



## **Ocular Diseases in HIV-positive Patients in a Tertiary Hospital in Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aims:** To determine the pattern of ocular disorders in HIV-positive patients in a tertiary hospital in Nigeria.

**Study Design:** A cross-sectional hospital based study on confirmed HIV positive adult patients attending the HIV clinic in University of Port Harcourt Teaching Hospital.

**Duration of Study:** November and December 2011.

**Methodology:** Consecutive patients within the inclusion criteria were recruited until the required sample size was met. The visual acuity was tested using the Snellen's chart and the illiterate E-chart. Ocular examination of the adnexial and anterior segments were done using a pen torch and a slit lamp biomicroscope. Fundoscopy was done using a direct and indirect ophthalmoscope as well as with a 90D lens. Other information such as CD4 count and HIV serotype were retrieved from the patient's case notes. The data was analysed using EPI-info version 7.0. Statistical methods such as the frequency and chi-square were used to test the significance of association. Level of significance was drawn at  $P < 0.05$ .

**Results:** A total of 411 patients were enrolled in this study. The age range was between 18-69 years with a mean age of 36.9 years. There was a female preponderance with a male to female ratio of 1:2. Ocular disorders were seen in 37.1% of patients studied. The commonest manifestation

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was the ocular adnexial manifestation and conjunctival microvasculopathy ranked highest (15.6%) in this group. Herpes zoster ophthalmicus was seen in 5 (1.2%) patients, presumed squamous cell carcinoma in 12(2.9%) and Kaposi sarcoma in 3(0.7%). Chorioretinitis was found in 12(2.9%), retinal microvasculopathy in 19(4.6%) and maculopathy in 15(3.6%). There was no case of CMV retinitis.

**Conclusion:** Ocular findings seen in HIV- positive patients were mostly adnexial and occurred in 37% of the study population.

*Keywords: Ocular findings; HIV-positive; tertiary hospital.*

## 1. INTRODUCTION

Human immunodeficiency virus (HIV) infection came into limelight in 1981 after a group of homosexual men presented with atypical lesions which pointed towards immunosuppression [1,2]. The disease caused by this virus was later named acquired immunodeficiency virus (AIDS) in 1982 [1]. The HIV virus was identified as the cause of AIDS in 1984 [1]. An estimated 37.9 million people worldwide are living with HIV/AIDS. Of these 36.2 million are adults and 1.7million are children (<15years old) [3]. The vast majority of people with HIV are in low and middle income countries [3]. In Nigeria, 1.5% of the populations are living with HIV (15 to 49 years) and an estimated 1.9 million people are living with HIV [4].

The ophthalmic manifestations of AIDS were first described by Holland et al. [5]; other studies have described a wide range of ocular manifestations in HIV/AIDS. Ophthalmic disease affects 70 - 80% of patients with HIV infection during the course of the infection [6,7,8]. Various studies have demonstrated that 40-45% of HIV infected patients have some or other ophthalmic manifestations when examined by an ophthalmologist [9,10]. The life time cumulative risk of at least one abnormal ocular lesion developing among HIV positive patients ranges from 52-100% [10]. At present, most patients with HIV/AIDS in developing countries losing vision have a limited life expectancy [6]. Patients attach great value to vision and this has an impact on the quality of life [11]. The psychosocial impact of HIV associated blindness is prominent. The blind faces a loss of self-esteem due to family neglect and this is compounded if the person is HIV positive due to the social ostracism associated with the disease [12].

As a result of the potentially devastating and rapid course of retinal opportunistic infection, all persons with HIV infection should undergo

routine baseline ophthalmologic evaluations. Various studies have shown that the ocular manifestations of HIV/AIDS vary around the world [13,14,15].

Cytomegalovirus (CMV) retinitis is the most frequent cause of blindness in the west although the incidence of this condition has decreased with the introduction of Highly Active Anti Retroviral Therapy (HAART) [16,17,18,19]. This condition is not as common in Africa probably because most patients die by the time their CD4 count drops to the level that will predispose them to the disease. A study in Uganda showed that uveitis was the commonest cause of visual impairment among their study population [20].

In Nigeria, ophthalmic manifestations of HIV/AIDS have ranged from Herpes Zoster ophthalmicus (HZO) which is the most common ocular adnexial Infection [21-26] to uveitis, chorioretinitis, corneal ulcers, ocular motor nerve palsy. Umeh et al therefore proposed that HZO be regarded as a possible indicator of HIV infection [25]. Disease severity and clinical improvement were worse in patients with HIV [25,26].

HAART was introduced in Nigeria in the early 1990's and is presently widely and is presently widely distributed in various centers in the country. The survival and quality of life of patients have improved with the free distribution of HAART The ocular complications of HIV/AIDS if detected early and treated will reduce the blinding consequence and therefore decrease the economic burden of the disease. A retrospective study has been done by Adio et al on Herpes Zoster ophthalmicus and HIV seropositivity in south-south Nigeria, [22] with the study setting at the University of Port Harcourt Teaching Hospital eye clinic and blinding complications found mainly in those seropositive for HIV. This present study aims to give a broader view of ocular complications of

HIV/AIDS, not limited to Herpes zoster ophthalmicus, so that with early detection, appropriate treatment can be instituted early to avoid blinding complications.

**2. MATERIALS AND METHOD**

This was a hospital based cross-sectional study carried out on patients attending the HIV/AIDS clinic in University of Port Harcourt Teaching Hospital (UPTH) between November and December 2011.

**Inclusion criteria**

- Confirmed HIV positive adult patients (18 years and above) by western blot technique whether on HAART or not.
- Patients who gave consent for study.

**Exclusion criteria**

- Unconfirmed HIV positive patients.
- Patients who did not give consent for study.

The sample size calculated for the study was 382 persons.

**2.1 Sampling Technique**

Consecutive patients on clinic days that met the criteria for study were recruited until the sample size was met. All persons who met the inclusion criteria had a comprehensive ocular examination comprising of Unaided and Aided Snellen visual acuity, Pin hole vision for Visual acuity <6/12, Color vision testing using Ishihara color vision chart, Ocular examination of adnexial and anterior segment using the slit lamp biomicroscope (Keeler), dilated slit lamp biomicroscopy of the posterior segment using +90Diopter Volk Lens and Tonometry (Perkins Hand held MK tonometer). Other relevant

information from patient's case notes (CD4, HIV serotype) were retrieved. Patients requiring further management were referred to the Ophthalmology department, UPTH.

Data generated was analyzed using EPI INFO v.7.0. The age, sex and occupation frequencies were determined. The frequency and pattern of ocular manifestations were also analyzed.

**3. RESULTS**

A total of 428 patients attending the HIV/AIDS clinic in UPTH between November and December 2011 were recruited for the study out of which 411 had complete information. The mean age was 36.9±9.2 years, 30-39 years had the highest frequency of patients with ocular manifestations of HIV/AIDS, and there was female preponderance with male: female ratio was 1:2.

Trading ranked the highest (25.3%) while the least frequent occupation was driving (1.9%). Most of the sample population were either traders (25.3%) or businessmen/women (20.9%). None was a commercial sex worker.

The married patients in the monogamous setting ranked highest (46%) in the study population, followed by those who were single (29.4%) and widows (17.8%).

Most of the patients had secondary education (49.6%), 25.7% had post secondary education with only 4.6% without any formal education.

A high proportion (95.5%) had good visual acuity. There was no patient blind in both eyes. Out of the 7 patients with unilateral blindness, 3 were not HIV related blindness. Of the 411 patients studied, 153 (37.1%) presented with ocular manifestation.

**Table 1. Age/sex distribution of the 411 sample population**

Age group in years	Males no (%)	Females no (%)	Total no (%)
<20	1(0.2)	0 (0%)	1 (0.2%)
20-29	5 (1.2%)	87 (21.2%)	92 (22.45)
30-39	47 (11.4%)	128 (31.1%)	175 (42.6%)
40-49	40 (9.7%)	50 (12.2%)	90 (21.9%)
50-59	28 (6.8%)	19 (4.6%)	47 (11.4%)
60-69	3 (0.7%)	3 (0.7%)	6 (1.5%)
<b>TOTAL</b>	<b>124 (30.2%)</b>	<b>287 (69.8%)</b>	<b>411 (100%)</b>

**Table 2. Occupation of the 411 sample population**

Occupation	Frequency (%)
Applicant	17 (4.1%)
Business man/woman	86 (20.9%)
Civil servant	40 (9.7%)
Driver	8 (1.9%)
Farmer	12 (2.9%)
Student	36 (8.8%)
Teacher	29 (4.9%)
Petty trader	104 (25.3%)
Unskilled labourer	17 (4.1%)
Artisan	59 (14.4%)
Others	12 (2.9%)
<b>Total</b>	<b>411 (100%)</b>

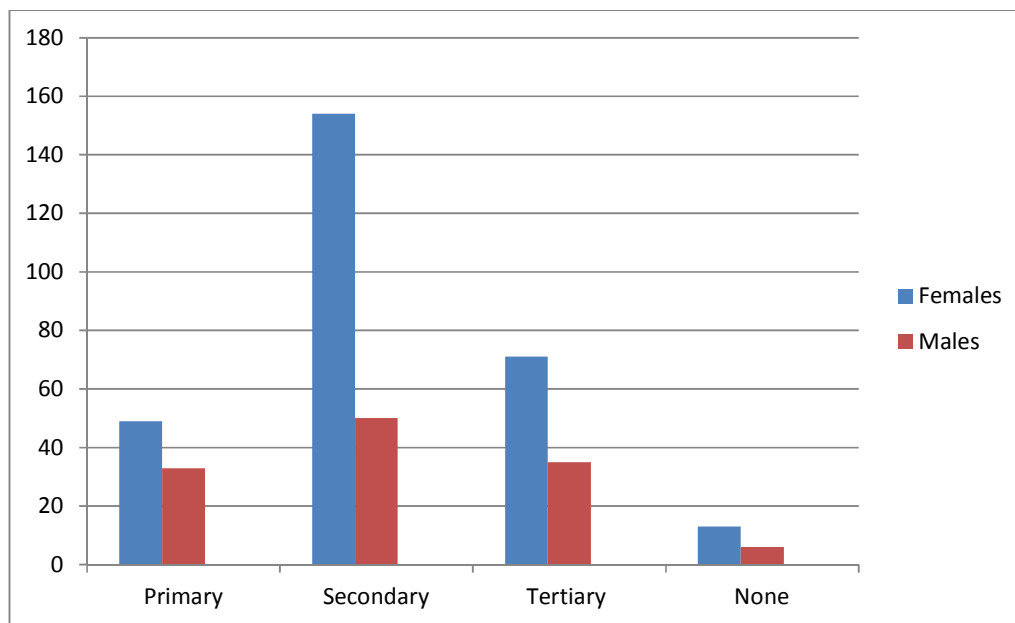
**Table 3. Distribution of marital status of the 411 sample population**

Marital status	Frequency (%)
Divorced	19 (4.6%)
Polygamous	7 (1.7%)
Monogamous	189 (46.0%)
Single	121 (29.4%)
Widow	73 (17.8%)
Widower	2 (0.5%)
<b>Total</b>	<b>411 (100%)</b>

**Table 4. Presenting visual acuity in both eyes of the 411 HIV/AIDS patient**

VA	Frequency (%)
6/6-6/18	785 (95.5%)
6/18-3/60	30 (3.6%)
3/60-NPL	7 (0.9%)
<b>TOTAL</b>	<b>822 (100%)</b>

Conjunctival microvasculopathy was the most frequent ocular disorder among the sample population accounting for 15.6%, retinal vessel occlusion was the least frequent (0.5%).

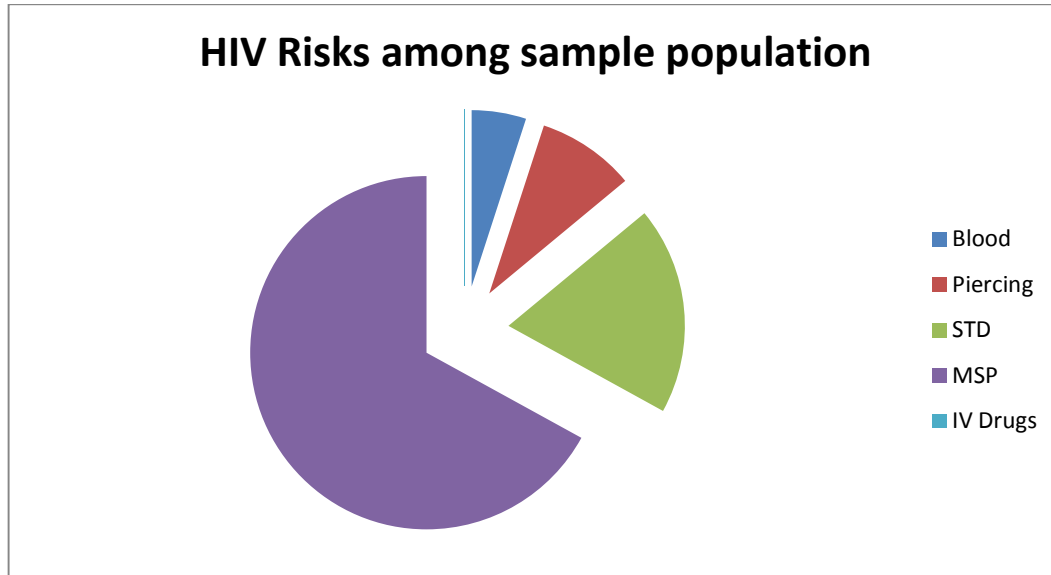


**Fig. 1. Distribution of educational status by sex of the 411 HIV/AIDS patient**  
*Chi square = 8.00 p value = 0.09154*

**Table 5. Analysis of ocular disorder in the 153 HIV positive patients**

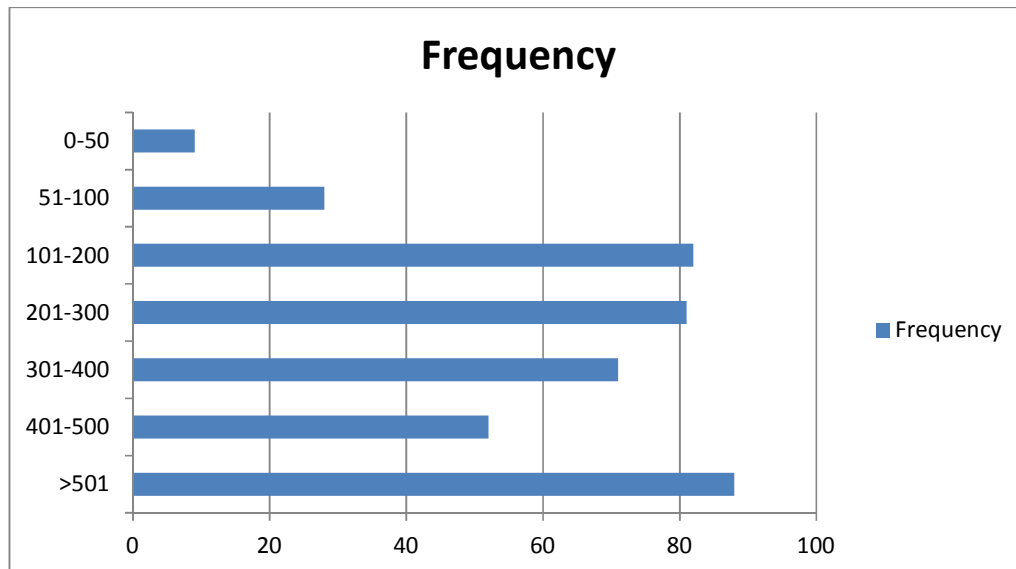
Ocular disorder	Frequency of ocular disorder (%)	Frequency in total sample size (%)
Conjunctival microvasculopathy	64 (41.8%)	15.6%
Molluscum contagiosum	9 (5.9%)	2.2%
Herpeszoster ophthalmicus	5 (3.3%)	1.2%
Kaposi sarcoma	3 (2.0%)	0.7%
Presumed squamous cell carcinoma	12 (7.8%)	2.9%
Infectious keratitis	3 (2.0%)	0.7%

Ocular disorder	Frequency of ocular disorder (%)	Frequency in total sample size (%)
Iridocyclitis	5 (3.3%)	1.2%
Chorioretinitis	12 (7.8%)	2.9%
Retinal microvasculopathy	19 (12.4%)	4.6%
Retinal vessel occlusion/ Ghost vessels	2 (1.3%)	0.5%
Maculopathy	15 (9.8%)	3.6%
Optic atrophy	4 (2.6%)	1.0%
TOTAL	153 (100%)	37.1%



**Fig. 2. HIV risks of the 411 sample population**

Legend: Blood (Blood and blood products) products, Piercing (Body piercing), STD (Sexually transmitted disease), MSP: Multiple sexual partners; IV drugs (Intravenous drug user)



**Fig. 3. CD4 count of the 411 HIV patients**

**Table 6. Ocular adnexal manifestation of the 411 HIV/AIDS patients versus CD4 count**

Ocular lesion	0-50	51-100	101-200	201-300	301-400	401-500	>500	Total
Conjunctival microvasculopathy	5 (1.2%)	5 (1.2%)	18 (4.2%)	13 (3.1%)	10 (3.1%)	4 (1.0%)	9 (2.1%)	64(15.6%)
Molluscum contagiosum	0(0%)	0(0%)	2(0.5%)	3(0.7%)	3(0.7%)	1(0.2%)	0(0-0%)	9(2.2%)
Herpes zoster ophthalmicus	0(0.0%)	0(0.0%)	1(0.2%)	2(0.5%)	0(0.0%)	0(0.0%)	1(0.2%)	5(1-2%)
Kaposi sarcoma	0(0.0%)	0(0.0%)	1(0.2%)	2(0.5%)	0(0.0%)	0(0.0%)	0(0.0%)	3(0.7%)
Presumed squamous cell carcinoma	1(0.2%)	3(0.7%)	2(0.5%)	2(0.5%)	4(1.0%)	0(0.0%)	0(0.0%)	12(2.9%)
Nil	3(0.7%)	20(4.9%)	58(14.1%)	59(14.3%)	53(12.9%)	47(11.4%)	78(19.0%)	318(77.4%)
Total	9(2.2%)	28(6.8%)	82(19.9%)	81(19.7%)	71(17.4%)	52(12.6%)	88(21.4%)	411(100%)

Chi square = 67.28

P value = 0.00000000

Most of the ocular adnexal manifestations occurred in patients with CD4 above 200 cells/mm<sup>3</sup>

#### 4. DISCUSSION

The age range in this study was between 18 – 69 years with a mean age of 36.9 years. There was a female preponderance. This was similarly reported by Omolase [26], Onakoya [27] and Entonu [28] in their study. The female preponderance may be due to the multiple risk factors in females which include biologic vulnerability, socioeconomic issues and inequality in relationships among others.

Majority of patients in this study were traders and most patients had secondary education same as the study by Omolase [26] Petty trading is quite common in Port Harcourt with people getting good patronage. There is a general awareness about the importance of education with majority of people tending to achieve at least post primary education.

Married patients in the monogamous setting made the highest frequency in the sample population with a significant number having multiple sexual partners. Omolase [26] also found a majority of married patients in his study. Reports have shown multiple sexual partners to be the main route of HIV infection. All the patients studied were heterosexual. HIV infection is spread almost exclusively by heterosexual transmission [3].

Ocular disorders were seen in 37.1% of patients in this study. A similar study in Nigeria by Onunkwor [29] reported 47% of cases with ocular manifestations. The difference observed may be due to variation in the sample size. In Ghana, Martin-Odoom [30] 57% showed various ocular manifestations with a mean age of 31-45 years. In Cameroon, Ebana et al. [31] reported a prevalence of 63.2% with female preponderance, mean age of 38.9±10.3 years while Ndoye et al. [32] reported 52.3% prevalence in Senegal. Most of our patients had good visual acuity (95.5%) similar to reports by Odeyemi [33] and Onunkwor [29]. There was no report of bilateral blindness. Three of the seven cases of unioocular blindness were not HIV related (two cases were secondary to trauma and the third was secondary to measles keratitis during childhood). Colour vision was abnormal in 4.4% of the patients. Ocular adnexal manifestation was the commonest presentation in this study with conjunctival microvasculopathy being highest in frequency. This was also reported by Odeyemi [33] in their study.

There were only 1.2% of cases with herpes zoster ophthalmicus reported in this study. This is also similar to that reported by Odeyemi [33]. A study conducted by Adio et al. [22] among other studies conducted in Nigeria showed herpes zoster ophthalmicus to be the commonest presentation among HIV/AIDS patient [21-27]. The difference in this study may be due to the study setting which is an HIV clinic as compared to patients presenting in the eye clinic. There were 71% cases with CD4 count >200 cells/mm<sup>3</sup> and 2.1% had CD4 count < 50 cells/mm<sup>3</sup>. The pattern of the CD4 count was similar to that reported by Onunkwor [29] and Odeyemi [33]. Over 70% of patients had had HAART for more than 1 year. Using the WHO criteria for Clinical Staging of HIV/AIDS, about 75% of patients studied had stage 1 disease while only 1% had stage 4 disease. This could be due to a reduction in morbidity and mortality among patients on HAART.

#### 5. LIMITATION OF THE STUDY

1. There was no indication of the HIV subtype in most patients laboratory result, thus it was not possible to determine the proportion of those with HIV 1 and 2.
2. This was a hospital based study and may not be generalizable to the general populace.

#### 6. CONCLUSION

This study revealed a prevalence of 37.1% ocular manifestation in the HIV-positive patients studied. Ocular adnexal manifestation was the commonest finding.

#### CONSENT

An informed consent was obtained and a structured interviewer administered questionnaire was used.

#### ETHICAL APPROVAL

Ethical approval was sought for and obtained from the Ethical committee of the institution.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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