Clinical and parasitological assessment of lymphatic filariasis in Jahum Local Government Area, Jigawa State

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ABSTRACT

The Nigerian lymphatic filariasis elimination programme (NLFEP) has set 2015 to eliminate the disease in the country. The successes of this programme depends of identify and treating endemic communities. Unfortunately, information on the distribution and nature of the disease from many parts of the country is lacking. This study was carried out to assess the clinical and parasitological prevalence in three (3) communities in Jahum Local government of Jigawa state, Nigeria. One hundred and fifty (150) participants were assessed. Clinical examination of the participants was carried out to assess the manifestation associated with the infection. Blood samples were collected between 10 pm and 1 am local time by finger prick method and stained with Giemsa stain for examination to establish the presence of Wuchereria bancrofti. Chronic manifestation such as lymphoedema of the legs, scrotum and breasts where observed during the study. 11.3% had lymphoedema, and hydrocele was 7.0%. Involvement of the breast was rare in the study population. There was no association between the clinical manifestations and communities, gender and age (P>0.05). The overall microfilariae prevalence was 2% and microfilariae density was between 1-5 mf/µl in the study area. There was no statistically significant association between microfilaria prevalence, density, age and gender (P>0.05). Lymphatic filariasis is endemic in the study area, the prevalence is above the threshold level of endemicity recommended by WHO for selecting endemic communities for the mass drugs administration MDA to eradicate the diseases.

Keywords: Prevalence, Filariasis, Elephantiasis, Lymphoedema, Wuchereria, Microfilaria.

INTRODUCTION

Lymphatic filariasis (LF) is a mosquito-borne parasitic disease unlike some other parasitic and helminthic diseases that are transmitted through faecally contaminated food and water[19] and is endemic to 73 countries worldwide. An estimated 1.4 billion people are said to be at-risk of LF disease with approximately 120 million infected and 40 million suffering from the crippling and stigmatizing clinical manifestations of the disease, especially lymphoedema and hydrocele [16].

It is an ancient disease, with significant social and economic consequences for affected individuals, families and communities. The worst symptoms of chronic disease generally appear in adult men more often than in women, and include damage to the lymphatic system, arms, legs or genitals, which causes significant pain, wide-scale loss of productivity and social exclusion [17].

Nigeria is the third most endemic country in the world for Lymphatic filariasis (after India and Indonesia) with 22.1 % of its population thought to be infected [9]. The country also has the largest population at risk on the African continent [16].
Microfilaria prevalence of between 11% and 32.8% has been reported in parts of northern Nigeria [1, 3, 4, 6]. The rapid assessment study carried out in Kano, North West Nigeria showed the prevalence of 1.2% [6]. In Jegawa State, study carried out in Yakwashi Local Government Area showed the prevalence of 1.0%, however, there was no comprehensive study on the prevalence and clinical manifestations in Jahum Local Government Area, even though there are cases indicative to the presence of infection in the study area. This study therefore, is aimed at determining the prevalence of the infection and to show if it reaches the WHO threshold level that qualifies the areas for mass drug administration.

MATERIALS AND METHODS

THE STUDY AREA

Jahun Local Government Area of Jigawa state is located at 61km north of the state capital Dutse. It has an area of 1,172 km² and population of 229,094 at 2006 census. Themajor occupations are farming, fishing, civil service and trading. The tribe in the study area is the Hausa/Fulani.

Three wards (Jahun, HarboTsohuwa and Sabuwa) were selected and two villages were randomly selected from each ward. A total of six villages were visited for the clinical and parasitological surveys. The study areas were Jahun Ward (Jahun, Kwajiramawa) HarboSabuwa ward (HarboTsohuwa, Taraya) and HarboTsohuwa ward (HarboTsohuwa and Nahuce) these areas are crisscrossed by several seasonal rivers (Fig.1).

![Figure 1: Map of Jigawa State showing Study Area](Source: Adapted and Modified from the Administrative map of Jigawa State)
ETHICAL CLEARANCE
Ethical clearance was obtained from Gunduma Health System Council, Jahun Jahun local Government of Jigawa State. Informed oral consent was obtained from each of the participants. The consent was sought orally because the subject could neither read nor write. The entire participant gave their consent to participate in the clinical and parasitological examination. The consent was duly acknowledged in this research report.

STUDY SAMPLE

Table 1. Description of study sample by communities

<table>
<thead>
<tr>
<th>Ward / Village</th>
<th>No. examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jahun</td>
<td>5</td>
</tr>
<tr>
<td>Harbo Tsohuwa</td>
<td>4</td>
</tr>
<tr>
<td>Harbo Sabuwa</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
</tr>
</tbody>
</table>

DATA COLLECTION

Clinical examination and interview
Three wards selected as previously described were visited in the company of health personnels. During the visits to Wards/villages the village leaders were briefed on the purpose, procedures and benefits of study to individuals and the communities. Dates were agreed upon for clinical examination and collection of an anthropological (in-depth interviews and group discussions) data.

In each house hold, basic demographic information (age, sex, educational status, occupation and ethnic group) on members of each household was obtained and recorded on a household survey form. The individuals were then examined for clinical manifestation of the disease. Physical examinations are described below:

Lymphoedema
Grade 1: Mostly pitting oedema spontaneously reversible on elevation, no skin changes.

Grade 2: Mostly non-pitting oedema and non-spontaneously reversible on elevation. This grade is characterized by shallow skin fold and change in skin texture.

Grade 3: Lymphoedema depicts irreversible oedema with deep fold, papillomatous lesions or knobs warty growth (dermatosclerosis).

Hydrocele, scrotal elephantiasis were not graded.

PARASITOLOGICAL EXAMINATION

In each selected house, oral inform consent was obtained from individuals of age >15 years and from the parents of younger individuals. Individuals who have lived in the community at least one year were registered and their blood samples collected. One hundred and fifty (150) blood samples were collected from three wards (Jahun, Harbo Sabuwa and Harbo Tsohuwa).

Finger prick method was used for the identification of microfilaremia. The third of the sad finger was clean with cotton swab (dipped in methylated spirit) to remove dirt; and sterile lancet use to prick the finger. A little pressure was then applied on the finger to ease the flows of blood. The 2 drops of blood were clean in a grease-free glass slide and edge of spreader use to make thick smear of the blood. The site of finger pricked was cleaned up with methylated spirit. The blood smears were placed on gauge and allowed to dry for 8-10 hours over night and stained with Giemsa stain solution and allowed to stand for 30 minutes and examined with x100 objective for identification of microfilaria [5].

RESULTS

DISTRIBUTION OF CLEANICAL MANIFESTATION

Chronic manifestation such as lymphoedema of the legs, scrotum and breasts where observed during the study. One hundred and fifty (150) participates were examined for clinical manifestation of bancroftian filariasis, 17 (11.3%) had lymphoedema, and hydrocele was (7.0%). Involvement of the breast was rare in the study population.
Distribution of clinical manifestation by community
In the study areas, Harbo-Sabuwa village showed the highest Lymphoedema prevalence of 18.0% (Table 2). However, there was statistically significant difference between lymphoedema prevalence among the villages (P>0.05).

Table 2: Distribution of clinical manifestation by ward/village

<table>
<thead>
<tr>
<th>Ward / Village</th>
<th>No. Examined</th>
<th>No. of lymphoedema</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jahun</td>
<td>5</td>
<td>2</td>
<td>3.6</td>
</tr>
<tr>
<td>Harbotsohawa</td>
<td>4</td>
<td>6</td>
<td>1.3</td>
</tr>
<tr>
<td>Harbo Sabuwa</td>
<td>5</td>
<td>9</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>17</td>
<td>11.3</td>
</tr>
</tbody>
</table>

Prevalence of lymphoedema in relation to ages
A total of 17 individual had lymphedema (11%), the highest prevalence was seen in 60-69 years age group having 29.6%, age groups 10-19 years and 50-59 years have no record of lymphoedema respectively as shown in figure 2. However, there was no significant difference in the distribution of lymphoedema by age in the study area (p>0.05).

Fig. 2: Prevalence of lymphoedema by ages

Figure 3: Prevalence of lymphoedema by sex
Prevalence of lymphoedema in relation to gender
The distribution of lymphoedema by gender showed that one hundred and twenty four (124) were males, out of which 15(10%) was having lymphoedema (Fig. 3), while 24 participants were females (1.3%). There was no significant difference between sex-specific prevalence of lymphoedema the study area P>0.05).

Distribution of Microfilariae Infection in relation to wards/villages
All microfilariae who nuclei did not reach the tail and had the sheath were classify as those of *wuchereria bancrofti* (plate1). The study showed that microfilariae was examined in two (2) participants in Jahun, with microfilaria density between 1-5 mf/µl and one (1) from HarboSabuwa Having microfilariae density between 1-5 mf/µl and the overall prevalence was 2% in all the three communities (Table 3).

**Plate I:** *Wuchereria bancrofti*  
Source: WHO/TDR/Stammers

<table>
<thead>
<tr>
<th>Community</th>
<th>No. Examined</th>
<th>Table 3: Microfilarial prevalence and densities by villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jahun</td>
<td>5</td>
<td>1 - 5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Harbo Tsohuwa</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Harbo Sabuwa</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>5</td>
</tr>
</tbody>
</table>

Age-specific prevalence of bancroftian infection in the study area
In the study area the trend of infection was observed in adults. Age group 30-39 years showed the highest prevalence (Table 4). There was no statistically significant difference between microfilaria prevalence, density and age (P>0.05)

**Table 4:** Age-specific prevalence of bancroftian infection in the study area

<table>
<thead>
<tr>
<th>Age group</th>
<th>No. Examined</th>
<th>Table 4: Age-specific prevalence of bancroftian infection in the study area</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10</td>
<td>1</td>
<td>1 - 5</td>
</tr>
<tr>
<td>10 - 19</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>20 - 39</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>30 - 39</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>40 - 49</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>50 - 59</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>5</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The clinical manifestations indicative of lymphatic filariasis (hydrocele and elephantiasis) in the study area showed that lymphoedema had the prevalence of 11.3%, this showed similarity in other studies. For instance, Blackburne* al [4]*reported an overall prevalence of 12.95% from central state of Plateau and NasarawaStates, Nigeria while Udonsi [15] reported hydrocoele prevalence of 12.3% in Niger Delta areas and 15.5% in the IgwunRiver Basin respectively. However, hydrocele prevalence in the study was 7.0%, which is lower than the prevalence of lymphoedema this may be attributed to the provision of hydrocele surgery. The finding of Anosike* et al [2]* revealed overall hydrocele prevalence of 1.8%was however lower than that of the present study. The increase in hydrocoele prevalence with
age is corresponds with several studies such as those of Onapaet al [12] in three communities in Uganda, Simonsenet al [13] in three endemic communities of North Eastern Tanzania and Omudu and Ochoga [11]among Igedeethinic group in Benue State, Nigeria. In the study area the prevalence of limb lymphoedema appearance in latter state of life and its gradual increase with age is in agreed with most previous findings such as those ofSimonsenet al [13] andHopkins, et al [8]. In this study more males had lymphoedema than female which showed dissimilarity with the report of simonsenet al [13], and as well differ from that of Omudu and Ochoga [11]which indicated that those with higher prevalence of lymphoedema where female.

The prevalence of microfilaria was 2% in the study area. The microfilaria suggested low level of infection in the study area. It could result from the lack of sensitivity of the TBF method used to identify the infection. Although the prevalence was low compared to the prevalence clinical manifestations indicative to lymphatic filariasis, it is above the one percent(1%) threshold level of endemicity recommended for selecting endemic communities for the mass drug administration (MDA) in the global effort to eradicate the disease.

The low prevalence of microfilaria compared well with previous studies in Nigeria and elsewhere for example, Anosikeet al [2] reported an overall prevalence 16.9% in ten communities in EbonyiState while Badakiet al [3] reported 24.4% in three Local Government Areas of Taraba State.

In this study, none of the female participants was found with microfilariae probably because few of them participated in the screening exercise, in addition, they may not be prone exposure to the bite of mosquitoes when compared to men. This is because in a typical Hausa society, the women folk traditionally tend to cover their entire bodies and do not stay out door as men do. The low turnout of female participants in this exercise was attributable to the purdah system prevalent in the study area which does not allow women to go out most of the time even during the day time talk less of in the night when the survey was conducted. None of the children age 1-15 years was found to be microfilariae positive probably because of immunological suppression of the microfilariae as suggested by McMahononet al [10] and the lack of sensitivity and the reliability of TBF method used to determine infection in this group. In addition, the rare occurrence of microfilariae in children is that, a high number of infective bites and prolonged period of time are necessary before the establishment of a patent infection with MF will occur [14].

Lymphatic filariasis is endemic in the communities in JahunLocal Government Area; the microfilariae prevalence was 2% which was more than 1% threshold level. This makes these villages qualify for mass drug administration (MDA) in order to eliminate the disease. However, there is need to carry out further studies in more villages using more sensitive diagnostic techniques such as Immuno-chromatographic (ICT) card for the detection of infected persons.

CONCLUSION

The findings from the study show that the clinical manifestations such as lymphoedema and hydrocele occurrence was higher than the microfilariae prevalence, this may be attributed to non- sensitivity of microfilariae examination which may lead to “false negative”. In overall assessment, lymphatic filariasis is a problem in JahunLocal Government Area of Jigawa State and there is urgent need to institute an elimination and possible management program with a view of halting transmission in the area and providing relief for individuals with chronic form of the disease.

REFERENCES


