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Lymphatic Filariasis Knowledge, Attitude and Practice among Households in Kano Metropolis North-Western Nigeria

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Abstract
Common to most neglected tropical diseases worldwide is little published data of knowledge, attitude and practice of lymphatic filariasis (LF) in regions where the disease is endemic, despite the fact that such data is needed for preparations and plans for integrated management and control of the diseases. A cross-sectional study using structured questionnaire was conducted to assess; demography, socio-economic information, household knowledge, attitude and practice on LF in Kano metropolis North-western Nigeria. A total of 400 respondents participated in the study; 247 were males and 157 females aged 18-78 years. The study confirms the presence of LF in the study area with 33% of the participants mentioning to have seen people infected with LF in the metropolis. Although, 43% of the participant have heard about LF, only 15.6% mentioned mosquitoes as vectors while 72.0% had no idea how it is transmitted. Some of the respondents believed that it is transmitted through; the use of contaminated water (8.4%), drug abuse (1.2%) and Tsetse fly bite (1.2%). Pearson Chi-square test reveals knowledge of LF among participants to be significantly ($P<0.05$) associated with age rather than level of education. However, 99.6% used variety of methods to control mosquitoes. Elusive data and paucity of knowledge are threats to control of infectious disease as such it is necessary they are addressed through; creating awareness, research and publications.

Keywords: Lymphatic filariasis, Neglected Tropical Disease, Knowledge, Attitude, Practice.

INTRODUCTION
Lymphatic filariasis (LF) is a mosquito borne parasitic disease transmitted by *Culex*, *Anopheles*, *Aedes*, *Ochleretatus* and *Mansonia* species of mosquitoes (Okorie *et al*., 2013). The parasites known to cause LF include; *Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori* (Hussaini *et al*., 2019). The disease is endemic in almost 80 countries in the Tropics and Sub-tropic regions of the world (Kouassi *et al*., 2017). About 1.4 billion people are exposed to LF of which over 120 million people are infected worldwide, and it is one of the 10 neglected tropical diseases considered second leading cause of long-term and permanent disability in humans (Nana-Djeunga, 2017).

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Nigeria as the most populated country in Africa is ranked third for LF infection globally with over 25 million infected individuals and about 120 million at risk of infection (Dawaki *et al*., 2018). Of all the six geopolitical zones of the country, North West region has the highest LF burden (Hussaini *et al*., 2019). Economic and social impacts of LF on infected individuals is of great concern, as it mostly affects individuals at their youthful and productive stage, thereby rendering them helpless and less likely to contribute to the society economically (Wynd *et al*., 2007).

Efforts to combat such human diseases consist notably the mass drug administration to halt parasite transmission through annual drug administration of diethylcarbamazine and albendazole, or albendazole and ivermectin, for a period of four to six years (WHO, 2017). WHO assessment however, noticed partial elimination and resurgence in some endemic areas where the strategy is implemented, as a result suggested sociocultural awareness inclusion in plans for preparations of subsequent interventions (Wynd *et al*., 2007). Common to most neglected tropical diseases, there are scarce data on knowledge, attitude and practice towards LF in regions where the disease is endemic (Wynd *et al*., 2007).

This study provides current information on LF knowledge, attitude and practice as well as useful information for inclusion into plans for integrated control of the disease. These will curtail transmission in vulnerable populations, comparison and preparedness for the management of LF not only in Kano metropolis but in surrounding environs, region, the country and other areas where the disease is endemic.

MATERIALS AND METHOD

Ethical consideration

The aim and benefits of the study were explained to all participants. The purpose of the survey and the key topics addressed in the questionnaire were explained. Introductory letter which was obtained from the Department of Biological Science Bayero University Kano was presented to the participants. All recorded responses are from participants that agreed to take part in the research.

Study area

Data was collected between February and April 2019 within Kano metropolis. The metropolis which represents the state capital consists of eight Local Government Areas (Figure 1). It lies between Latitude 12° 25′ and 12° 40′N and longitudes 8° 35′N and 8° 45′E. It shares boarders with five local government Areas of the state; Gezawa, Minjibir, Dawakin Kudu, Madobi and Tofa, from the east, northeast, southeast and southwest respectively. Estimated household population of 477,805 households. Hausa is the native and most widely used language in the area. Culicidological situation of the metropolis was already studied, showing the presence of *Anopheles, Culex*, *Aedes* (Ahmed & Ahmed, 2011), the main vectors of LF. Kano State lies in the Sahelian savanna area which experiences rainfall for six months per year (May to October) and an average precipitation of 800–900mm annually. The state is typically hot throughout the year with temperatures ranging between 25 and 40 °C (with a mean of about 26 °C) and reaching as high as 43 °C during the dry season, although from December to February the state is noticeably cooler with temperatures as low as 8 °C.

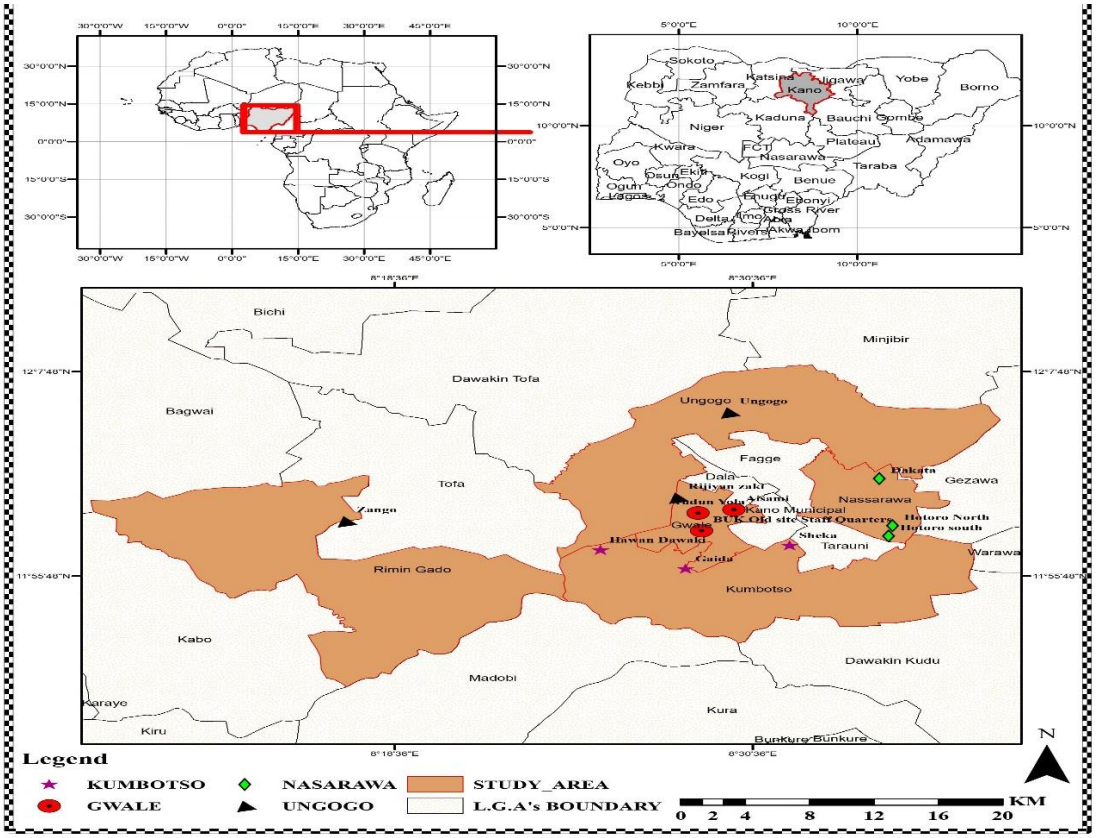

Figure 1: Map of the study area with sampling points for questionnaire survey

Sampling size and household selection

The study area has a total number of 477,805 households distributed within eight Local Government Areas (LGAs) namely; Kano municipal 53,303 households, Kumbotso 52,969 households, Tarauni 37,553 households, Ungogo 62,664 households, Nasarawa 108,780 households, Dala 68,005 households, Fagge 40,527 households and Gwale 54,004 households (Khalil *et al*., 2020). The LGAs were divided into two; Low household population (KMC, Kumbotso, Gwale, Tarauni and Fagge) and high household population (Dala, Ungogo and Nasarawa). Two LGAs each from low household population and high household population were selected at random and sample taken proportionately from each. For high population Ungogo and Dala were selected, for low household population Kumbotso and Gwale were selected. Yamane's formula was used to determine sample size. The formula; n = $\frac{N}{1+N\,(e)2}$, (where n = sample size, N = population size of households in Kano metropolis, 1 = constant, e = margin of error = 0.05) gave a sample size of approximately 400 samples. As such 400 sample questionnaires were distributed among households residing within the metropolis. In order to account for incomplete questionnaires 80 questionnaires were added. Number of samples questionnaires distributed proportionately for each LGA selected: Dala 115 (28.6%) with additional 23 questionnaires, Ungogo 105 (26.4%) with additional 21 questionnaires, Kumbotso 89 (22.3%) with additional 18 questionnaires and Gwale 91 (21.7%) with additional 18 questionnaires. Head of household or adult representative was interviewed.

Questionnaire Design and Data Analysis

A structured questionnaire assessing demography, socioeconomic, knowledge, attitude and practice, consisting of 25 questions was used. The questionnaire was translated into Hausa language (Local language of the participants) by experienced language translators. A pilot survey was conducted to test the validity and reliability of the questionnaire using SPSS 20.

Thirty-one questionnaires were distributed to participants for the reliability test of the major objectives; knowledge of LF among participants (Chronbach's alpha = 0.808), participants' attitude towards LF (Chronbach's alpha 0.765 and 0.699 respectively), use of mosquito coil and aerosol as control measures (Chronbach's alpha = 0.778). Demographic, Socioeconomic, KAP were treated as categorical variables and presented as frequencies and percentages. Association between KAP items and Demographic information was determined using Pearson Chi-square test (at 95% confidence interval) in SPSS 20.

RESULTS

Socio demographic information

A total of 400 individuals sampled from four LGAs within Kano metropolis participated in this study; 243 were males and 157 were females. Age of the participants ranged between 18-78 years, with the majority lying between 18-40 years. Education level of respondents showed 89.25% of respondents having attended at least secondary school (12 years of formal education) while only 2% without attending any form of education. Monthly household income of 53% of participants was below N30, 000, while those earning above N30, 000 represents 47% (Table 1).

Table 1: Sociodemographic information of respondents

Variables	Responses N (%)
Age (Years)	
18 to ≤ 39	265 (66%)
≥40	135 (34%)
Gender	
Males	243 (61%)
Females	157 (39%)
Highest Level of Education	
Quranic School	35 (9%)
Primary School	53 (13%)
Secondary School	85 (21%)
Tertiary Institution	219 (55%)
None	8 (2%)
Monthly Household Income	
Less than 30,000	211 (53%)
30,000 and Above	189 (47%)

Knowledge, Attitude and Practice towards LF and Vector

About 43% of respondents knew about LF, and only 33% have seen people infected with LF. Only 15% of the participants know LF is transmitted through mosquitoes while 70% had no idea how it is being transmitted. Others attributed its occurrence to use of contaminated water, drug abuse, Tsetse fly bite among others. More than half (66%) of the participants believed that LF is curable and preventable (71%). However, only 11% identified mosquito control measures as method of LF prevention. As 56% had no idea on its preventive measures, others mentioned prayers, abstaining from drug abuse, avoiding contaminated water, avoiding walking barefooted among others as preventive measures (Table 2).

Table 2: Participants' knowledge, attitude and practice on LF

Variables	Responses
Know or Have Heard about LF	
Yes	173 (43%)
No	227 (57%)
Come across people infected with LF	
Yes	131 (33%)
No	269 (67%)
How people get LF	
Through Mosquito bite	62 (16%)
Through the bite of Tsetse fly	2 (1%)
Through the use of contaminated water	34 (9%)
Drug abuse	5 (1%)
Through Mosquito & Tsetse fly bite	2 (1%)
Through Tsetse fly bite and use of contaminated water	2 (1%)
Others	6 (2%)
No Idea	287 (72%)
LF curable	
Yes	265 (66%)
No	51 (13%)
No Idea	83 (21%)
LF Preventable	
Yes	284 (71%)
No	34 (9%)
No Idea	82 (21%)
LF Preventive measures	
1. Mosquito control	45 (11%)
2. Avoid contact with infected individuals	49 (12%)
3. Avoid drinking contaminated water	32 (8%)
4. Good Hygiene practice	14 (4%)
5. Avoid walking bare footed	5 (1%)
6. Abstaining from drug abuse	3 (1%)
7. Prayers	3 (1%)
8. Others	16 (4%)
9. Avoid contact with infected individuals & Good Hygiene practice	8 (2%)
10. No Idea	225 (56%)

Participants identified gutters (4%), plantations, dirty environment (23%), stagnant water (35%), dump site (7%) as possible sources of mosquitoes, while 5% of the participants stated that they have no idea where mosquitoes come from. Participants identified three major practice that will help in the control of LF that revolves around vector control; use of mosquito net, use of insecticides, proper environmental sanitation, getting rid of stagnant water (Table 3).

Table 3: **Participant's knowledge on source of mosquitoes**

Source of mosquito	Response
Stagnant water	141 (35%)
Dumpsite	27 (7%)
Plantation	22 (6%)
Gutters	14 (4%)
Dirty environment	91 (23%)
No Idea	21 (5%)
Dumpsite and dirty environment	14 (4%)
Stagnant water and plantation	47 (12%)

Vector Control practice among participants

Only 1% of the participants used no method to control mosquitoes, 99% adopted at least one method to control the vectors. Methods exclusively employed by the participants in controlling mosquitoes include use of mosquito nets (13%), insecticides (26%), environmental hygiene, and destruction of mosquito breeding sites (2%) among others. Some households (51%) adopted combination of more than one method at a time to control mosquitoes, most notably the use of mosquito net alongside insecticides 30% (Table 4).

Table 4: **Mosquito control methods among participants**

Control method	Responses
Mosquito net	52 (13%)
Insecticide	104(26%)
Environmental hygiene	24 (6%)
Destroying Breeding Habitat	8 (2%)
Others	4 (1%)
None	4 (1%)
Mosquito net and insecticide	120 (30%)
Mosquito net and environmental hygiene	16 (4%)
Insecticide and environmental hygiene	36 (9%)
Mosquito net and insecticide and environmental hygiene	8 (2%)
Environmental hygiene and destroying Breeding Habitat	24 (6%)

DISCUSSION

Despite the fact that 43% of the participants indicated to have heard or know LF and 32% to have seen people infected with LF in Kano metropolis, only 16% of the participants know how LF is transmitted. These indicate the presence, poor knowledge and probably rare occurrence of LF among the study population. Poor knowledge may pose a threat to its control, as disease control success is tied to good knowledge of the disease and its mode of transmission. Interestingly, knowledge of LF is significantly ($P<0.05$) associated with age rather than level of education; older people tended to have heard about LF more than the younger participants. This suggests the effectiveness of interventions that reduced the prevalence of the disease over time. The finding in this study is similar to the study conducted by Koussi *et al*. (2017) in Guinea Conakry and that of Oducado (2014) in Philippines where fewer participants in their studies mentioned mosquito bite as means of contracting LF. However, in contrast to the use of contaminated water as the major cause of LF in this study they attributed the cause of the disease to be of supernatural origin. Similar perceptions of LF, where the true cause and the mode of disease transmission are replaced by superstitious reasoning were reported in Nigeria (Omudu and Okafor, 2011), Ghana (Ahorlu *et al*., 1999) and India (Jayakumary *et al*.,

2006). The finding in this study regarding the knowledge of participants on the vector of LF is not in agreement with the study conducted by Upadhyayula *et al*. (2012) in Andhra Pradesh, India where majority of respondents reported to have known mosquitoes as the vectors of LF. Participants have adopted mosquito control measures to halt transmission of other mosquito borne disease, particularly malaria; this is a step in halting transmission of LF. However, there is need for proper knowledge of LF which will reduce stigma and enhance preparedness towards its control. The finding in this study also reveals that knowledge of the disease in the study area is not linked to presence or absence of the disease as 87% of the LF participants didn't know how LF is transmitted.

In the other hand, there is awareness of mosquitoes as nuisance and vector of diseases among the participants. However, poor knowledge of LF preventative measures will be devastating should cases erupt in the study population, as inappropriate measures will be adopted which will not counter the transmission unless otherwise interventions are put in place.

When nets are not treated with insecticides or when effectiveness slows over time, nets will not provide the much-needed control, as it will only protect individual from the bite without reducing the population of mosquitoes. Outside the net in the presence of mosquitoes, disease agents can easily be transmitted, but when population are controlled by the two other methods; insecticides and environmental sanitations that will destroy breeding and resting sites, mosquito population will reduce and transmission will also reduce eventually.

CONCLUSION

The findings from this study indicates the presence of LF, poor knowledge of its vector among households in Kano metropolis. Knowledge of LF in this study is significantly associated age rather than level of education, income or gender which may indicate the success of LF control intervention programs in the region overtime, since older participants tended to have heard about LF more than the younger participants. Vector control practice among participants to halt other diseases associated with mosquitoes was also observed.

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