

Soumendra SAHOO

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*Department of Ophthalmology, Melaka Manipal Medical College,  
Jalan Batu Hampar, 75150 Bukit Baru, Melaka, Malaysia*

## Abstract

**Background:** Although around 70% of HIV+ cases used to have ocular manifestations, the late reporting of cases often results in severe forms of ocular morbidity that would otherwise have been prevented. The objective of this study was to describe the ocular manifestations of HIV and AIDS-related patients who had been admitted to TM Jafferji Hospital, Dar-es-Salaam, Tanzania.

**Methods:** Proven cases of HIV were recruited in this study. Detailed slit lamp examination and fundoscopy using a +90D lens were carried out in all cases after thoroughly dilating the pupil with 1% Tropicamide eye drops.

**Results:** Around 90% of the recruited cases were in clinical stage III and IV HIV. The notable ocular manifestations included micro-vasculopathy of the retina in 25%, uveitis in 8%, CMV retinitis in 7%, neuro-ophthalmic manifestation in 6%, Herpes zoster ophthalmicus in 5%, Kaposi's sarcoma in 3% and conjunctival carcinoma in 2% of cases. Fifty-three percent of the cases had other anterior segment disorders like conjunctivitis, blepharitis and corneal ulcers.

**Conclusion:** Most of the cases recruited in our study were in the late stages of HIV. A significantly high number of cases (70%) had ocular manifestations. Around 53% had additional anterior segment disorders like conjunctivitis, blepharitis and corneal ulcers.

**Keywords:** AIDS, CMV retinitis, HIV, micro-vasculopathy, medical sciences

## Introduction

A World Health Organisation (WHO) report estimated that currently around 32 million people including around 2 million children have been infected with human immunodeficiency virus (HIV) worldwide (1,2). Of the total cases of HIV, 58% are thought to be sub-manifestations of HIV infection involving the anterior or posterior segment of the eye. Anterior segment findings include tumours of the peri-ocular tissues and a variety of external infections. Posterior segment changes include an HIV-associated retinopathy and a number of opportunistic infections of the retina and choroid. The increasing longevity of individuals with HIV disease may result in greater numbers of patients with opportunistic infections of the retina.

HIV and AIDS-related ocular manifestations may affect 45–75% of HIV+ individuals, although the types of manifestations seen in developing nations varies in comparison to those reported in developed countries (3,4,5,6). A study on HIV+ individuals in India reported around 45% having ocular manifestations (7,8). Most notably, while antibodies against cytomegalovirus (CMV) are detectable in 90% of people living with HIV and

AIDS (PLWHA), CMV retinitis is rare (less than 5%) in AIDS patients in developing countries (6,9). However, ocular manifestations affecting only one eye, like Herpes zoster ophthalmicus (HZO) and conjunctival squamous cell carcinoma, are relatively common in developing countries (10). Such variations in distribution are most likely because of the early and high mortality rate in PLWHA in developing countries and possibly differences in HIV subtype, race, and the influence of co-morbidity diseases. The earlier WHO clinical staging of HIV recommended in 1990 was modified in 2005. Clinical stage I represents mostly asymptomatic cases in which the CD4 T-cell count remains around 1000, and the common ocular manifestations noted in this stage are dry eyes and an inflamed conjunctiva. Clinical stage II constitutes early HIV manifestations in which the CD4 T-cell count is usually between 500 and 1000, and the common ocular features are allergic conjunctivitis, intermediate uveitis, retinal vasculitis, HIV retinopathy and optic neuropathy. Clinical stage III is known as the intermediate stage in which the CD4 T-cell count is usually between 200–500, and the common ocular manifestations noted are dry eyes, blepharitis, bacterial and follicular conjunctivitis, Kaposi's

sarcoma, molluscum contagiosum, HZO, herpes simplex, HIV retinopathy and Aspergillosis. Clinical stage IV represents the stage of AIDS in which the CD4 T-cell count stays below 200 and the ocular manifestations are due to on various opportunistic infections (11,12,13). The goal of the present study was to discover the types of ocular manifestations and their severity in HIV cases referred for ophthalmological examination.

The objective of this study is to describe the ocular manifestations of HIV and AIDS-related patients who had been admitted to TMJ Hospital, Dar-es-Salaam, Tanzania.

## Materials and Methods

This cross sectional study was performed in a specialty hospital of Tanzania called TMJ Hospital. TMJ Hospital in Dar-es-Salaam, Tanzania is a tertiary care hospital as well as a teaching hospital. It has an outpatient department that provides services in various disciplines. The hospital has a bed capacity of 100 and a Voluntary Counseling and Testing Clinic where both self-referred individuals and physician-referred patients are tested for HIV. Hospital policy requires all admitted cases of diagnosed HIV / AIDS to undergo ocular examination.

A total of 150 diagnosed cases of HIV that were referred to the Department of Ophthalmology from March 2005 to August 2005 were recruited for this study. For the laboratory diagnosis of HIV, serum samples were considered positive only if they were found to be repeatedly reactive by the rapid enzyme immunoassays (Serocard and Tridot screening tests). Diagnosis was then confirmed by the Enzyme-linked immunosorbent assay (ELISA). In a few equivocal cases, the western Blot test was carried out for further confirmation. A CD4 T-cell count was performed in all cases. The cases were staged as per WHO staging criteria.

All cases underwent a detailed anterior segment and posterior segment slit lamp and +90D lens examination. Fundoscopy was performed after thoroughly dilating the pupil with Tropicamide eye drop. Fundus photographs were taken for cases showing posterior segment changes. When indicated, conjunctival and lid masses were subjected to histo-pathological examination. Blindness was defined as a visual acuity (VA) less than counting fingers (CF) at three meters with the better eye. Data collection and analysis was performed using a standard format.

## Results

One hundred and fifty adult serology proven HIV/AIDS patients were enrolled in the study. The mean age was  $34 \pm 13$  years old, ranging from 18–82 years, and 69 of the patients were male. About 90% of the patients were in WHO stages III and IV, indicating that a very high proportion of the patients visiting the hospital were seriously sick and had marked immune suppression.

No patients in stage I were observed (Table 1). Enrolled patients ( $n=150$ ) had a median CD4 cell count of 190 cells/ $\mu$ L. The majority of cases in the present study had a CD4 cell count between 200–500 cells per microlitre of blood. Two cases (1.3%) had CD4 T-cell counts below 200 cells per microlitre of blood.

Ocular involvements were documented in 105 (70%) individuals. The ocular manifestations observed included retinal micro-vasculopathy in 26 (25%), neuro-ophthalmic disorders in 7 (6%), uveitis in 9 (8%), herpes zoster (HZO) in 6 (5%), CMV retinitis in 8 (7%) and conjunctival carcinoma in 3 (2%) cases. Kaposi's sarcoma in the eyelid was found in 4 (3%) of the cases. Around 56 (53%) of the cases presented other anterior segment manifestations like conjunctivitis, blepharitis and corneal ulcers (Table 2). Two patients had bilateral blindness due to CMV. Six patients had unilateral blindness. The most common cause of unilateral blindness was HZO in three patients, followed by toxoplasma-induced retino-choroiditis in two patients and anterior uveitis of unknown aetiology in one individual. Cotton wool spots were observed in 80% of the patients with micro-vasculopathy, and retinal haemorrhage and perivascular sheathing were also found in a few patients. The most common presentations of neuro-ophthalmic disorders were papilloedema, followed by optic atrophy and cranial nerve palsy (III & VII). Two of the patients with papilloedema had cryptococcal meningitis. Two patients had sub-conjunctival haemorrhage. The haemorrhage in one patient subsided spontaneously. The most common opportunistic disease was tuberculosis (40%).

**Table 1:** Percentage of cases in various stages of HIV infection.

WHO stage	No of patients (%)
I	0 (0%)
II	15 (10%)
III	90 (60%)
IV	45 (30%)

**Table 2:** Various ocular manifestations and the percentages of involvement.

Ocular findings	No of cases (%)
Micro-vasculopathy	26 (25%)
Uveitis	9 (8%)
Cytomegalovirus retinitis	8 (7%)
Neuro-ophthalmic manifestations	7 (6%)
Herpes zoster ophthalmicus	6 (5%)
Kaposi sarcoma lid	4 (3%)
Conjunctival carcinoma	3 (2%)
Sub-conjunctival haemorrhage	2 (1%)
Others (conjunctivitis, blepharitis, corneal ulcer)	56 (53%)

## Discussion

The present study indicates that most of the HIV/AIDS patients (90%) referred to the eye department were in late stages of the disease. About two thirds of the patients had ocular complications of HIV. Most of the cases with ocular manifestations had a CD4 T-cell count in the range of 200–500. These findings are similar to the frequency of ocular complications reported in a study carried out in Senegal, (14) but are higher than previous reports from Burundi and Malawi (Table 3). A recent report from one of the studies conducted in western India reported that around 45% of patients had ophthalmic manifestations (7). The fact that more than 90% of the patients were in the later stages of the disease might partially explain the higher occurrence of eye manifestations in this study.

In this study, the most common ocular manifestation observed was retinal micro-vasculopathy (25%). Previous cross-sectional studies from other African countries found micro-vasculopathy to be the most common manifestation, ranging between 10% and 42% (15). A report from India found micro-vasculopathy in 50% of the study subjects (16). On the other hand, prospective cohort studies from developed countries showed a high prevalence of micro-vasculopathy (70%–80%) (17). The most common types of retinal micro-vasculopathy were cotton wool spots, but their magnitude may be underestimated because they are typically transient and asymptomatic. Common presentations in neuro-ophthalmic parts were papilloedema followed by optic atrophy & cranial nerve (CN III & VI) palsy. This is in agreement with the rates reported elsewhere (3). Three of the

patients had uveitis due to toxoplasmosis, while the cause of the uveitis was not established in the remaining six patients. Kaposi's sarcoma of the eyelid was found in 3% of the patients, which may be slightly lower than the results of other studies. Sub-conjunctival haemorrhage was observed in two patients. In one of the patients, the haemorrhage was drug-induced (Fansidar) pancytopenia, and the problem gradually disappeared when the patient stopped taking the drug. The haemorrhage in the second patient might represent an early sign of conjunctival Kaposi's sarcoma. Blindness due to CMV retinitis was present in only 2% of patients, comparable to reports from other African countries (Table 3).

Other important observations in the present study were the other anterior segment ocular manifestations, including conjunctivitis, blepharitis and corneal ulcer. These observations were probably due to most of our recruited cases having opportunistic infections. A recent report from a study in India described only a few cases with problems involving the conjunctiva and eyelid (7,8). All of the recruited cases in this study were admitted cases in various inpatient departments of the hospital that had been referred for ophthalmological examination which explains the higher percentage of cases having eye manifestations as well as the severity of HIV infection in this study. Although the ocular manifestations found in this study are consistent with most of the documented eye manifestations found in the literature (11,12,13), a bigger sample size especially from a community-based study would have revealed a more accurate picture.

**Table 3:** Comparative analysis of ocular manifestations in the present study and two other studies conducted in other parts of Africa.

Eye Lesions	Present study	Burundi study by Cochereau et al. (5)	Malawi study by Gharai et al. (8).
Percentage of eye involvement	70%	19%	20%
Retinal micro-vasculopathy	25%	16%	17%
HZO	5%	1%	Not available
Anterior uveitis	8%	4%	2%
CMV Retinitis	7%	1%	1%
Neuro-ophthalmic manifestations	6%	Not available	Not available
Others (conjunctivitis, blepharitis, corneal ulcer)	53%	Not available	Not available

## Conclusion

Most of the cases recruited in our study were in the late stages of HIV, as defined by WHO clinical staging of HIV. A significantly higher number (70%) of cases had ocular manifestations. Our study reported a higher number of retinal manifestations in comparison to two studies performed in other African nations. Around 53% of the cases had non-specific manifestations like dry eyes, conjunctivitis, and blepharitis, compared to studies reported from India. Increased numbers of people living with HIV and AIDS have been a general threat to society. Furthermore, the visual disabilities add to the woes of the patients and the society as a whole. Therefore, routine eye examinations need to be done in all diagnosed cases of HIV to avoid visual morbidity; similarly, any suspicious ocular lesions need to be screened for HIV.

## Author's contributions

Conception and design, collection and assembly of data, data analysis and interpretation, drafting of the article, critical revision of the article: SS

## Correspondence

Dr Soumendra Sahoo  
MBBS, MS(Ophthalmology)  
Department of Ophthalmology  
Melaka Manipal Medical College  
Jalan Batu Hampar  
75150 Bukit Baru  
Melaka, Malaysia  
Tel: +606-292 5849 ext. 1041  
Fax: +606-281 7977  
E-mail: dr\_soumendra@yahoo.com

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