the least infection rate with 16%. There was no statistically significant difference in the prevalence of Wuchereriabancrofti wb123 antigen within the study locations (x^2=0.99; P>0.05)

The prevalence of *Wuchereriabancrofti* in the study area by presence of microfilaria is presented in Table 2. Out of the 120 person examined in Ekpri-Ikang, 4(6.7%) had the presence of microfilaria. Out of the 180 persons in Ikang community examined, 8(8.9%) showed the presence of microfilaria and out of the 100 persons tested in Ebot-20, 2(4%) had the presence of microfilaria. The result was not statistically significant (X^2 = 0.47, X^2 = 5.99; P>0.05).

The prevalence of *Wuchereria*bancrofti wb123 antigens according to age is shown in table 2. The study revealed that those within the age group of 36 – 41years were more infected 41.7% andthose within the age group of 48 and with the lowest infection rate of 9.1%. There was no significant difference (X^2 = 0.05, X^2 = P>0.05).

Table 1Prevalence of *Wuchereriabancrofti*by sample location

Location	NumberExamined	No (%) positive for microfilaria of *Wbancrofti*	positive for *Wbancrofti* (wb123) antigen
Ekpri-Ikang	120	4 (6.7)	20 (16.7)
Ikang	180	8 (8.9)	32 (17.8)
Ebot-20	100	2 (4)	16 (16)
Total	**400**	**14 (7)**	**68 (17)**

Table 2
Prevalence of *Wuchereriabancrofti* Wb123 antigen by Age

Age groups (years)	Numberexamined	No (%) positive for *WBancrofti w123antigen*	No (%) positive microfilaria *ofWbancrofti*
18 – 23	116	8(6.9)1()	
24 – 29	84	16 (19.1)	3()
30 – 35	72	20 (27.8)	6()
36 – 41	48	20 (41.7)	3()
42 – 47	44	4 (9.1)	1()
>48	36	-	-
Total	**400**	**68 (17)**	**14()**

Table 3 shows prevalence of *Wuchereriabancrofti* by presence of microfilaria according to gender. Of the 400 persons examined, 184 and 216 were males and females respectively, and 21(15.2%) and 30(18.2%) males and females were positive for *W bancroftiW123 antigen while* 6(6.5%) and 8(7.4%) harboured microfilariaerespectively. There was no statistically significant difference in the rate of infection between male and female subjects (X^2 = 0.59, X^2 = 3.84; P>0.05). The results however did not show statistical significant difference in the presence of microfilaria between the genders (X^2 = 0.71, = 3.84; P>0.05).

The prevalence of *Wuchereriabancrofti* wb123 antigens by occupation of subjects is presented in Table 4. Farmers, fishermen and traders had the prevalence rates of 32(22.9%), 20(33.3%) and 12(15%) respectively, while students were the least infected 4(3.3%). Although the prevalence of infection was higher among fishermen and farmers, there was no statistically significant difference according to occupation (X^2 = 0.21, P>0.05).

The prevalence of *Wuchereriabancrofti* by occupation of subjects using Knott concentration method. The results revealed that out of the 140, 60, 80 and 120 persons examined that were farmers, fishermen, traders and students respectively, their prevalence of infection using Knott concentration method were 16(11.4%), 8(13.3%), 4(5%) respectively for farmers, fishermen and traders with no infection recorded among the students. The difference among the occupations was however not statistically significant (X^2 = 0.34, P>0.05).

Table 3
Prevalence of Antigenemia of *WuchereriaBancrofti*Wb123 antigen by gender

Gender	Number Examined	No (%) positive for microfilaria of *Wbancrofti*	No (%) positive for *Wbancrofti* Wb123
Males	184	6 (6.5)	28 (15.2)
Females	216	8(7.4)	40 (18.5)
Total	**400**	**14(7)**	**68 (17)**

Table 4
Prevalence of microfilaria of *Wuchereriabancrofti* by occupation

Occupation	NumberExamined	No (%) positive for Microfilaria*Wbancrofti*	No (%) positive for *Wbancrofti* Wb123
Farmers	140	8 (11.4)	32 (22.9)
Fishermen	60	4(13.3)	20 (33.3)
Traders	80	2 (5)	12 (15)
Students	120	-	4 (3.3)
Total	**400**	**14 (7)**	**68(17)**

IV. Discussions

This study on lymphatic filariasis among 400 people from Ekpri-Ikang, Ikang and Ebot20 communities in Bakassi Local Government Area of Cross River State, Nigeria revealed an overall prevalence of 68(17%) and 14(5%) for *Wuchereriabancrofti* Wb123 and microfilaria worms respectively which is lower compared to the 47% on the studies on the diagnosis and transmission dynamics of lymphatic filariasiscarried out by Mbah*et al.,* (2010) in Biase Local Government Area of Cross River State.. This result is slightly higher than the work by Okon*et al.,* (2002) whoreported 15.5% among Mbembe people of Cross River State and Anosike*et al.,* (2005) who reported 16.9% among the Ezza people of Ebonyi State. Lower prevalence was found in other studies of lymphatic filariasis in Nigeria. Work by Ibor*et al.,* (2012) reported 6.1% among Yakurr people of Cross River State.This low prevalence may be due to the annual administration of Ivermectin in the study area.

Ivermectinhas the ability to eliminate microfilariae of filarial worms such as *M. perstans* ,*Loaloa* and*Wuchereriabancrofti* (WHO, 2011). The potential benefit of overlapping interventions has been highlighted elsewhere, and is an important consideration for determining the risk of lymphatic filariasis in Nigeria (Kelly *et al.,* 2011).

This study indicated a higher prevalence of *Wuchereriabancrofti* wb123 detected in Ikang 8(17.8%), followed by Ekpri-Ikang 5(16%) and Ebot 20, 4(16%), although the difference was not statistically significant (X^2 = 0.99, = 5.99; P>0.05) Table 1. This difference may be attributed to the involvement of the people of the communities actively in activities that expose them to the vectors including farming and fishing.

The prevalence of *Wuchereriabancrofti*inthe study area by presence of microfilaria also showed that Ikang had a higher prevalence of 8.9%, while 6.7% and 4% were the prevalence rates at Ekpri-Ikang and Ebot 20 respectively, although the difference was not statistically significant (X^2 = 0.47, = 5.99; P>0.05).

This study indicated a gradual higher prevalence of *Wuchereriabancrofti* wb123 antigen among the age group of between 18 – 23yeras, 24 – 29years and 30 – 35yeras having 6.9%, 19.9% and 27.8% prevalence respectively and a decline in older age groups (Table 3). In a similar study carried out by Mbah*et al* in 2009, the prevalence of *Wbancofti*antigenamiaincreased with age from 26 to 49 years reaching the peak at 59 years. The decline in the infection observed in the older age groups may be due to resistance to new infection resulting from acquired immunity. In a related study, Anosike (2005), observed a gradual increase in prevalence with increasing age and peak prevalence at range of 40 – 49years. In this study, the high prevalence observed between 30 – 35years might be due to the fact that these age groups are involved in intense occupational activities such as farming and fishing.

The prevalence of *Wuchereriabancrofti* Wb123 antigen by gender revealed that females were more infected than the males with prevalence of 18.5% and 15.2% respectively, the difference was not statistically significant (X^2 = 0.59, = 3.84; P>0.05) Table 4. Also, the prevalence of *Wuchereriabancrofti* by presence of microfilaria showed that more females were infected than the males with prevalence of 7.4% and 6.5% respectively, and this was statistically not significant (X^2 = 0.71, = 3.84; P>0.05) (Table 5). These results imply that both men and women engage equally in the activities that exposed them to the vectors. They are also exposed to same living conditions. Most houses in the area had mud walls and thatched roofs, without ceiling; hence permitting movement of vectors in and out as was earlier reported by Udoidung*et al in* 2008. Poor environmental and unhygienic conditions, including human settling areaswhich favour the breeding sites of the vectors might have accounted for the transmission of infection in both males and females.

This study also revealed a prevalence of 22.9%, 33.3% and 15% recorded among farmers, fishermen and traders respectively, with students having the lowest prevalence of 3.3% for *Wuchereriabancrofti* wb123 antigen. This concords with the work done by Mbah*et al* in Biase in 2009 where the prevalence rate among farmers was 52.2% followed by traders44.4% and lastly by fishermen 15.4%. The reasons of these high prevalence rates among farmers may be because of their occupational and outdoor activities which expose them to mosquito bites. The prevalence of *Wuchereriabancrofti* microfilaria by occupation of subjects using Knott's concentration method revealed a higher infection rate of 11.4% and 13.3% for farmers and fishermen respectively (Table 7).InBakassi farmers, fishermen and traders spend three-quarters of the day time in outdoor farming and fishing activities. Hence they were exposed to more mosquito vectors in water pools prevailing in their cassava farms and river banks.

V. Conclusion

This study has revealed the prevalence of *bancroftianfilariasis* infections and will thus enrich the epidemiological baseline data of the disease (lymphatic filariasis) in the studied communities in Bakassi Local Government Area of Cross River State, Nigeria.

Recommendations

1. Government should intervene by expanding the distribution of albendazole in addition to the Ivermectin treatment that is given in the community.
2. Preventative chemotherapy and transmission control (PCT) with albendazole and Ivermectin annually in populations at risk where lymphatic filariasis prevalence of more than equal to 1%.

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