

Lymphatic Filariasis in Communities of Ardo-Kola Local Government Area, Taraba State, Nigeria

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Abstract

Lymphatic filariasis is one of the most important parasitic and neglected diseases in the tropics, that inflicts and underdevelopment especially in sub-Saharan Africa. This study was carried out to determine the status of lymphatic filariasis in six rural communities of Ardo-Kola Local Government Area where no epidemiological data exist. Rapid Assessment Method for clinical signs and Standard Parasitological Techniques were used for diagnosis. A total of 464 night blood samples were collected using finger-prick method. Out of the number, 136 (29.31%) were infected with *Wuchereria bancrofti*. Infection rates among the six communities differed significantly (ANOVA, $P < 0.05$). Chi-square analysis (chi-square, $P > 0.05$) revealed the following: No significant difference in infection between the sexes; significant differences in infection among the different age groups and occupational groups. Pearson correlation analysis showed close association between the presence of *W. bancrofti* and Itching ($r = 0.76$, $P < 0.05$), ADL ($r = 0.80$, $P < 0.05$), Hydrocoel ($r = 0.93$), Dermatitis ($r = 0.87$) and Hernia ($r = 0.87$). However, a weak relationship was observed between the presence of microfilaraemia and elephantiasis of limb ($r = 0.44$, $P > 0.05$) and lymphoedema of breast ($r = 0.30$, $P > 0.05$). A mean microfilarial density of 2.31mf/60 μ l was obtained. This finding revealed a very high prevalence of bancroftian filariasis and demands urgent attention on the control of the infection.

Keywords: Ardo-Kola, Lymphatic Filariasis, Microfilarial Density, Lymphoedema

Introduction

Lymphatic filariasis (LF) caused by mosquito-borne filarial nematode that is called *Wuchereria bancrofti* is a debilitating neglected tropical disease of major public health importance and more than 100 million individuals worldwide are estimated to suffer from the disease [1]. It is one of the three parasitic worms, together with *Brugia malayi* and *B. timori* that cause lymphatic filariasis through the infection of the lymphatic system. Reports have shown that about 1.1 billion people are at risk of becoming infected in the world [2-4]. Nigeria with an estimated population of 170 million people is Africa's most endemic country with approximately 80 to 120 million people at risk [5]. The disease is prevalent and wide-

spread in the six geo-political zones of the country [3].

In Sub-Saharan Africa, an estimated 28 million people are infected with LF while 512 million people are at risk of infection [6]. The clinical manifestations of lymphatic filariasis range from periodic reoccurring attacks of localized inflammation, tenderness and pain, often accompanied by fever, nausea and vomiting known as acute adenolymphagitis (ADL) to chronic symptoms including lymphoedema, elephantiasis and chyluria [7]. The visible manifestations of the disease are severe and disfiguring. Lymphoedema and elephantiasis of the limbs and or genitalia, hydrocoel and scrotal pathology in men, recurrent infections associated with damaged

lymphatics, chyluria or abnormalities of the renal functions occur in an estimated 44 million people.

The socio-economic and psychological burden of the disease are enormous and included direct cost of treatment, losses resulting from incapacitation and loss of labour [8]. Taraba State had been designated as hyper endemic for Onchocerciasis with yearly distribution of mectizan to endemic communities along Taraba River Valley in the 90's [9]. However, there is a serious decline in number of people accessing the drugs in the State for a decade now. This study therefore was designed to determine the status of the disease in five communities of Ardo-Kola L.G.A with the view of enriching the epidemiological baseline data in Nigeria. This will strengthen the control intervention to be initiated in these communities.

Materials and Methods

Study Area

The study area was Ardo Kola L.G.A, Taraba State, Nigeria. The State lies approximately between latitude 60251 and 90301 N and Longitude 90301 and 110 451E. Ardo-Kola Local Government Areas is divided into eight wards with two major ethnic groups and four minor ones. The majority of the inhabitants live in rural agricultural areas with farming as the major occupation. The L.G.A has numerous streams traversing villages/communities and draining into the major river Benue. Communities rely mainly on the streams and rivers for water supply. Domestic water is usually stored in and around homes in drums, clay pots and all sorts of metal and plastic containers which provide permanent breeding sites for mosquitoes and ecological associates (Nwoke *et al.*, 2006).

Ethical Approval and Permission

The study receives ethical clearance certificate from an institutional health research committee (JUTH) and ethical approval of Taraba State Ministry of Health. Also additional permission were sought and obtained from Local government chairman of Ardo-Kola, Local Government Area, Taraba State, Primary Health Care (PHC) Department, Districts Heads, Village Heads, and key informants before the study commenced.

Sample Size

The sample population for this study consisted of 464 participants, which contains 283 males and 176 females drawn from six villages of Ardo-Kola L.G.A between the age brackets 1-70 years. Inclusion criteria for the study include permanent residents in the communities for 5 years and above.

Rapid Assessment Method

On the schedule day, informed oral consent of individuals who gathered at the agreed venue (Village Head compound, schools or church premises) were sought and obtained after the explanation of the procedures and the benefit of the study before they were examined in secrecy for chronic clinical signs and symptoms of filariasis by the criteria of Edungbola *et al.* (1993) and Nwoke *et al.* (2006) [10, 7]. Clinical symptoms such as Lymphoedema of limbs, breast and Scrotal Elephantiasis were recorded in personal

data form containing the patients' name. Female examination was restricted to the legs, arms and breast because of cultural inhibitions in most communities.

Parasitological Examination

Night blood samples of consenting individuals were obtained between 20.00hrs and 01.00hrs. At each blood collection, the left thumb finger was cleaned with methylated spirit soaked in cotton wool. A sterile blood lancet was used to prick the finger and 60µl of blood collected on a slide was used to make a thick blood film which was air dried and stained with 10% Giemsa solution for 10 minutes [11]. The slides were then examined under a light microscope at x10, x40 and x100 objective lenses. Sheathed microfilariae without caudal nuclei were classified as *Wuchereria bancrofti* [11].

Statistical analysis

Data obtained were analyzed using Statistical Package Epi- info Version 7.0 software. Chi-square test and 2-way ANOVA were used to compare differences in infections and various variables. Statistical significance was achieved if $p < 0.05$.

Results

The Mean Microfilarial density (MMD/60µl) according to communities is shown in Table 1. The result shows that Mean Microfilarial Density ranges from 1.08 Mfd/60µl in Kofai to 1.34Mfd/60µl in Yawai Abbare. From the 464 persons examined, 136 (29.31%) were positive for *Wuchereria bancrofti*. Infection was recorded in all the six communities in varying degrees but not statistically significantly ($p > 0.05$) (Table 1). The highest infection of 35.0% was recorded in Yawai Abbare while the lowest was observed in Kofai community (17.55%).

Table 1: Prevalence of lymphatic filariasis in the communities in Ardo-Kola LGA

Community	Total no. examined	No. infected (%)	Mf density
Kofai	68	12 (17.65)	1.08
Sobai	55	18 (32.73)	1.17
Dankodi	75	24 (32.00)	1.42
Kobo waban	101	29 (28.71)	1.41
Yawai Abbare	99	35 (35.35)	1.43
Muribai	66	18 (27.27)	1.22
Total	464	136 (29.31)	

The prevalence of microfilarial infection by age and sex is shown in Table 2. There was no significant difference between females and males subjects. The Females had slightly lower (28.41%) infection than their male counterparts (29.9%) but not statistically significant ($\chi^2 = 0.012$, $df = 1$, $p > 0.05$). In both sexes, prevalence of infection increases rapidly with age and get to the peak 61 and 70 years. Infection differed significantly among age groups ($\chi^2 = 31.34$, $p < 0.05$).

Table 2: Prevalence of LF in communities of Ardo-kola LGA in relation to age and sex $\chi^2 = 31.34$; df = 6; P < 0.05

Age group	Male		Female		Total	
	No. examined	No. infected (%)	No. examined	No. infected	No. examined	No. infected (%)
1-10	16	3 (18.6)	4	0 (0.0)	20	3 (15.0)
11-20	50	10 (20.0)	31	6 (19.4)	81	16 (19.8)
21-30	91	28 (30.8)	34	8 (23.5)	125	36 (28.8)
31-40	52	10 (19.2)	26	8 (30.8)	78	18 (23.1)
41-50	43	14 (32.6)	36	11 (30.6)	79	25 (31.6)
51-60	18	12 (66.7)	27	10 (37.0)	45	22 (48.9)
61-70	15	7 (46.7)	13	5 (38.5)	28	12 (42.9)
71>	3	2 (66.7)	5	2 (40.0)	8	4 (50.0)
Total	283	86 (29.9)	176	50 (28.4)	464	136 (29.3)

$\chi^2 = 31.34$; df = 6; P < 0.05

Occupation-related prevalence of infection is shown in Figure 1. Infection appeared to be so common among local brewers (48.5%), followed by Farmers (38.47%) and business individuals (11.0%) the least. Chi square analysis showed a significant difference in infection ($\chi^2 = 19.875$, p < 0.05) among occupational groups.

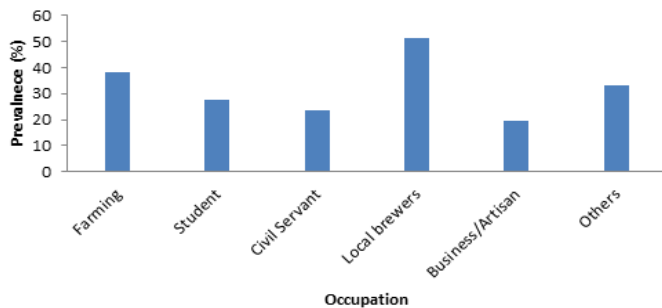


Figure 1: Occupation related prevalence of lymphatic filariasis in Ardokola

In Table 3, the clinical signs indicative of lymphatic filariasis in respect to age group and sex are shown. Generally, the proportion of clinical signs when compared is higher in females than the male, except in hydrocoel and hernia where 0% was recorded for the females respectively. Fever is the most frequent clinical signs of lymphatic filariasis in females (63.06%), followed by itching (59.04%), then dermatitis (20.5%), and elephantiasis (13.6%). However, no clinical sign was recorded for breast enlargement for males (Table 3). Itching and fever were more severe in females in age group 71>, as the percentage proportion of 100% was recorded respectively. Similarly, dermatitis and elephantiasis appeared to more severe in the age group 71>. However, the proportion of the occurrence of hernia was higher in males (5.5%) of the age group 21-30 years. While the age group 31-40 years have breast cancer more severe (7.7%) than the other age groups as shown in Table 3.

TABLE 3: Clinical signs indicative of lymphatic filariasis in relation to age and sex in Ardo-Kola LGA

Age	No. examined	Sex	Itching (%)	Fever/ADL (%)	Dermatitis (%)	Lymphoedema/ Elephantiasis	Hydrocoel (%)	Hernia (%)	Breast enlargement (%)
1-10	20	M 16	5 (31.3)	9 (53.6)	2 (12.5)	1 (6.3)	2 (12.5)	0 (0.0)	0 (0.0)
		F 4	1 (25.0)	3 (75.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
11-20	81	M 50	28 (56.0)	27 (54.0)	4 (8.0)	4 (8.0)	5 (10.0)	0 (0.0)	0 (0.0)
		F 31	23 (74.2)	13 (41.93)	3 (9.7)	3 (9.7)	0 (0.0)	0 (0.0)	1 (3.2)
21-30	125	M 91	18 (19.7)	42 (46.1)	10 (11.0)	3 (3.3)	11 (12.1)	5 (5.5)	0 (0.0)
		F 34	20 (58.0)	26 (76.5)	4 (11.8)	3 (8.8)	0 (0.0)	0 (0.0)	1 (2.9)
31-40	78	M 52	10 (19.2)	27 (51.9)	3 (5.8)	2 (3.8)	6 (11.5)	1 (1.9)	0 (0.0)
		F 26	14 (53.40)	17 (65.4)	8 (30.8)	7 (26.9)	0 (0.0)	0 (0.0)	2 (7.7)
41-50	79	M 43	19 (44.2)	15 (34.9)	5 (11.6)	4 (9.3)	8 (18.6)	1 (2.3)	0 (0.0)
		F 36	18 (50.0)	19 (52.77)	8 (22.2)	4 (11.1)	0 (0.0)	0 (0.0)	2 (5.6)
51-60	45	M 18	14 (77.8)	11 (61.1)	5 (27.8)	3 (16.7)	6 (33.3)	1 (5.6)	0 (0.0)
		F 27	13 (48.14)	18 (66.7)	8 (29.6)	3 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)
61-70	28	M 15	5 (33.3)	6 (40.0)	4 (26.7)	3 (20.0)	4 (26.7)	0 (0.0)	0 (0.0)
		F 13	10 (76.9)	10 (76.9)	3 (23.1)	2 (13.4)	0 (0.0)	0 (0.0)	0 (0.0)
71>	8	M 3	1 (33.3)	1 (33.3)	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)
		F 5	5 (100.0)	5 (100.0)	2 (40.0)	2 (40.0)	0 (0.0)	0 (0.0)	0 (0.0)
Total	464	M 288	100 (30.27)	138 (47.9)	33 (11.5)	20 (6.9)	43 (14.9)	8 (2.8)	0 (0.0)
		F 176	104 (59.04)	111 (63.06)	36 (20.5)	24 (13.6)	0 (0.0)	0 (0.0)	6 (3.4)

No= Number, M=Males, F=Female

Discussion

This study provides reliable estimates of the prevalence and the burden of Lymphatic filariasis in Ardo-Kola L.G.A of Taraba State. The result showed that lymphatic filariasis is endemic in the communities investigated and active transmission could be on going, since community members live in houses that are unprotected and exposed to vector-mosquito species [12]. The absence of significant variation in prevalence between communities could be attributed to similarities on the socio-economic status, local environmental condition and the presence of ecological conditions that favour the breeding of the vectors in each of these communities [13, 14]. The prevalence rate of 30.9% was reported in the study area, is higher than the prevalence rate (36.0%) reported in recent study in Ose L.G.A, Ondo State, Nigeria [15].

Sex-related infection revealed that there is no significant difference in infection among gender, suggestive that both sexes are equally exposed to the bites of mosquito species since they engaged in similar activities. This observation is consistent with other reports of Akogun and Onwuliri (1991), Usip *et al.* (2006) and Elkanah *et al.* (2017) [16, 3, 12]. In this study, prevalence of infection in increased rapidly with age in both sexes. The age group 70> had higher infection, followed by 61-70 age brackets. This is similar to the findings of other researchers in Nigeria [2, 3, 17]. Who described these categories as the productive and active age brackets.

This age-related prevalence could be mainly due to steady progression of infections acquired in early child hood. Occupation-related infection showed local brewers being the most infected in comparison to the uneducated famers [18], who reported higher infections among the uneducated farmers, contradicts the result of our findings in this study. The clinical manifestations observed in the current study include, lymphoedema of limbs, hydrocoel and breast lymphoedema. Weerasooriya *et al.* (2001), in their findings observed similar trend in Srilanka [19, 20].

Conclusion

In conclusion, Lymphatic filariasis is endemic in Ardo-Kola L.G.A with chances of prevalence, intensity and clinical symptoms increasing overtime. There are strong indications that there could be more affected people than those examined since the most sensitive method of diagnosis (ICT) was not used and the disease is stigmatized. Therefore, there is an urgent need to constitute control measures with the aim of halting the transmission. The combination therapy of albendazole and mectizan in eradicating the adult worm and microfilariae is advocated in the entire province.

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