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Prevalence of Malaria Parasites among HIV/AIDS Patients Attending HIV Clinic in Usmanu Danfodiyo University Teaching Hospital and Sokoto State Specialist Hospital, Sokoto, Nigeria

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Abstract: **From January-March 2014, blood samples from 350 HIV/AIDS patients who are attending HIV clinic in Sokoto State Specialist and Usmanu Danfodiyo University Teaching Hospital, Sokoto were examined for malaria parasites. Both thin and thick films were made and stained using Giemsa staining technique. Of the 350 samples examined, 159 (45.4%) had Plasmodium parasites. Only *Plasmodium falciparum* (96.9%) and *Plasmodium malariae* (3.1%) were seen. The study showed that age group of 21-30 years had the highest prevalence rate of 64 (40.0%) while the least prevalence rate was found among age group 11-20 years. Females had the higher prevalence rate of 103 (64.2%) and males had lower prevalence rate of 57(35.8%). With regard to marital status the result showed that married had the higher prevalence rate of 97 (61.0%) while lower prevalence rate of 62 (39.0%) was recorded in single. There was no significant difference of malaria parasite infection among age group (p=0.818), sexes (p=0.392) and marital status (p=0.287) of the HIV patients. The need to improve the quality of health care, malaria prevention and treatment given to HIV/AIDS patients attending clinic is recommended.**

Keywords: **Giemsa stain, HIV/AIDS, Malaria parasite, Plasmodium, prevalence, thick and thin films.**

1. INTRODUCTION

Malaria (augue, marsh fever periodic fever, paludism) is an infectious due to the presence of parasitic protozoan of the genus plasmodium (*plasmodium ovale, plasmodium vivax, plasmodium falciparuum, plasmodium malariae)* within the red blood cell through the bite of an infected female anopheles mosquito and most important mainly to tropical and

subtropical countries. Malaria is the most important and wide spread of parasitic disease in tropical countries (Baron *et at.*, 1994).

Clinical cases are being reported in countries with initial "Clean bill" on malaria and in some that have not reported cases previously. The resurgence of malaria is not only a health problem but also a serious impediment to socio-economic development. (Carnivale and Mauchet, 2011).

The record according to Bunnang and Harinasuta (2013) could be attributed to some factors including failure of vector control due to indiscriminate use of insecticides in Agriculture and to emergence of drug resistance strain of plasmodium traceable to high rate of presumptive treatment, growth in population which undoubtedly show down antimalaria measure in most countries of the world (Wendorfer, 1979 and Mayousumo and Snow, 1995).

Currently, most countries in the temperature zone free from malaria which has persisted in all tropical Africa and subtropical most cases in America are among international travelers. However, Zucker (1996) reported three recently outbreak of locally acquired malaria in densely populated area of united states of America, demonstrating the continued risk of mosquito – borne transmission of malaria even in develop countries of the world.

Despite efforts over many years to eradicate or at least control it, the disease continues to be a major impediment of health and hence to development in many of the countries especially poorer one in the world.

Inspite of all these disturbing startling, statistics, malaria is preventable, treatable and curable, (Baron *et at.*, 1994).

2. MATERIALS AND METHOD

Study Area:

The study was conducted in Specialist Hospital Sokoto and Usmanu Danfodiyo Teaching Hospital Sokoto, Nigeria. Sokoto is located on Longitude 11'30" to 13'50" East and Latitude 40' to 60" North. The study was carried out from September through December, 2013. The area has two seasons, the dry season (October – April and extend to May or June) and rainy season (May – September or October). Malaria is usually very high in this area towards the end of the rainy season.

Problem Statement:

Human immunodeficiency disease (HIV) and malaria infections often coexist in patients in many parts of the world due to geographic overlap of these two diseases. This is particularly true in sub-Saharan Africa, where an estimated 40 million people are living with HIV and more than 350 million episodes of malaria occur yearly (Goselle etal, 2007).

There is also evidence of a negative interaction between these two infections. HIV increases the risk of malaria infection. There are five malarial species that infect humans. Presently, most data on HIV interaction with malaria are derived from *P. falciparum* endemic regions of sub-Saharan Africa. However, as HIV spreads to areas endemic for *P. vivax,* similar important interactions may be identified. Immunity to malaria is characterized by an age-related reduction in parasite burden, clinical symptoms, and prevalence of severe disease in individuals residing in an endemic area. *P. falciparum* infection and the burden of parasitemia are often less severe in older adults than in children. Children are at increased risk since they have not yet acquired natural immunity; pregnant women transiently lose some of their acquired immunity due to the relative immunosuppression of pregnancy. The degree of immunity is also related to transmission intensity, which varies geographically.HIV-related immunosuppression diminishes this acquired immunity (Mouala, 2013).

These two infections interact bidirectionally and synergistically with each other. HIV infection can increase the risk and severity of malaria infection and the increased parasite burdens might facilitate higher rates of malaria transmission. Individuals in malaria-endemic areas that are considered semi-immune to malaria can also develop clinical malaria if they are infected with HIV. Also malaria infection is associated with strong CD4+ cell activation and up-regulation of proinflammatory cytokines, providing an ideal microenvironment for the spread of the virus among CD4 + cells and thus for rapid HIV-1 replication (Corbett, 2012).

Sample collection and processing:

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Five ml of blood sample was obtained by venous-puncture from each of these patients into bottles containing Ethylene Diamine Tetraacetic Acid (EDTA) anti-coagulant. The following information was collected from each patient, age, sex and marital status. Thick and thin blood films were prepared from each sample on two separate microscopic slides.

a. Thick films – Large drop of blood was placed at the centre of a clean grease-free slide. The smear was made with the edge of another slide to cover an area on the slide. The slide was labeled with a diamond pencil and kept to air-dry. The smear labeled with a grease pencil and kept to dry in the air. This method yields a much higher concentration of the parasites when they are few in numbers (Cheesbrough, 2010).

b. Thin film: - A drop of blood was gently touched onto one end of a clean grease-free slide. A spreader was placed at a suitable angle in front of a blood, and the blood allowed touching and spreading along the edge of the spreader. The spreader was pushed along the slide, drawing the blood behind it, until the whole drop had been smeared. This was labeled and kept to dry in the air. This method permits the study of the morphology and density of the parasites and the condition of the blood corpuscles (Cheesbrough, 2010).

Staining Technique:

Giemsa staining method – thin films were first fixed in absolute methyl alcohol for 2 minutes. The diluted 1:10 Giemsa stain was used to flood both the thin and thick films and left for 45 minutes. The slides were washed in buffered distilled water pH 7.2 and dried (Cheesbrough, 2010).

Examination of blood films:

Both thick and thin films were examined microscopically using immersion oil objective.

3. RESULT

The result showed that out of 350 samples examined in the study a total of 159 (45.4%) was found to be positive for malaria parasite.The results were subjected to comparative analysis as shown below.

Table 1: The prevalence of malaria parasite with respect to ages of HIV positive shows the highest prevalence rate of 40.2% among the HIV positive persons with age group 21-30 with sample population of 137 out of which 64 were positive for malaria parasite. The prevalence rate of 4.4%, 34.0%, 15.7% and 5.7% with age group 11-20, 41-50 and 51-above respectively.

Table 2: The prevalence of malaria parasite in relation to sex revealed that females have high prevalence rate of 64.2% and males have prevalence rate of 35.8%.

Table 3: This shows percentage prevalence of malaria parasite with respect to marital status of HIV positive individuals with 39.0% and 61.0% of single and married respectively.

Table 1: The prevalence of malaria parasite with respect to age

Age group(years)	Result		Total
	positive	Negative	
11-20	7(4.4%)	7(3.7%)	14(4.0%)
21-30	64(40.2%)	73(38.2%)	137(39.1%)
31-40	54(34.0%)	74(38.7%)	128(36.6)
41-50	25(15.7%)	24(12.6%)	49(14.0%)
51- Above	9(5.7%)	13(6.8%)	22(6.3%)
Total	159	191	350

Pearson chi-square, P=0.818

Table 2: Prevalence of malaria parasite with respect to sex

Sex	Result		Total
	Positive	Negative	
Male	57(35.8%)	77(40.3%)	134(38.3%)

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Female	102(64.2%)	114(59.7%)	216(61.7%)
Total	159	191	350

Pearson chi-square, P=0.392

Table 3: Prevalence of malaria parasite with respect to marital status

		Result	
Marital status	Positive	Negative	Total
Single	62(39.0%)	64(33.5%)	126(36.0%)
Married	97(61.0%)	127(66.5%)	224(64.0%)
Total	159	191	350

Pearson chi-square, P=0.287

4. DISCUSSION

HIV infected adults in malaria-endemic areas are at increased risk for malaria and HIV infection increases the incidence and severity of clinical malaria and the infection has been found to roughly double the risk of malaria parasitaemia in linical malaria (Patnaik et al., 2014). Cheesbrough, (2010) reported that P. falciparum assumes the leading role in the causation of malaria in West Africa. This is true in the study which showed that 159 (45.4%) of the 350 HIV infected individuals examined have detectable Plasmodium falciparum (96.9%) in their peripheral blood sample. This is lower than the report of Tatfeng et al., (2010) who recorded high prevalence rate of malaria (88.8%) in HIV infected individuals in Benin City, Nigeria. This may be due to fact that the study was carried out during dry season of January to March. The finding is slightly higher than that in Jos, Nigeria where prevalence rate of 64 (32.0%) was recorded (Goselle et al., 2007). The reason for the higher outcomehis study may be attributed to the large sample size and varying transmission pattern (Patnaik etal 2014).Dutta and Bhattacharyya (2008) indicated that malaria attack rate is high in younger age group. Table 1 shows the high prevalence rate (40.2%) in age group 21-30 years. This is in accordance with the report of Goselle et al., (2007) who recorded the high prevalence rate among the age group 21-30 years (17.5%). This result supports the existing knowledge that high prevalence is due to existence of natural immunity to infectious diseases including malaria (Oduola et al., 1992).

The prevalence of malaria parasite with respect to sex (Table 2) shows that females are at high risk of acquiring malaria with prevalence rate of 102 (64.2%). This is in agreement with Onyenekwe et al., (2011) who recorded prevalence rate of 101 (61.6%) in females but higher than that of Goselle et al., (2007) who recorded prevalence rate of 41(37.96%). The high rate of malaria infection in emales could be attributed to their staying out late during mosquito-biting hours carrying out domestic activities. The findings also agree with that of Warren and Mohamoud, (1990) who observed that females are at higher risk of malaria infection compared to their male counterparts.

The main epidemiological factor to malaria parasite especially Plasmodium falciparum infection in HIV/AIDS should be considered in relation to the endemic malaria condition under which HIV infected individuals are living. Evidence from tudies in different countries show that; Malaria and HIV are two of the most important infectious diseases, which affect millions of people across overlapping geographic distributions. Therefore, knowing of interaction between malaria and HIV are important for management or control of these diseases and further research activities in the area are highly required.

5. CONCLUSION

This study showed a high prevalence of malaria parasite among the HIV/AIDS patients attending HIV clinic in Sokoto state specialist hospital and Usmanu Danfodiyo University Teaching Hospital Sokoto, Nigeria. Our work emphasizes the eld studies on the interaction among parasitic infections and the risk of HIV infection and on the impact of control interventions. Thus, it would be important to obtain epidemics on individuals who are known to be dually infected with malaria and HIV. Reducing malaria transmission becomes even more important to address in the context of HIV. With the high numbers of cases of HIV and malaria, even small decreases in malaria prevalence could have an important impact on the relative risk of HIV infection in areas with high malaria prevalence. It is recommended that government should further intensify efforts at public enlightenment campaigns. Since roll back malaria initiatives places particular emphases on

prevention of malaria through the use of insecticides treated nets. Government should ensure that these are made available to Nigerians especially HIV infected individuals at highly affordable rates. Indiscreminate use of anti-malarial drugs should be discouraged through strict regulatory practice for pharmaceutical companies and their drug vendor.

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