

Pattern of HIV, Hepatitis B and Hepatitis C Viral Infections among Pterygium Patients in Onitsha, Nigeria

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ABSTRACT

Background: Human immunodeficiency virus (HIV), Hepatitis B virus (HBV) and Hepatitis C virus (HCV) are avoidable diseases that have remained serious global health issues. This is because of serious morbidity and mortality that result from these diseases. **Objectives:** To determine the pattern of HIV, HBV and HCV infections among pterygium patients in Southeast Nigeria. **Materials and Method:** This was a retrospective cross sectional study of patients that underwent pterygium surgeries at City of Refuge specialist eye clinic Onitsha, Nigeria, between March 2021 and February 2022. Case files of patients were retrieved and relevant data like socio-demographics and HIV, HBV and HCV serostatus were collected. Data obtained were analyzed using the Statistical Package for Social Sciences (version 23.0; SPSS Inc., Chicago, IL). Statistical significance was set at $p < 0.05$. **Results:** Data collected from 227 participants who met inclusion criteria were analyzed. The mean age of the participants was 54.1 ± 13.63 years. The overall prevalence of HBV, HCV and HIV among pterygium patients was 0.44% (1/227, 95%CI=0.01-2.45), 1.76% (4/227, 95%CI=0.48-4.51) and 16.74% (38/227, 95%CI=11.85-22.98) respectively. The prevalence of HBV and HCV were not influenced by age or gender while the prevalence of HIV was influenced by age ($p=0.002$). **Conclusion:** The prevalence of HBV, HCV, and HIV are high among pterygium patients in south-east Nigeria. Professional support regarding universal precautions and the prevention approaches should be recommended among health care providers in ophthalmology practice.

Keywords: HBV, HCV, HIV, pattern, pterygium, viral infections.

INTRODUCTION

Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) and Hepatitis C Viruses are important public health problems [1-4]. While HIV caused about 680,000 deaths in 2020 globally, HBV and HCV caused 840,000 and 290,000 deaths respectively worldwide in 2020 with a very large proportion of these deaths occurring in low-and middle-income countries because of late diagnoses and high endemicity [5-7]. These viruses

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share similar modes of transmission and each of them is capable of causing not only acute but also chronic infections with apparently healthy asymptomatic individuals usually serving as means of transmission [3,4,8]. Health workers are reported to be at increased risk of contracting these infections usually due to accidental exposures in the course of management of infected patients [6]

HBV infections unlike HCV and HIV infections can be prevented through vaccinations but HBV vaccine coverage is still low in many nations even in countries with high prevalence of HBV [9,10]. Improved awareness, access to screening and treatment and also increased access to HBV vaccinations have led to decline in the prevalence of these viral infections in some countries [4,11].

Many studies have reported on the prevalence of HIV, HBV and HCV among patients with cataract. Tahir et al [12] noted prevalence of 2.6% and 6.2% respectively for HBV and HCV in Pakistan while Naeem et al [13] reported prevalence of 2.1% and 11.1% respectively. However, Onwuegbuna et al [14,15] observed a prevalence of 1.2% each for HBV and HCV among cataract patients in southeast Nigeria. Study by Okoye et al [16] indicated a prevalence of 3.7 % for HIV among cataract patients in Nigeria while another Nigerian hospital based study [17] reported HIV prevalence of 3.8% among cataract patients. But Alhassan and colleagues noted a prevalence of 0.2% and 1.5% for HIV and HBV respectively among cataract patients in Kaduna, Nigeria [18].

Pterygium is a common eye disease, more prevalent in the tropics especially among those aged 40 years and above. Pterygium may cause ocular discomfort, redness, tearing and decreased vision which may progress to blindness if the central cornea is covered [19,20]. Factors associated with pterygium development include dry weather, ultraviolet (UV) rays, environmental irritants, inflammatory, hereditary factors and outdoor work [21,22]. Viral agents such human papilloma (HPV), herpes simplex virus (HSV) and cytomegalovirus (CMV) have also been implicated as risk factors for pterygium development [22,23].

Pterygium is mainly treated surgically via bare scleral excision with application of antifibrotic agents, resection with autologous conjunctival graft and amniotic membrane grafts, but recurrence following pterygium excision is high [22-25]. Pterygium surgery is one of the commonest ocular surgeries performed in Nigeria [26]. Even though Nigeria has high burden of HIV, HBV and HCV, yet routine screening for these viruses are not commonly done as part of preoperative assessment for ocular surgical patients in Nigeria [3-4,14-15]. The implication of this is that asymptomatic carriers of these diseases may be sources of transmission of these deadly diseases to health workers and to other patients [6]. Moreover, HBV vaccine coverage in Nigeria is low [9].

Screening for these viral infections at every given opportunity remains a major method of identifying and treating carriers [4]. Hence routine screening of pterygium surgery patients in Nigeria may be helpful in this regard. But we are yet to know the prevalence of HIV, HBV and HCV in Nigeria among patients undergoing pterygium surgery. To the best of the authors' knowledge, this is the first study of these triple infections among pterygium patients in Nigeria. This study therefore is aimed at determining the prevalence of HIV, HBV and HCV among pterygium patients in Southeast Nigeria and also to determine the need or otherwise for routine screening of these viral infections among patients undergoing pterygium surgeries in Nigeria.

MATERIALS AND METHOD

Study design

A retrospective cross-sectional study.

Study population

Patients who underwent pterygium surgeries within the study period.

Study site

City of Refuge Specialist Eye Clinic, Onitsha, Anambra State, Nigeria. This is a private specialist eye hospital which also serves as referral eye center for patients from Anambra State, Delta State, Imo

and Enugu States. It is a major referral eye center for ophthalmic medical, surgical and diagnostic services.

Inclusion criteria

Pterygium patients who consented to HIV, HBV and HCV testing as part of their preoperative assessment.

Exclusion criteria:

Non-consenting patients and those without a diagnosis of pterygium.

Sample technique

Convenience sampling technique. All the available case files of eligible subjects within the study period were studied.

Study outcome Measures

Proportion of pterygium patients with HIV, HBV and HCV seropositive.

Procedures involved:

Case files of patients that underwent pterygium excision at City of Refuge specialist eye clinic Onitsha, Anambra State Nigeria and who met the inclusion criteria, between March 2021 and February 2022 were retrieved and relevant data like sociodemographics and HIV, HBV and HCV serostatus were retrieved. Data was analyzed using SPSS 23.0. HIV was tested using commercially available rapid test kits following the manufacturer's protocol and Nigerian national HIV test algorithm. The national HIV test algorithm involves three tests to confirm HIV sero-positivity. According to the algorithm, Alere Determine (Alere Medical Co. Ltd., Matsudo, Japan) was the first screening test and any positive samples in Alere Determine need re-confirming with second test Uni-Gold Recombigen® (Trinity Biotech, Ireland) to be positive. Samples giving discordant results in the two tests (Alere Determine and Uni-Gold Recombigen®) were retested using tiebreakers STAT-PAK (Chembio Diagnostic Systems, Inc., USA).

Patients who were positive on the third test were also considered positive. Strict national guidelines, manufacturer's direction, and standard operational procedures were followed for each test procedure to ensure quality.

HBV testing; Rapid chromatography immunoassay for qualitative detection of surface antigen for HBV was the screening technique used in the study. Results that were found positive on screening tests were confirmed by the Enzyme-Linked Immunosorbent Assay (ELISA) method.

HCV detection; Rapid chromatography immunoassay for qualitative detection of HCV antibodies was the screening technique used in the study. (version 23.0; SPSS Inc., Chicago, IL).

Ethical consideration

The approval for this study was obtained from the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital Ethics Committee. The confidentiality of the collected data and anonymity of the study participants were kept during analysis.

RESULTS

The results of the socio-demographic variables of the study participants is shown in Table 1. The mean age of the participants is 54.1 ± 13.63 years. The prevalence of HBV, HCV and HIV among the study participants are shown in Table 2, Table 3, and Table 4 respectively. The overall prevalence of HBV, HCV and HIV among pterygium patients was 0.44% (1/227, 95%CI=0.01-2.45), 1.76% (4/227, 95%CI=0.48-4.51) and 16.74% (38/227, 95%CI=11.85-22.98) respectively. Table 5 shows the relationship between socio-demographics and HBV. Table 6 and Table 7 show the relationship between socio-demographics and HBV and HIV respectively. The HIV was significantly affected by age of the participants.

Table 1: Socio demographics of the study participants

Socio-demographics	Frequency	Percentage
Age group n=216		
10-19 years	2	0.93
20-29 years	6	2.78
30-39 years	22	10.19
40-49 years	47	21.76
50-59 years	60	27.78
≥60 years	79	36.57
Mean±SD	54.1±13.63	
Gender n=227		
Female	132	58.15
Male	95	41.85
Occupation n=200		
Artisan	16	8.00
Civil Servant	19	9.50
Farmer	23	11.50
Trading	109	54.50
Unemployed	33	16.50

Table 2: The prevalence of HBV among the study participants.

Disease	Frequency	Percentage
HBV		
Positive	1	0.40
Negative	226	99.56
Total	227	100.0

Table 3: The prevalence of HCV among the study participants.

Disease	Frequency	Percentage
HCV		
Positive	4	1.76
Negative	223	98.24
Total	227	100.0

Table 4: The prevalence of HIV among the study participants.

Disease	Frequency	Percentage
RVS		
Positive	38	16.74
Negative	189	83.26
Total	227	100.0

Table 5: The relationship between socio-demographics and HBV

Socio-demographics	HBV		χ^2 value	p-value
	Positive	Negative		
Age group				
10-19 years	0	2 (0.93)	1.74	0.884
20-29 years	0	6 (2.79)		
30-39 years	0	22 (10.23)		
40-49 years	0	47 (21.86)		
50-59 years	0	60 (27.91)		
≥60 years	1 (100.0)	78 (36.28)		
Total	1 (100.0)	215 (100.0)		
Gender				
Female	1 (100.0)	131 (57.96)	0.72	0.999
Male	0	95 (42.04)		
Total	1 (100.0)	226 (100.00)		

Table 6: The relationship between socio-demographics and HCV

Socio-demographics	HCV		χ^2 value	p-value
	Positive	Negative		
Age group				
10-19 years	0	2 (0.94)	7.07	0.216
20-29 years	0	6 (2.83)		
30-39 years	0	22 (10.38)		
40-49 years	0	47 (22.17)		
50-59 years	0	60 (28.30)		
≥60 years	4 (100.0)	75 (35.38)		
Total	4 (100.0)	212 (100.00)		
Gender				
Female	2 (50.0)	130 (58.3)	0.11	0.999
Male	2 (50.0)	93 (41.7)		
Total	4 (100.0)	223 (100.0)		

Table 7: The relationship between socio-demographics and HIV

Socio-demographics	RVS		χ^2 value	p-value
	Positive	Negative		
Age group				
10-19 years	2 (5.71)	0	18.41	0.002*
20-29 years	1 (2.86)	5 (2.76)		
30-39 years	1 (2.86)	21 (11.60)		
40-49 years	3 (8.57)	44 (24.31)		
50-59 years	10 (28.57)	50 (27.62)		
≥60 years	18 (51.43)	61 (33.70)		
Total	35 (100.0)	181 (100.0)		
Gender				
Female	23 (60.53)	109 (57.67)	0.11	0.857
Male	15 (39.47)	80 (42.33)		
Total	38 (100.0)	189 (100.0)		

*; statistically significant, p-value <0.05

DISCUSSION

As far as we know, there was very little research on the triad of HIV, HBV and HCV infections among pterygium patients in the English literature. This study represents the first to evaluate simultaneously the prevalence of triple HIV, HBV and HCV among pterygium patients in Africa. This study was undertaken not only because Nigeria has a very large population and high endemicity of HIV, HBV and HCV but also because pterygium surgery is one of the commonest ocular surgeries performed in Nigeria.

The prevalence of HIV in this present study was 16.74%. This is much higher than the reported national prevalence of 3.2% [27]. Also the HIV prevalence of this study is higher than 3.7% reported by Okoye et al [16] and 3.8% noted by Onwuegbuna et al [17] among cataract patients in southeast Nigeria. HIV positive patients are known to develop ocular surface malignant lesions like squamous cell carcinoma, which in its early stages may resemble pterygium. In a study by Chui et al [28], pterygium was observed to co-exist with secondary premalignant lesions, and this may be responsible for the high prevalence of HIV reported in this work.

However, the HBV prevalence in the present study was 0.44%, a lower value than 1.2% and 1.5% reported among cataract patients in Nigeria [15, 18]. The HBV prevalence observed in this study is much less than 3.9% indicated by Ali et al [2] among ophthalmic patients in Pakistan but similar to 0.2% reported in Egypt by Dahab et al [29] among patients undergoing elective anterior segment surgeries. The low HBV prevalence observed in this study may be because the present study was hospital-based and there has been improved HBV vaccination coverage across Nigeria recently.

On the other hand, the prevalence of HCV in this index study was 1.76%, which is similar to 1.2% reported in a previous study [15], among cataract patients in Nigeria but lower than that reported by Dahab and colleagues [29] in Egypt, and Naem et al [13] in Pakistan, in both cases mostly cataract

patients were studied.

The study has indicated that blood borne viral infections among pterygium patients in Nigeria is a significant public health issue apart from the risk of transmission of these diseases among patients, health workers also stand the risk of being infected, which may further reduce the number of active health care workers in Nigeria. Presently there has been an exodus of Nigerian doctors and other health workers to the USA, UK and Saudi Arabia [30].

Therefore routine screening for the HIV, HBV and HCV before surgery will not only help in protecting patients and health workers from being infected but also is a very good effort towards a global target for the elimination of these diseases.

However, the findings of this study cannot be generalized because apart from being a hospital-based study, it is also retrospective, making it difficult to determine the level of exposure to these diseases among the study subjects. Again, only pterygium patients were evaluated.

Nonetheless, the high HIV prevalence observed indicates that many cases of clinically assumed pterygium may be secondary malignant lesions in their early stages, especially early squamous cell carcinoma mimicking pterygium. Single HIV screening will raise suspicions for these quadric malignant lesions in the early stages, which can be confirmed by histology.

This study addresses the topic of the common blood borne viral infections among pterygium patients which is often overlooked and not acknowledged, causing many health care providers and patients to be exposed to the infections during ophthalmic practice.

CONCLUSION

At the time of this study, there was no available study conducted simultaneously on the prevalence of these triple infections HIV, HBV and HCV among pterygium patients in Africa. This study was initiated to evaluate the prevalence of HIV, HBV and HCV among pterygium patients in Nigeria. Though routine viral screening for HIV, HBV and HCV are not performed before ocular surgeries in

Nigeria, the high prevalence of these avoidable diseases observed in this study brings to the front burner the need to create awareness among eye health workers for regular screening of these viral infections among ophthalmic surgical patients.

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Author contributions

AAO and AAI conceptualized and designed the study. GUE, CGC and CEA contributed to implementation of the project and revision of the manuscript. All authors were involved in the writing and revision of the manuscript. The authors read, approved the final manuscript and agree to be accountable for all aspects of the work.

Data availability

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

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Conflict of interest:

None declared.

Ethical approval:

The study was approved by the Institutional Ethics Committee.

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