Bancroftian filariasis in some remote villages in bunza local government area of Kebbi State, Nigeria

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Abstract

This study was conducted between January and August, 2018 to determine the status of Bancroftian filariasis in six remote villages of Bunza LGA of Kebbi State. Mass Medicine Administration (MMA) with Albendazole and ivermectin has been going on in the area for over five years. It is necessart to determine if transmission has been halted so that MMA can be stopped. A total of 422 volunteers were sero-diagnosed using onsite fitariasis 1gG/1gM Combo Rapid test kit. Night blood samples were also taken for parasitological test. Physical manifestations and entomological studies were also conducted. An overall sero-prevalence of 1.65% was recorded, from seven (7) participants and none for microfilaria of W.bancrofti. Highest prevalence was recorded in Maidahini and Sabon-Birnin Villages (4.28%), followed by Salwai (1.38%) while the other three villages had no positive cases. Analysis of data indicate significant association between infection and village infection rates were higher in females than males, age-group 40-49, singles than married, housewives than other occupational groups. However, there were no significant association between the infection rates and the variables ($p>0.05$). Overall prevalence of all clinical manifestations was 4.50% with lymphedema, hydrocele, breast edema and fever/chills constituting 0.7%, 0.9%, 1.1% and 1.60% respectively of the total population. Out of 138 female mosquitoes dissected, none (0.0%) harboured the microfilaria of W. bancroft. It is concluded that transmission has been halted in 3 of the villages (Zogirma, Bunza and Raha) and so MMA should be stopped in those villages. However, morbidity management, vector control and surveillance should continue as well as treatment of the 3 endemic villages.

Keywords: bancroftian filariasis, MMA, prevalence, bunza LGA

Introduction

Bancroftian filariasis is a parasitic disease caused by microscopic thread-like worms that belongs to the nematode superfamity filaroidea which inhabit the lymphatic vessels and lymphnodes of human host [1, 2]. The parasitis are transmitted by different species of mosquitoes [3]. The larvae of the parasites enter the human body at the time of the mosquito bite. They then travel to the lymphatic system where they mature into adult worms. The adult worms can live for several years in the lymphatic system, where they mate and produce millions of live immature forms known as microfilaria that circulate in the blood [4]. The presence of these worms in the lymphatic system causes damage and blockage of the lymph channels, thereby preventing the return of lymphatic fluid to the circulatory system. Such blockage results in the fluid accumulation in the tissues especially the legs and genitalia [5]. Symptoms of the infection in subcutaneous form include itching, urticaria, skin rashes, headache, muscle aches and pains, abdominal pains, high fever, nausea with or without vomiting and joint involvement or arthritis that may result to oedema, the most common symptom of filariasis that can lead to elephantiasis [4]. Lymphatic filariasis is among the neglected tropical diseases being the second most common vector-borne parasitic disease after malaria. Lymphatic filariasis was also ranked the second leading cause of long-term and permanent disability after mental illness worldwide [6, 7]. An estimated 25million men suffer with genital disease and over 15million people are afflicted with lymphedema [8]. In the year 2000, more than 120 million people of all ages and sexes were infected with one or more of the lymphatic filariae worldwide [3]. About 947 million people in 54 countries worldwide were at risk of being infected. Enhanced strategies are now required in about 29 countries to achieve elimination targets and stop treatment [3, 9] by the year 2020.

Nigeria was rated as the third most endemic country with lymphatic filariasis in the world after India and Indonesia in the year 2000. Currently, Nigeria is the second most endemic country worldwide after only India and still the most endemic in Africa [16]. It was reported that 22.1% of the Nigerian population is thought to be infected with 66% people at risk of being infected. The significant burden of the disease in Nigeria is caused by *Wuchereria bancrofti* [10, 11]. The cater center [12] reported that in Nigeria, lymphatic fitariasis is transmitted by the same mosquito that transmits malaria. It is in this light coupled with the absence of a comprehensive report on lymphatic fitariasis in Kebbi State that this study was conducted in order to determine its status in Bunza LGA.

Materials and methods

The study was conducted at Bunza LGA., which is situated between latitudes 11^0 59'N and 12^0 20'N and longitudes 3^0 40'E and 40^0 05'E. The LGA shares common boundary with Kalgo and Arewa LGA in the North, Dandi LGA in the West, Maiyama LGA in the East and Suru LGA in the South.

It has a mean annual temperature of 21^0c though it sometimes fluctuates. The highest temperatures are recorded in the months of April and May. The harmattian season runs through November to February while the hot season starts from March and April. The mean annual rainfall is about 1000mm. the bulk of the rains fall between June and September with an average of 220mm in August. The major ethnic groups in Bunza LGA are Hausa, Fulani and Zarbarmawa. The people are farmers, cattle rearers and fishermen. There are also traders, artisans and those who engage in numerous skills such as driving, and sewing etc.

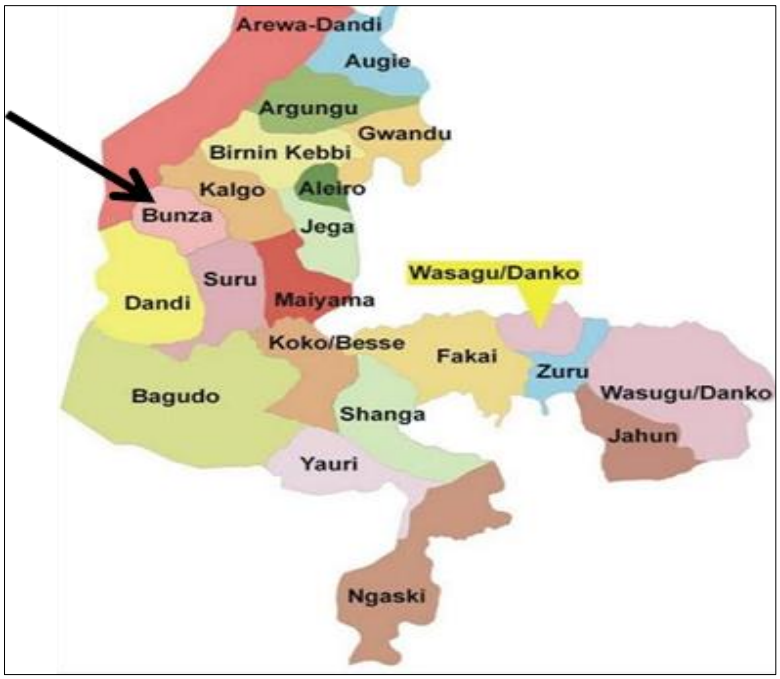

Fig 1: Map of Kebbi state showing Bunza Local Government

Fig 2: Map of Bunza Local Government showing the study villages

Ethical clearance

Before the commencement of the study, an approval from Kebbi State Ministry of Health was obtained, so as to have better access to the community members and to ensure consent of their leaders and confidentiality of the participants for the study.

Determination of circulating filarial antibody

Blood samples from 422 volunteers were sero-diagnosed for determination of circulating filarial antibody using the lateral flow chromatographic immunoassay (onsite filariasis 1gG/1gM Combo Rapid test for the simultaneous detection and differentiation of 1gG and 1gM antilymphatic fitarial parasites (*W.bancrofti and B.malayi*) in human serum, plasma or whole blood, following the manufacturers instructions [18]. The test cassette was labeled with the participants ID number and then placed on a clean flat surface. The participants left finger was sterilized with methylated spirit and then punctured using a sterile lancet to collect blood (about 40-50NL) in a capillary tube and then transferred to the sample well of the test cassette by making sure that there is no air bubbles. Then immediately one drop (about 35-50NL) of sample diluent was added to the sample well. The result of each cassette was read within 15mins. The test result, whether positive or negative was recorded on personal data sheet that corresponds to the participants ID number.

Parasitological examination

Night blood samples were collected by finger-pricking between 10.00pm and 2.00 am. Thick smears were made from about 20 µL blood, air dried, fixed in methanol, stained with giemsa and examined under microscope.

Clinical examination

Search for chronic clinical manifestations was conducted with the help of a trained medical personnel. Consented males were examined in private rooms with good light for hydrocele. Limbs of participants and female breasts were examined for lymphedema and breast oedema. Acute stage symptoms (Adenolymphangitis) were diagnosed by taking history of periodic fever/chills lasting 4-7days.

Entomological studies

Houses were randomly selected for mosquito collection. Light traps and pyrethrum spray (Baygon) were used between 6.00pm and 6.00am. Collections were separated by sex, males discarded, females identified into genera, and dissected.

Statistical analysis

Prevalence of infection was calculated in percentages association between infection and villages, gender, age, occupation was screened by chi-square test. The P.value less than 0.05 was considered significant.

Results

The overall seroprevalence of 1.65 was found in the study area and no microfilarial of W.bancrofti was recorded. However, the prevalence of infection varied among the villages. Sabon Birnin and Maidahini had the highest seroprevalence (4.28%) followed by Salwai (1.38%). In Bunza, Raha and Zogirma, no infection was recorded.

The occurrence of the infection is significantly associated (p<0.05) with the settlement of the communities (Table 1).

The results obtained with respect to gender of the people indicated that females were found to be more infected than males (p>0.05). In age related seroprevalence, the age-group 40-49 were recorded with the highest prevalence (5.00%) of infection than their counterpants in other age groups. The sero-prevalence of infection is not statistically significantly (p>0.05) associated with the occupation of the people in the study area. The highest sero-prevalence occurred among housewives, followed by farmers.

Clinical manifestations of the disease observed in the area include hydrocele, lymphedema, breast oedema and fever/chills. Overall prevalence of hydrocele was 4 (0.9%) and lymphedema was 3 (0.7%), fever/chills 7 (1.60%) (Table 6). Unilateral and bilateral lymphedema were both observed. Distribution of clinical manifestation according to age showed that those within the age group 70+ had the highest prevalence of clinical manifestation 4 (80.00%), followed by 40-49 3 (15.00%) and 50-59 5 (14.76%) (Table 7).

Species of mosquitoes caught in the arrear were Anopheles and culex. Out of 138 female mosquitoes dissected, none (0.00%) haboured the microfilaria of *W. bancrofti*.

Table 1: Sero-prevalence of Bancroftians filariasis with respect to villages

Village	No. examined	No. positive	Prevalence (%)
Bunza	70	0	0.00
Maidahini	70	3	4.28
Raha	70	0	0.00
Sabon Birnin	70	3	4.28
Salwai	72	1	1.38
Zogirma	70	0	0.00
Total	422	7	1.65

Table 2: Gender related prevalence of the infection in the study area

Gender	No. examined	No. positive	Prevalence (%)
Male	291	3	1.03
Female	131	4	3.05
Total	422	7	1.65

Table 3: Age related prevalence of lymphatic fitariasis in the study area

Age range	No. examined	No. positive	Prevalence (%)
0 – 9	77	0	0.00
10 – 19	162	1	0.59
20 – 29	41	2	4.87
30 – 39	69	3	4.34
40 – 49	20	1	5.00
50 – 59	34	0	0.00
60 – 69	14	0	0.00
70 and above	5	0	0.00
Total	422	7	1.65

Table 4: Distribution of infection based on marital status

Marital status	No. examined	No. positive	Prevalence (%)
Married	166	5	3.01
Single	256	2	0.78
Total	422	7	1.65

Table 5: Occupation based sero-prevalence of infection in the study area

Occupation	No. Examined	No. Positive	Prevalence (%)
Fishermen	2	0	0.00
Farmers	100	2	3.00
Traders	27	0	0.00
Pupils/Stds	140	1	0.71
Civil servants	17	0	0.00
Housewives	44	2	4.54
None	92	1	1.08
Total	422	7	1.65

Table 6: Prev. of clinical manifestation by village

Village	No. examined	Breast	Lympoedema	Hydrocele	Fever/Chills	Total
Zogirma	70	0	0	0	0	0
Salwai	72	5	3	1	1	10
Bunza	70	0	0	0	0	0
Raha	70	0	0	1	1	2
Maidahini	70	0	0	0	3	3
Sabon Birnin	70	0	0	2	2	4
Total	422	5	3	4	7	19
Prevalence (%)		1.1	0.7	0.9	1.60	4.50

Table 7: Clinical manifestation by age

Village	No. Examined	Breast	Lympoedema	Hydrocele	Fever/Chills	Total	Prev. (%)
0 – 9	77	0	0	0	0	0	0.00
10 – 19	162	0	0	0	1	1	0.61
20 – 29	41	0	0	1	1	2	4.87
30 – 39	69	2	0	0	1	3	4.34
40 – 49	20	0	0	1	1	3	15.00
50 – 59	34	3	0	0	1	5	14.76
60 – 69	14	0	0	0	1	1	7.14
70 and above	5	0	0	2	1	4	80.00
Total	422	5	0	4	7	19	4.50

Discussion

The overall prevalence of lymphatic filariasis antibody in this study was low when compared to the findings [13] who recorded 38.72% in Zamfara State and [14] who reported 21.00% in India. However, it is higher than the World Health Organization threshold of 1.0% CFA positively for MDA in a given community [15]. Low endemicity may be due to low transmission rate of the lymphatic filariasis. It may also be due to effective distribution of insecticide treated bed nets in the Roll back malaria programme in the State.

Though the overall prevalence is low some villages such as Sabon Birnin and Maidahini recorded higher prevalence rates. This may be due to closeness to riverine areas that provide suitable breeding sites for the mosquito vector.

In this study, it was observed that females were more infected than males. This may be due to the fact that both males and females are equally exposed to mosquito bites. The age bracket 40-49 have the highest risk of contacting the infection.

The overall hydrocele rate low when compared with findings of [17] who found hydrocele rate of 8.5% in Benue State and [18] who recorded 2.6% in Angola. Lymphedema rate was also low. Low hydrocele rate may be due to free hydrocele surgery conducted in the State before the study.

The public health importance of elephantiasis should not be underemphasized since it has severe psychological and social consequences.

The 138 dissected mosquitoes did not harbour microfilaria of *W. bancrofti*. Similarly, studies conducted by [19] did not also find microfilaria of *W. bancrofti.* However, the studies of [20] in three villages of Kano State found microfilaria in one *C. quinquefasciatus*. It seems the transmission of *W. bancrofti* infection has been reduced below sustainable level in the study-area.

In conclusion, this study determined that 3 villages – Zogirma, Bunza and Raha of Bunza LGA have met WHO criteria for stopping Lymphatic filariasis Mass Medicine Administration. The remaining 3 villages should intensify sensitization to increase compliance to MMA.

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