

## A REVIEW OF LEISHMANIASIS IN WEST AFRICA

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### The Disease

Leishmaniasis is vector-borne disease caused by blood and tissue dwelling protozoan parasite species belonging to the genus *Leishmania*. It is basically a disease of animals that gets into the human population when man, flies and the animal reservoirs coexist in the same environment. In man, infections with *Leishmania* parasites results in a broad range of clinical manifestations involving the skin, mucous membranes and visceral organs with devastating consequences. Two main forms of leishmaniasis have been reported in humans. These are Cutaneous Leishmaniasis, which is a less severe form of the disease with usually self-healing ulcers and Visceral Leishmaniasis, the most severe form of the disease which can result in 100% mortality of infected patients if not treated<sup>1</sup>. A third form, muco-cutaneous leishmaniasis, results in extensive disfiguring lesions of the nose, mouth and throat mucous membranes. The diverse clinical manifestations of the disease result from a reaction between the virulence of the parasite species and the host's immune response.

**Keywords:** Leishmaniasis, Sandflies, West Africa, Ghana.

### Geographical Distribution

The disease has been described from parts of 88 countries in the tropics and sub-tropics where some 350million are at risk of infection, over 12million affected with some 1.5-2million new cases each year (WHO fact sheet). In Africa, leishmaniasis is endemic to countries mostly in the North, Central, East and the Horn of Africa. The disease is also endemic in West Africa<sup>2</sup>. Although the disease has a long history in West Africa, it appears to be one of the less recognized or under-reported parasitic infections in this region<sup>3</sup>. Since the first published work indicating the presence of leishmaniasis in Niger in 1911<sup>4</sup>, other cases of leishmaniasis have been reported in West Africa mostly from Mali<sup>5</sup>, Nigeria<sup>6</sup> and Senegal<sup>7</sup> as well

as Cameroon<sup>8</sup>. Other countries in the sub-region that also reported cases in the past included, Haute Volta (present day Burkina Faso), Mauritania, Gambia and Guinea. Based on this information, cutaneous leishmaniasis is proposed to be endemic in a belt running from Mauritania, Gambia and Senegal in the west to Nigeria and Cameroon in the east. Although the cutaneous leishmaniasis belt mentioned cuts across the northern part of Ghana, the disease has not been reported in the country until recently, 1999, when some chronic ulcers diagnosed as cutaneous leishmaniasis were observed in the Ho District of the Volta Region (Personal Communications by M. Kweku). A case search in 2002 revealed a total of 2,348 infected individuals in 3 sub-districts; Ho/Shia, Kpedze/Vane and Tsito of the Ho District. The local people had named the disease as "Ag-bamekanu". Although, the communities involved speculated that the diseases could have been an importation from neighbouring Togo, there were no reported cases from that country. However, during the same period, cases of leishmaniasis were also observed in Burkina Faso where 1,845 people were diagnosed with the infection in the capital Ouagadougou from 1996 to 1999<sup>9</sup>.

The most devastating form of cutaneous leishmaniasis which involves the mucous membranes of the nose, mouth and throat as well as the deadly visceral form are reported to be rare in West Africa. However, two cases of cutaneous leishmaniasis with mucous membrane involvement were reported in Senegal<sup>10</sup> whilst some cases of visceral leishmaniasis have been recorded in at least three countries. The visceral leishmaniasis cases were from Togo<sup>11</sup>, Haute Volta (Burkina Faso)<sup>12</sup> and the Gambia<sup>13,14</sup>. Conteh and Desjeux (1983)<sup>13</sup> suggested that fevers and splenomegaly in countries neighbouring The Gambia could be due to visceral leishmaniasis and Sirol et al (1972)<sup>15</sup> also indicated that visceral leishmaniasis could be common in West Africa. There has however, not been any

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cases of either a mucous membrane involvement or visceral leishmaniasis in the endemic areas in Ghana.

### Epidemiology

The infections are found in all ages. In the report by Dedet *et al* (1982a)<sup>16</sup>, the most frequently cutaneous leishmaniasis infected age group in the Thies region was 10-40 age classes. A similar pattern was found in Ouagadougou<sup>9</sup> and in Ghana. The few cases of muco-cutaneous leishmaniasis reported included a six year old girl from Senegal.

The disease appears to occur in epidemic proportions in the various West African countries increasing in frequency over a few years followed by a drastic reduction in incidence. This could be a contributing factor in the under-reporting of leishmaniasis in West Africa as well as the self-healing nature of cutaneous leishmaniasis. Within the year, the highest number of cases is observed during the rainy season indicating that transmission may occur at least two months before the rains. For example in Burkina Faso, 76.5% of the lesions appear between July and the end of November each year<sup>9</sup>. Similar findings were made in Niger<sup>17</sup> and Senegal<sup>16</sup>.

### Transmission

The transmission of *Leishmaniasis* parasites depends on vector factors such as the tendency to take blood from humans or animals only or both as well as the capability of the ingested parasites to develop to the infective stages within the specific vector. In most cases of leishmaniasis, humans are usually not good sources of parasites for transmission<sup>1</sup>.

There are various *Leishmaniasis* species that cause human leishmaniasis worldwide but in West Africa only *Leishmania major* has been reported from reservoir hosts, vectors and human patients from The Gambia, Senegal, Burkina Faso and Mali<sup>18-22</sup>. Dedet *et al* (1982c) observed that all the *Leishmaniasis major* strains isolated from Senegal were identical to those from Central Asian<sup>20</sup>. However, the zymodeme found in Burkina Faso was different from that from Mali and Senegal<sup>21</sup>. Most other reports including those from Ghana have indicated the presence of amastigotes in human samples but have not identified the specific *Leishmania* parasites. There is the possibility that *L. donovani* which is the causative agent of visceral leishmaniasis occurs in West Africa<sup>1</sup>. Also, Bjorvatn and Neva (1979) used a strain of *L. tropica* from West Africa to infect mice<sup>23</sup>. The

presence of reservoir hosts is very important in the transmission of leishmaniasis since they provide a better source of parasites for vector infection. Animal hosts for *Leishmania* species that infect man are usually rodents, canines including dogs and edentates. In West Africa, the reservoir hosts have been identified only from Senegal and The Gambia<sup>18,20,3,24</sup>. These are the rodents *Mastomys erythroleucus*, *Tatera gambiana* and *Arvicantis niloticus* (Keur Moussa focus and other areas of Senegal) and *Mastomys erythroleucus* and a dog in The Gambia. The paucity of information on the reservoir hosts stems in part from the fact that most of the published information have often been reports on human cases in epidemic situations. There have been very few comprehensive studies on leishmaniasis in West Africa. In Ghana, attempts by researchers of the Noguchi Memorial Institute for Medical Research and the Ghana Health Service at determining the probable reservoir hosts in the epidemic area did not yield much information due to difficulties in trapping animals. However, in some of the communities with reported leishmaniasis cases, the research team were informed that it was a taboo to keep dogs. Hence dogs may not be important as reservoir hosts of the parasites in these areas.

The distribution of leishmaniasis is greatly related to the distribution of appropriate vector species. Vectors of leishmaniasis are phlebotomine sand flies belonging to insect order Diptera (true flies) in the family Psychodidae. In the old world including West Africa two main genera of sandflies are found. These are *Phlebotomus* and *Sergentomyia*. The known vectors of leishmaniasis are species belonging to the genus *Phlebotomus*. Although some *Sergentomyia* species anthropophilic, they are not known as vectors of leishmaniasis.

A list of the sandflies of West Africa that have been identified from Ghana<sup>25,26</sup> included *P. duboscqi* and *P. rhodaini*. In the studies of leishmaniasis in Senegal<sup>19</sup> *P. duboscqi* was implicated as the vector species. Observations in The Gambia also collected large numbers of *P. duboscqi* in the leishmaniasis endemic area suggestive of the role of this species in the transmission of the disease.

In Ghana sandfly species collected in 1997 and 2002 from Navrongo in the Upper East Region showed the presence of 14 different species thirteen of which belonged to the genus *Sergentomyia*. The only *Phlebotomus* species was *P. duboscqi* a known vector of cutaneous leishmaniasis in West Africa. Identification of sandfly collections from

the cutaneous leishmaniasis outbreak area in the Ho District, Volta Region from March 2004 to May 2005 yielded 17 species including *P. duboscqi* and *P. rodhaini* which is a new geographic record for Ghana. Samples from areas within the same district as the outbreak area but without any cases however did not have any *Phlebotomus*. The numbers of the *Phlebotomus* species, *P. duboscqi* the assumed cutaneous leishmaniasis (CL) vector and *P. rodhaini* were, however, so low that their vectorial role is uncertain in Ghana.

Three man-biting *Sergentomyia* species, *S. Schwetzi*, *S. clydei* and *S. adleri* were identified from both Navrongo and Ho district. *Sergentomyia schwetzi* was in much greater numbers than both *P. duboscqi* and *P. rodhaini* however, its vectorial role is yet to be determined.

### Control

Due to the apparent neglect of leishmaniasis in West Africa, there is no organized control effort in this region except during outbreaks when chemotherapeutic treatment is administered to those showing the disease. Neva et al (1979) reported a case of cutaneous leishmaniasis in a Peace Corp volunteer who still had viable parasites even after multiple treatments including amphotericin B<sup>27</sup>. There is a lot of self-medication in outbreak communities as was observed in the Ho district (M. Kweku personal communication) and in Burkina Faso<sup>9</sup>.

Vector control with insecticides against the sandfly vectors is an effective way of reducing disease incidence. However, this has not been practiced in West Africa.

The Ghana Health Service however, undertook an insecticide spraying exercise in the endemic communities in the Ho, Hohoe and Kpando districts in the Volta Region (Aba-Baffoe Wilmot personal communication).

### Future

It is apparent that leishmaniasis is not an unknown disease in West Africa and that all the various forms could be present. There is therefore the need for the medical establishment to undertake regular surveys to identify cases, reservoir hosts and vectors similar to studies reported by Blanchot et al (1984) to forestall the occasional epidemic outbreaks as has been seen in Ghana and Burkina Faso in recent times<sup>24</sup>.

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