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Epidemiology of *Lymphatic filariasis* in Danbatta and Kumbotso Local Government Areas of Kano State, Nigeria

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Abstract

Lymphatic filariasis (LF) is a major cause of permanent disability in many tropical and sub – tropical countries of the world including Nigeria. To determine the prevalence and the common clinical manifestation Lymphatic filariasis in two Local Governent Areas of Kano State, Nigeria, blood samples were collected from 357 individuals in Danbatta and Kumbotso LGAs between 10pm – 3am using heparinized capillary tubes. Samples collected were processed by thick smear and wet preparation techniques respectively. Participating individuals were also examined for overt clinical manifestation of lymphatic filariasis by Medical personnel. Information on age, sex, knowledge, attitude and practice (KAP) of participated individuals were also recorded using questionnaire. Out of the 357 individuals examined, 3.6% were found to be infected by *W. bancrofti*. Danbatta LGA had relatively higher (5.9%) prevalence than Kumbotso LGA (1.2%). In Danbatta LGA, infection was found to be higher in males (10.60%) than females (04.50%) while higher infection rate was recorded in females (4.54%) than males (2.0%) in Kumbotso LGA.

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Among those presenting overt clinical manifestations of LF, 10.64% of the males had hydrocele in Danbatta LGA, while no case of hydrocele or lypmhoedema was recorded in Kumbotso LGA. Analysis of KAP data from questionnaire administered and retrieved showed a significant difference in prevalence of LF between individuals who are aware and have knowledge of LF and those that lacked knowledge of the disease ($P < 0.05$). It was concluded that LF is endemic in Danbatta and Kumbotso LGAs of Kano State. Considering the poor awareness of the disease by the inhabitants in the two LGAs, there is need for relevant Government agencies and Non Governmental Organizations (NGOs) to launch awareness campaigns on the causes of LF, transmission, symptoms and measures that can be taken to prevent infection by this dilapidating disease for improved health and economic development of the State and the country at large.

Keywords: Lymphatic filariasis; microfilariae; hydrocele; elephantiasis; lymphedema.

1. Introduction

Lymphatic filariasis (LF) is a neglected tropical disease caused by species of filarid nematodes of the genus *Wucheriaria* and *Brugia* and transmitted to humans by night biting culex and anopheles species [1].

Some of the night-biting mosquito species reported to transmit LF includes *C. quinquefasciatus, A. gambiae* and *A. funestus* [2], while the etiological agents are *Wuchereria bancrofti, Brugia malayi*, and *Brugia timori.* The adult worms occupy the lymphatic system, including the lymph nodes, and in chronic cases lead to elephantiasis. In Africa, the prevalence of lymphatic filariasis is especially striking affecting over 40 million people in the Sub- Saharan region alone [3]. Similarly, the authors in [4, 5] reported Nigeria as having the highest burden of lymphatic filariaisis in Africa, authors in [5, 6, 7, 8] shows that lymphatic filariasis is prevalent and widespread in the North Central, North Eastern, South Eastern and Niger Delta areas of Nigeria. This has placed Nigeria as the third most endemic Country for this disease after India and Indonesia where *Bancroftian filariasis* is estimated at 22.1% [9].

Unfortunately, epidemiological information is still needed on the distribution, clinical signs and intensity of lymphatic filariasis in many parts of Nigeria [6].

As in most northern states in Nigeria, the status of lymphatic filariasis in some part of Kano State still remains unknown. The present study which is part of a larger work was carried out to determine the epidemiology of the disease using clinical and parasitological examination in some selected communities of Danbatta and Kumbotso Local Government Areas (LGAs) of Kano State. It is hoped that this baseline information will assist in guiding decision makers in executing the current national LF elimination programme in these communities of the two LGAs.

2. Materials and Methods

2.1 The Study Area

Kano state is found in the Sahel Savannah region of west Africa, It is located in the North Western zone of Nigeria, between longitude $100^{o}\,37^{I}$ N & $100^{o}\,33^{I}$N and $70^{o}\,34^{I}$E & $90^{o}\,29^{I}$ E respectively [10]. Kano State is bordered to Katsina State to the North-West, Jigawa State to the North-East and Bauchi State to the South-East.

The main river is the Kano River on which the second largest dam, Tiga is built. Minor rivers include Challawa, Watari, Tomas and Kafin – chin. Kano State has an estimated population of about 9, 383, 332 million people who are either traders, civil servants, artisans, business men and women, farmers among other occupations.

2.2 Method of Data Collection and Processing

2.2.1 Parasitological survey

Blood samples were collected from both sexes in each of the ward visited (between 10:00pm - 3:00am) by pricking their thumb finger with a sterile disposable lancet, and collected using heparinized capillary tube. Samples collected were processed by thick blood smear and wet preparation respectively. Dried smear was dehaemoglobinized in distilled water, fixed with methanol and stained with giemsa. Microfilariae present in blood samples were identified under light microscope at X100 magnification based on specific identification keys [11].

2.2.2 Clinical Examination and Questionnaire Administration

Each participant was examined by trained medical personnel for the presence of symptoms and signs of lymphatic filariasis such as lymphoedema/ elephantiasis/ or hydrocoele. Questionnaires were administered to participants to obtain information on age, sex, education, occupation, level of awareness of the disease and control of the disease. Each completed questionnaire was given an identification number corresponding to the subject's assigned blood sample number.

2.2.3 Data Analysis

The data generated was analyzed using simple frequencies, percentages and presented in a tabular form. Results were analyzed using chi square at Probability level of 0.05.

2.2.4 Ethical Clearance

Ethical clearance was obtained from Kano State Ministry of Health (Ref: MOH/S/MED/51/11) on the 13th October, 2014. Permission was also granted by the Local Government health officers, ward heads and elders of the selected wards where the studies were conducted.

3. Results

A total number of 357 individuals in six wards from Danbatta and Kumbotso LGAs were mobilized for blood collection. Out of the 357 individuals examined during the survey, 3.6% were found to be positive for LF. Danbatta LGA had a relatively higher prevalence (5.9%) than Kumbotso LGA which had 1.2% positive cases. Analysis of data showed that there was a statistically significant difference in the prevalence of LF between Danbatta and Kumbotso LGAs ($P < 0.05$) (Table 1).

The sex related prevalence of LF in the 2 LGAs is presented in Table 2. Although infection rate of LF was found to be higher in males (10.60%) than females (04.50%) in Danbatta LGA and lower in males (2.00%) than in females (4.54%) in Kumbotso LGA, the overall prevalence (both LGAs) of the infections generally higher in

males (11/144) than females (2/44). This difference is however not statistically significant (P > 0.05) (Table 2).

Table 1: Overall Prevalence of Lymphatic filariasis in sampled villages of Danbatta and Kumbotso LGAs of Kano States, Nigeria

LGAs	Wards	No. examined	No. infected	% infected
Danbatta	Goronmaje	65	7	10.8
	Danbatta East	57	4	7.02
	Dukawa	63	0	0
Subtotal		185	11	5.9
Kumbotso	Chiranci	53	0	0
	Chalawa	60	0	0
	Panshekara	59	2	3.4
Subtotal		172	2	1.2
Grand Total		357	13	3.6

Table 2: Prevalence of Lymphatic filariasis in relation to sex of sampled individuals in Danbatta and Kumbotso LGAs of Kano State, Nigeria

	LGA					
	Danbatta			Kombotso		
Sex	No. exam	No. infected	% infected	No. exam	No. infected	% infected
Male	94	10	10.60	50	01	02.00
Female	22	01	04.50	22	01	04.54
Total	116	11	09.50	72	02	02.78

Similarly, age group of participants was found not to significantly influence the prevalence of LF in both LGAs (P > 0.05). In Danbatta LGA, the younger age group 10 – 19 yr age group had higher prevalence of infection (17.60%) than all other age groups. This was followed by 30 - 39, 20 - 29 and >50 yr age groups with prevalence of 14.80%, 12.50% and 03.45% respectively. However, in Kumbotso LGA, LF infection was recorded only age groups 10 -19yrs and >50 yrs with prevalence of 05.26% and 06.67% respectively (Table 3).

3.1 Clinical Manifestation of LF

Among the 3 major clinical manifestations of LF, only elephantiasis was recorded during the present study in Kumbotso where prevalence was found to be 02% in males and 4.54% in females. However, females recorded higher prevalence of elephantiasis (4.5%) than males (2.10%) in Danbatta LGA. Although no case of lymphoedema was found in males, 4.54% of the females had hydrocele while relatively higher cases (10.64%)

were recorded in males (Table 4).

Table 3: Prevalence of Lymphatic filariasis in relation to age of sampled individuals in Danbatta and Kumbotso LGAs of Kano State, Nigeria

	LGA					
Age Group	Danbatta			Kumbotso		
(yrs)	No. Exam	No. infected	% infected	No. Exam	No. infected	% infected
6 – 9	02	00	00.00	00	00	00.00
10 – 19	17	03	17.60	19	01	05.26
20 – 29	24	03	12.50	21	00	00.00
30 – 39	27	04	14.80	09	00	00.00
40 – 49	17	00	00.00	08	00	00.00
> 50	29	01	03.45	15	01	06.67
Total	**116**	**11**	**09.50**	**72**	**02**	**02.78**

Table 4: Sex – related prevalence of clinical manifestation of Lymphatic filariasis among sampled individuals in Danbatta and Kumbotso LGAs of Kano State, Nigeria

	LGA							
	Danbatta				Kombotso			
	Prevalence				Prevalence			
	N	Elephantiasis No inf. (%)	Lymphoedema No. inf (%)	Hydrocele No. inf. (%)	N	Elephantiasis No. inf. (%)	Lymphoedema No. inf (%)	Hydrocele No. inf. (%)
Male	94	02(2.10)	0(0)	10(10.64)	50	01(02)	0(0)	0(0)
Female	22	01(4.54)	01(4.54)	0(0)	22	01(4.54)	0(0)	0(0)
Total	116	03(2.59)	01(0.86)	10(8.62)	72	02(2.78)	0(0)	0(0)

3. Discussion

This study provided baseline data on LF for some villages in the 2 LGAs of Kano State. The result shows that the areas studied are endemic for LF with an overall prevalence of 5.9% and 1.2% in Danbatta and Kumbotso LGAs respectively. The result recorded in the present study is in concordance to the work of authors in [8] who in an earlier study recorded cases of LF in some LGAs of the State. However, the prevalence of LF reported in this study for the two LGAs is relatively higher than previous reported by the authors [8]. This could probably be due to the differences in diagnostic technique used in the two studies. For instance, the authors in [8] used thick smear in parasitological diagnosis, while in this study additional method was used to detect cases of microfilariae. Wet preparation used in this study has been reported to help in observing microfilariae which

could not have been seen in thick smear.

The increase in infection rates of LF with age in this study is in conformity with what has been previously reported elsewhere in Nigeria [4, 8, 12]. The increased prevalence with increased age group though not significant could be associated to increased exposure to mosquito vector with age.

Out of the 11 persons that tested positive (+ve) for filariasis in Danbatta, 10 were between the age range of 10 - 39 years, only 1 person aged >50 years was positive (+ve). The low percentage of infection recorded in person above 50 years in the present study is similar to that recorded for the same age group in a study of LF in Gabasawa, Dawakin Tofa and Garko LGA of Kano State [8]. However, the high prevalence observed in males aged between 10 –- 39 years could be due to age related activities/ occupations and behavior which tend to expose these age groups to disease-transmitting mosquitoes.

The infection rate of LF by sex recorded irrespective of LGA is not different from previous studies reported in the state [13]. This however, is to be expected considering the communities' cultures and values where this study was carried out. In these communities, females irrespective of their age are restricted to their homes [13]. This among other cultural practices could have also been responsible for the low turnout of females that participated during the screening exercise/study despite all appeals. It is also worthy of note that women in a typical Hausa/Fulani community such as in the study area usually cover up their bodies which could serve to protect them against insect bite including mosquitoes, thus the generally low prevalence of LF infection compared to males.

Among the 3 major clinical manifestations of LF, elephantiasis is generally the primary chronic manifestation of the disease worldwide and is strongly associated with ongoing lymphoedema and cycles of acute dematolymphangioadenitis (ADLA) or acute filarial lymphangitis that could lead to death of adult worms in the host either naturally or due to pharmacological treatment. In the present study elephantiasis was found to be the commonest clinical manifestation of LF in the study area, in addition it was found to be the most common manifestation among females in communities in both LGAs studied. This observation is of significance considering the status of females in an African community setting where the woman is tasked with the responsibility of caring for the children, keeping the house clean and sometimes providing food for the house hold. The high prevalence of elephantiasis among women in the study area has significant consequences considering the social and economic burden of the disease in women and the society at large [14].

Several factors have been reported to favor the transmission of vector borne diseases. Some of these factors include increased vector density, accelerated parasite development, socioeconomic factors such as sanitation, building types, land use, treatment among other factors. The high rate of infection and clinical manifestation in Danbatta LGA therefore may be due the rural nature of the LGA and the presence of unhygienic environment that is characterized by outdoor waste disposals, lack of toilet facilities in most homes and presence of stagnant water bodies which provide suitable mosquito breeding sites.

Although most participants were found to use one form of mosquito prevention or the other, the use of mosquito bed nets by participants to protect themselves from mosquito bites was most prevalent in this study. It is therefore important for relevant government and non governmental agencies to enlighten the populace on the

use of bed nets as a cheaper way of controlling mosquito related diseases than treatment. However, to achieve reduced mosquito transmitted disease in Nigeria, the Federal Ministry of Health have to re-strategize on the ongoing distribution of long lasting insecticidal bed nets in order to reach the less privileged in the society since this group is more at risk of infection. Bed nets if properly used could contribute significantly to lowering prevalence of LF and other mosquito transmitted diseases in the study area.

4. Conclusion

Although the prevalence of LF in the study area is relatively low, Danbatta and Kumbotso LGAs of Kano State, Nigeria where the study was conducted could be considered endemic for the disease. This is because the observed low prevalence of LF in the two LGAs could be associated with mass drug administration campaigns previously embarked on by Kano state Government targetted at eradicating Onchocerciasis in some LGAs of the state. Knowledge, attitude and practice of most of the communities in both LGAs have also to some extend helped to reduce the risk of infection especially among females.

5. Recommendation

Relevant government agencies and independent health care providers should provide adequate surveillance to identify and provide necessary aid to those affected. Individuals in these LGAs should be encouraged by relevant Government agencies at the grass root to use bed nets and other protective measures to reduce mosquito bites. Individuals presenting clinical manifestations of LF should be availed free medical treatment to reduce stigmatization associated with the disease.

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