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Research article

Rates of Hepatitis C Virus Infection Among Cataract Patients in a Specialist Health Facility in South-East Nigeria

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Abstract

Background: Hepatitis C Virus (HCV) infection remains a serious health issue globally. Adequate attention has not been given to this viral infection which causes grave morbidity and mortality. To the best of our knowledge, there is no prior study in Nigeria on HCV among cataract patients. HCV infections could be pronounced when the immunity is depleted, and this could happen in the presence of co-existing cataract.

Objective: To determine the prevalence of HCV among cataract surgery patients in South East, Nigeria.

Methods: A hospital-based retrospective cross-sectional study was conducted among 423 consecutively selected cataract surgery cases from

September 2020 to March 2021. A structured proforma was used to collect sociodemographic and associated factors data. Rapid chromatography immunoassay for qualitative detection HCV antibodies was the screening technique used in the study. Data were entered and analyzed using STATA version 16. Descriptive statistics were used to compute prevalence of HCV infection among cataract surgery patients. Pearson Chi-square or Fisher's exact test were used to compute possible association between associated factors and HCV infection. Variables with P< 0.05 were considered to be statistically significant.

Results: The mean age of the participants was 68.85±12.75 years with male female ratio of 1:1. Among 423 cataract surgery cases, prevalence of HCV infection was 1.18% (5/423). Prevalence of HCV among cataract patients was not affected by gender (p=0.626), age (p=0.815), location of settlements (p=0.822) and months of presentation (p=0.658).

Conclusion: Prevalence of HCV infection among cataract surgery patients was high and is not affected by socio-demographic variables. Therefore, proper detection and treatment of HCV infection among cataract surgery patients should be prioritized in centres providing ophthalmic surgery services.

Keywords: Cataract; Hepatitis C; Prevalence rate

1. Introduction

Hepatitis C Virus (HCV) can cause acute and chronic liver inflammation which may lead to cirrhosis or cancer [1]. The WHO reports that about 170 million people worldwide are infected with HCV [2]. This is about 3% of the global population. About 50% of infected people are chronic with high risk of developing liver cirrhosis and cancer [3,4]. In Nigeria, the National average of prevalence of HCV is 0.5%–4% [5]. HCV is transmitted through blood to blood contact with an infected person. There are various treatment options available for the treatment of HCV, however the discovery of direct antiviral agents has transformed the disease from an incurable to a potentially curable condition with sustained virological response of >90% even in patients with advanced liver disease [5]. In the United States, there are about 500,000 percutaneous blood exposures among hospital based health care workers and this places surgeons and other surgical team members at enormous risk [4,6]. Cataract is a preventable cause of blindness due to opacity of the natural human lens, and cataract surgery that is done to restore vision is the most commonly done surgical procedure worldwide [1,7]. Routine screening for HCV is not usually done for patients booked for cataract surgery in both private and public hospitals and therefore a lot of asymptomatic carriers who undergo cataract surgery pose a risk to health workers and other patients [1,2]. For the ophthalmologists and hospital staff, the procedures which place them at risk for exposure to HCV infection include: intravenous injections, handling of contaminated sharps or other contaminated waste, cleaning up spills of human blood or other body fluids, exposure to open wounds, minor eye trauma including lacerations and abrasions, minor procedures limited to removal of small masses from eyelids and ocular tissues, and use of laser such as argon [7]. HCV screening is not routinely done for patients with ocular diseases in Nigeria, including those that have cataract. This study is aimed at determining the prevalence of HCV infection among patients who underwent cataract surgery.

2. Methods

Study design

A cross-sectional retrospective study.

Study population

The study was conducted among patients that underwent cataract surgery at city of Refuge Specialist Eye Clinic, Onitsha, Nigeria.

Study site

City of Refuge Specialist Eye Clinic, Onitsha, Nigeria. City of Refuge specialist hospital is located in the commercial city of Onitsha in Anambra state Nigeria and attends to patients from all the states in the South-Eastern part of Nigeria and beyond. It is a major referral centre for medical and surgical treatment of eye diseases.

Inclusion criteria

All cataract patients who underwent cataract surgery between 1st September 2020 and March 31st 2021 at the City of Refuge Specialist Eye Clinic, Onitsha, Anambra state, Nigeria.

Exclusion criteria

Patients who underwent surgery other than cataracts were excluded.

Sample size determination

The sample size was calculated using a single populace proportion with the following assumptions: an expected prevalence of 50%, margin of error of 5%, at 95% confidence level. The calculated sample size was 423. However, a total of 423 cataract patients, who were between 20 and 90 years old and eligible for the study, were identified during and their case files retrieved. Relevant data was extracted.

Sample technique

Non-random sampling technique was employed.

Study outcome measures

The prevalence of HCV, as well as the gender and the age of affected cataract patients.

Procedures involved

A structured proforma was used to collect data on sociodemographic variables and associated factors to HCV infection. The proforma was filled by trained data collectors via the theatre records to identify patients that underwent only cataract surgeries during the study period. The patients' socio-demographic data, HCV sero status and indication for the cataract surgery were retrieved and analyzed.

Detection of Antibody for HCV

Rapid chromatography immunoassay for qualitative detection of HCV antibodies was the screening technique used in the study.

Data quality assurances

Training was given for data collectors prior to the actual data collection. The proforma was pretested to ensure applicability to the local context. Data supervision was conducted on a daily basis and the proforma were rechecked.

Data processing and statistical analysis

All collected data were entered and cleaned by Excel spreadsheet. The cleaned data were exported to the STATA version 16.0 statistical software for analysis. Continuous variables were presented using mean, median and standard deviation, while categorical variables were described by frequency and proportion;

and presented using tables and figures. Descriptive statistics were used to compute prevalence of HCV infection among cataract surgery patients. Pearson Chi-square or Fisher's exact test were used to compute possible association between associated factors and HCV infection. Variables with $P<$ 0.05 were considered to be statistically significant.

Ethical consideration

Generally, our study followed the Declaration of Helsinki8. Ethical clearance was obtained from the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital Ethics Committee (Reference No. COOUTHWU/CMAC/ETH.C/VOL.1/FN:04/0091 and date of ethical approval obtained. 29/04/2021). All aspects of the study were conducted according to Good Clinical Practice and Good Laboratory Practice guidelines. Confidentiality of the study participants' information was securely stored and identified by study number.

3. Results

A total of 423 cataract patients were included. The mean age of the participants was 68.85±12.75years with male female ratio of 1:1. This is shown in Table 1. The majority of the participants were urban residents 223/369 (60.43%). The overall prevalence of HCV infections among cataract surgery patients was 1.18%. This is shown in Table 2. Table 3 shows the prevalence of HCV according to gender while Table 4 shows the prevalence of HCV according to age categories. The prevalence of HCV distribution among rural, urban and semi-urban settlements is shown in Table 5.

Table 6 shows the prevalence of HCV across different months of the year. Prevalence of HCV among cataract patients was not affected by gender (p=0.626), age (p=0.815), location of settlements (p=0.822) and months of presentation (p=0.658). Figure 1 shows the line graph showing the distribution of HCV across different months of the year.

Age (years)	**Total freq (%)** *(n=391)*	**Gender (%)**	
		Female *(n=200)*	**Male** *(n=191)*
15-29 years	9 (2.30)	2 (1.0)	7 (3.7)
30-44 years	20 (5.10)	13 (6.5)	7 (3.7)
45-59 years	85 (21.68)	47 (23.5)	38 (19.9)
60-74 years	210 (53.71)	102 (51.0)	108 (56.5)
75-89 years	62 (15.82)	32 (16.0)	30 (15.7)
> 90 years	5 (1.28)	4 (2.0)	1 (0.5)
Mean Age (±STD)	**63.85±12.75**	**63.66±12.28**	**64.05±13.29**

$\chi 2$-value= 7.363, df=5, p-value= 0.195

Table 1: Distribution of age and gender among the study participants

Hepatitis C	**Frequency**	**Prevalence (%)**
No disease	418	98.82
Positive	5	1.18
Total	**423**	**100**

Table 2: Prevalence of Hepatitis C virus among the study participants

Viral disease	Total freq (%)	Gender (%)	
		Female	Male
HCV			
Positive	4 (0.9)	3 (1.4)	1 (0.5)
No disease	418 (99.1)	220 (98.6)	198 (99.5)
Fischer's exact (p)	0.795 (0.626)		

Table 3: Prevalence of HCV distribution in males and females

Viral disease	Total freq (%)	Age category (years) (%)					
		15-29	30-44	45-59	60-74	75-89	> 90
HCV							
Positive	5 (1.3)	0	0	0	4 (1.9)	1 (1.6)	0
No disease	387 (98.7)	9 (100)	20 (100)	85 (100)	207 (98.1)	61 (98.4)	5 (100)
χ^2*-value (p)*	2.238 (0.815)						

Table 4: Prevalence of HCV distribution in among different age categories

Viral disease	Total freq (%)	Location (%)		
		Rural	Semi-urban	Urban
HCV				
Positive	2 (0.5)	1 (0.8)	0	1 (0.5)
No disease	367 (99.5)	117 (99.2)	28 (100)	222 (99.5)
χ^2*-value (p)*	0.393 (0.822)			

Table 5: Prevalence of HCV distribution among rural, urban and semi-urban settlements

Viral disease	Total freq (%)	HCV (%)	
		Positive *(n=5)*	**No disease** *(n=418)*
December	59 (13.9)	1 (20.0)	58 (13.9)
February	68 (16.1)	2 (40.0)	66 (15.8)
January	61 (14.4)	0	61 (14.6)
March	68 (16.1)	1 (20.0)	67 (16.0)
November	59 (13.9)	1 (20.0)	58 (13.9)
October	53 (12.5)	0	53 (12.7)
September	55 (13.0)	0	55 (13.2)
Total	**423 (100)**	**5 (100)**	**418 (100)**

χ2-value= 4.137, df=6, p-value= 0.658

Table 6: Prevalence of HCV across different months of the year (September-March)

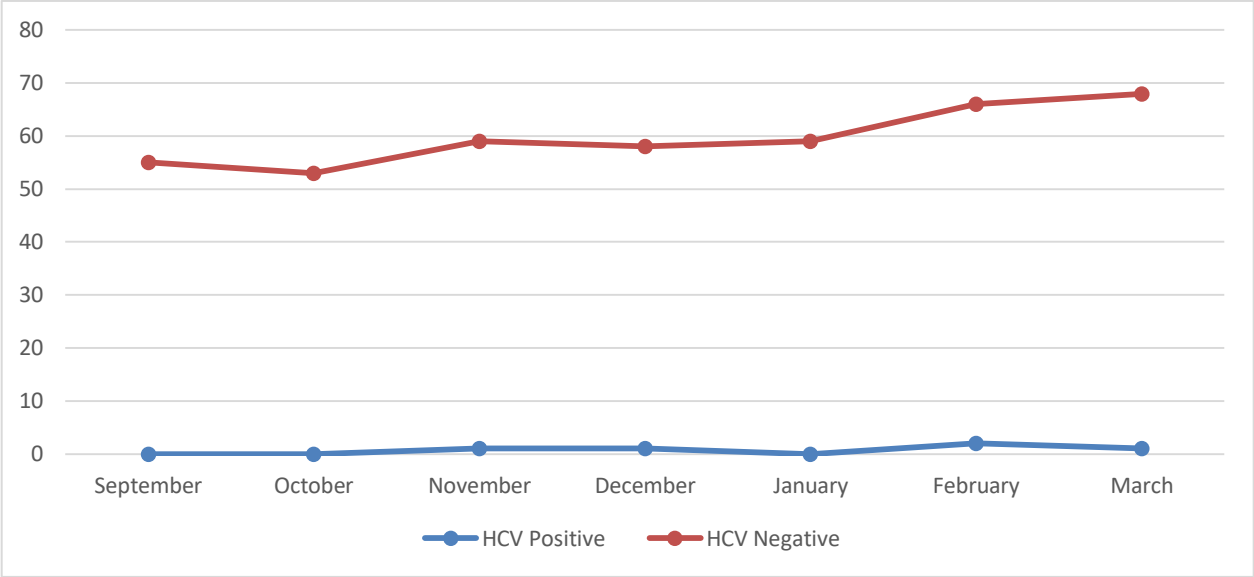

Figure 1: Line graph showing the distribution of HCV across different months of the year (September-March)

4. Discussion

Although cataract is also a manifestation of oxidative stress and has long-term effects in causing visual impairment if not treated, the association between cataract risk and HCV infection has seldom been investigated in detail. To the best of our knowledge, there is no prior study in Nigeria on HCV among cataract patients. HCV infections could be pronounced when the immunity is depleted, even in patients with co-existing cataract. In this present study, the overall prevalence rate of HCV infection among cataract surgery patients was 1.18%. This result is higher than the earlier reports in India that reported a prevalence of 0.53%9. The current result is also comparable with a recent national HCV prevalence among pregnant women in Nigeria by Eleje et al that reported an HCV prevalence of 1.3% [10]. However, the prevalence of HCV infections among cataract surgery patients in the present study is lower than the previous reports by Rewri et al. and Tahir et al. that reported a HCV prevalence of 4.9% and 6.17% respectively among cataract patients. Our finding is also lower than HCV prevalence study in Gabon that reported 11.8% for prevalence of HCV among participants undergoing cataract surgery [12]. The prevalence differences might be due to the population differences, geographic differences, sensitivity of diagnostic techniques, study participants' immunity status, hygiene practice, socioeconomic differences, change in living conditions and awareness of HCV of the study participants. Cataracts are a leading cause of vision loss worldwide and are associated with decreased quality of life. A group of researchers based in Taiwan at the Graduate Institute of Clinical Medical Science examined the possible link between HCV infection and cataracts [13]. According to the authors of the study, HCV infection induces oxidative stress on the host's system, and since the development of cataracts has been shown to be caused by oxidative stress, this establishes a potential link between HCV and cataracts. The clinical implication for this study was that previous study has revealed that patients with HCV were 1.36 times more

likely than non-HCV patients to develop cataracts. Women were also found to be at higher risk of developing cataracts than men. In addition, HCV patients aged 50 to 64 were 9.23 times more likely to develop cataracts than patients under 49 years of age. This prior published report was in line with our findings because the mean age of our study participants was 68.85±12.75 years and a male female ratio was 1:1. Although the Lin et al. study detected a positive correlation between HCV infection and the development of cataracts, the authors noted that cataracts were easily curable by surgery. The authors recommended implementing more rigorous screening for risk of developing cataracts in HCV patients. The limitation of the study included that the study participants were drawn from a single hospital and so the findings may not be generalizable. Despite this limitation, to the best of our knowledge, this study is the first of its kind in Nigeria.

5. Conclusion

The prevalence of HCV infection among cataract surgery patients was high and is not by socio-demographic variables. Therefore, proper detection and treatment of HCV infection among cataract surgery cases should be prioritized in ophthalmology centers.

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Disclosure statement for publication

All authors have made substantial contributions to: conception and design of the study, or acquisition of data, or analysis and interpretation of data; drafting the article or revising it critically for important intellectual content; and final approval of the version submitted. This manuscript has not been submitted for publication in another journal.

Ethics approval and consent to participate

Ethical approval was obtained from Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Amaku, Awka, Nigeria, with registration number: COOUTH/CMAC/ETH.C/vol.1/FN: 04/009 (approval date: April 29, 2021).

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

Data availability

The data used to support the findings of this study are available from the site publicly.

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Authors' contributions

AA Onwuegbuna, EA Chianakwalam, and GU Eleje were involved in the overall conceptual design and implementation of the project, and overall revision of the manuscript. MC Amobi, AI Apakama, CM Okosa, and CG Chigbo were involved in the writing of this manuscript and overall revision. The authors read, approved the final manuscript and agreed to be accountable for all aspects of the work.

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