Visceral Leishmaniasis Infection in Patients from Gboko Health Division, Benue State, Nigeria

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Authors’ contributions

This work was carried out in collaboration between all authors. Author JBO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author IM managed the analyses of the study. Author HUS managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JALSI/2019/v20i130071

Editor(s):
(1) Dr. Dan C. Vodnar, University of Agricultural Sciences and Veterinary Medicine, Cluj Napoca, Romania.
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Complete Peer review History: http://www.sdiarticle3.com/review-history/36369

ABSTRACT

A Study was carried out to investigate the Prevalence of Visceral leishmaniasis infection in Gboko Health Division, Benue State. Parasitological screening was carried out in Two hundred (200) patients comprising 74 males and 126 females sampled at random. Leucoconcentration method was used in the diagnosis of Visceral leishmaniasis in the patients in the study area. Out of the total number sampled, 26 tested positive 9 (12.2%) males and 17 (13.5%) females for Visceral Leishmaniasis infection. Infection rate of Visceral leishmaniasis showed significant difference (p<0.05) based on the sex and age of the patients with the females having higher infection than the males, $X^2_{cal}=12.59$ at $P \leq 0.05$ and 6df. Infection rate was significantly higher in female patients with 25.0% in the age groups of 51-60 and 60+ years respectively and 14.3% for males in the age group 31-40 years. No prevalence was recorded in males and females in the age group of 1-10 years. The presence of Visceral leishmaniasis in the study area is of clinical importance and requires routine check and public health awareness and further research conducted in the study area to help bring about complete eradication.
Keywords: Prevalence; visceral leishmaniasis; patients; Benue State.

1. INTRODUCTION

Leishmaniasis is a group of diseases caused by intracellular protozoan parasites of the genus Leishmania. Twenty one species of the genus infect humans and all are spread by bites of infected sand flies of the sub-family Phlebotominae. Mammalian infection of Leishmania depends on the ability of the parasite to evade non-specific host defenses, and to be ingested by the host cell and survive within the phagolysosome of macrophages. This can stimulate different types of inflammatory reactions giving rise to different clinical and pathological patterns of the disease [1].

Cutaneous, mucocutaneous and visceral leishmaniasis represents the major clinical groupings, although other forms of the disease are occasionally observed [2]. The pathological changes that characterize the various clinical forms of the disease reflect the balance between parasite multiplications, the immune response of the patient and the resultant degenerative changes.

Infections with viscetropic Leishmania spp. affect the spleen, liver, mucosa of the small intestine, bone marrow and lymph nodes. The common clinical signs are non-tender spleenomegaly, lymphadenopathy and anaemia [3]. Visceral leishmaniasis often accompanied by other diseases such as tuberculosis, pneumonia and HIV have a very high mortality rate unless treated.

In view of this, a research was carried out to determine the prevalence of Visceral Leishmaniasis among patients attending the Gboko Health Centre in Benue State which is open to patients in and around the metropolis with an estimated population of 260 thousand people from the 2006 population census figures [4] and as such the success of the study.

1.1 Aim

The aim of this research was to determine the prevalence of visceral leishmaniasis among patients attending Gboko Health Care Division in Benue State.

1.2 Objectives

1. To ascertain the visceral leishmaniasis infection between the different age groups among the patients.

2. To determine the prevalence of visceral leishmaniasis among the patients with respect to sex of the patients.

2. MATERIALS AND METHODS

The study area Gboko is bordered by Tarka LGA to the North, Ushongo LGA to the South, Buruku LGA to the West and Konshisha LGA to the East with a total are of 1,835Km² and density of 257.49Km² and an estimated population of 460 thousand inhabitants [4]. The study area has coordinates 7°36’ North, 9°03’ East and is characterized by a tropical climate with very thick forests. The surface temperature alters between 26°C-36°C.

The research was carried in 2015 on patients attending the Health Centre. A total of 200 patients comprising 74 males and 126 females were sampled at random from the study area and tested for visceral leishmaniasis infection.

Blood specimens were collected from patients at the Gboko Health Division by venipuncture with the patients’ consents and permission given by the hospital management and immediately tested for leishmaniasis infection. Blood specimens were placed in 1 ml 0.9% saline with three drops of haemolysis solution (2% saponin in physiological saline sterilized by filtration through a 0.22 um pore membrane filter paper and stored at a room temperature of 28ºC) in a 10 ml centrifuge tube. A pipette was then used to expel the suspension three times over 15 minutes. This solution was then centrifuged at 600 rpm for 10 mins and then the supernatant fluid was carefully poured off. The pellet was then re-suspended in 100 ul 0.9% saline and thick smears of the suspension were made on two slides for each sample. The slides were dried and then stained with May-Grunewald-Giemsa and then examined under a microscope at x1000 with oil immersion. This method was adopted because most of the amastigotes lie within phagocytic leucocytes [5].

3. RESULTS

Results as obtained in Table 1 shows the prevalence of Visceral Leishmaniasis which was more in females within the age group 51 - 60 and 60+ of 25.0% each followed by the age group 21-30 with prevalence rate of 16.67%. The highest prevalence rate among the males of 14.3% was seen in the age group 31-40 and followed by the
age group of 21-30 and 41-50 years respectively recording 13.33% each. The least prevalence of 0% was obtained in the age groups 1-10 and 60 and above in males and also 0% in the age group 1-10 years in the females; Visceral leishmaniasis was found present in almost all the age groups and the sexes. The differences in prevalence of the infection among the different age groups and sexes was statistically significant ($P \leq 0.05$).

Fig. 2 shows the prevalence rate among the sexes in the various age groups. It can be seen that the females among the age groups of 21-30 years and 31-40 years recorded the highest rate followed by the age groups of 51-60 years and 60 years and above while the least prevalence rate of 0% was recorded in the age groups of 1-10 years and 60 years and above. The males on the other hand recorded the highest prevalence among the age group of 21-30 years, 31-40 years, 41-50 years and 51-60 years respectively followed by that of 11-20 years and above 60 years recording 0%.

4. DISCUSSION

Two studies from the North central region including Benue State have reported 10.5% of visceral Leishmaniasis [6,7]. These areas share the same geographical location with the sample area; visceral leishmaniasis have also been reported in discovered foci in Keana, Nasarawa State which is a neighbouring State to the study area [8]. Visceral leishmaniasis occur all over Nigeria, thus the geographical distribution of the infections overlap indicating the progress of the infection.

Of the 200 patients examined, 9 males were recorded as against 17 females to be infected with visceral leishmaniasis indicating that the number of males infected were less than the females, this disagrees with the records of [9,10, 11] in their various research works and the reason is probably attributable to the cultural predisposition and exposure of women to the sand fly vector of *Leishmania* in endemic areas considering their engagements in farming, water fetching, religious and cultural activities [12].

In the same light, the limited access of women to health care due to cultural and social barriers may underestimate the real impact of infection in them. Women are also more likely to develop the clinical symptoms of visceral leishmaniasis than exposed men as discovered from some experimental murine models [13,14,15]. The research also agrees with Alexander [14] who separately reported higher infection in females in Spain and Northern Nigeria respectively. Alexander further observed that the disease epidemiology reflects the degree of exposure to infection and as such alternate infection rates with respect to sex.

The rate of visceral leishmaniasis was significantly higher in the age group of between
Table 1. Prevalence of Visceral leishmaniasis infection in relation to sex and age

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Sampled</td>
<td>No Infected</td>
<td>Percentage Infected (%)</td>
</tr>
<tr>
<td>1-10</td>
<td>2</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>11-20</td>
<td>10</td>
<td>1</td>
<td>10.00</td>
</tr>
<tr>
<td>21-30</td>
<td>15</td>
<td>2</td>
<td>13.33</td>
</tr>
<tr>
<td>31-40</td>
<td>14</td>
<td>2</td>
<td>14.30</td>
</tr>
<tr>
<td>41-50</td>
<td>15</td>
<td>2</td>
<td>13.33</td>
</tr>
<tr>
<td>51-60</td>
<td>17</td>
<td>2</td>
<td>11.76</td>
</tr>
<tr>
<td>60+</td>
<td>1</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>9</td>
<td>12.16</td>
</tr>
</tbody>
</table>

$X^2$ tab 12.59 < Cal. 16.42, df 6, $P ≤ 0.05$

There is therefore a significant difference in visceral leishmaniasis infection

Fig. 2. A chart showing the number of males and females infected with visceral leishmaniasis at the study centre

Key: Male – Blue, Female – Brown
21-30 years who are regarded as adults and is compared to [16] when they reported the rate of infection of visceral leishmaniasis in 50-75% adults in Southern Europe. Agwale et al. [8] also reported 58% of adults with leishmaniasis in Keana, Nasarawa State.

There was no infection recorded between the males and females within the ages of 1-10 years but infection also was recorded reaching a peak in females within the age of 31-40 years.

**5. CONCLUSION AND RECOMMENDATIONS**

The findings of this study report the prevalence of visceral leishmaniasis among patients attending the Gboko Health Care Centre comprising of men and women, despite the incidence, clinical implications and epidemiological impact of the infection, surprisingly, scarce data is available regarding treatment. The survey also shows that most people in the study area are ignorant of the disease and its mode of transmission. World Health Organisation [17] reported that infection with leishmaniasis is centered on poverty and lack of awareness. These are among the contributing factors for its distribution. Most of the inhabitants work about without body cover so are open to the sand flies that serve as vectors of the infection.

It is suggested that leishmaniasis tests in general be incorporated in the routine tests recommended for patients in order to cushion the burden of the infection.

Immediate intervention to eliminate the spread of this infection by the government is recommended; the local, the state and the federal governments should organize public health education campaigns with adequate action to alleviate this health problem.

The use of knee-high boots and arms length gloves which should be worn to protect the skin from bites of the phlebotomine flies. Chemotherapy is the most important measure for the control of leishmaniasis.

In conclusion, health education should be carried out in communities and other public gathering to enlighten those that might have forgotten the epidemiology of the disease.

**DISCLAIMER**

This manuscript was presented in the conference “39th Annual Parasitology and Public Health Society Conference, At Lafia, Nigeria”. Available link is: “https://www.researchgate.net/publication/311740304_Prevalence_of_Visceral_Leishmaniasis_Infection_Among_Patients_Attending_Gboko_Health_Division_Benue_State_Nigeria”.

Date September 2015.

**COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle3.com/review-history/36369