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Original Research Article

A Prospective Observational Assessment of the Prevalence of Human Immunodeficiency Virus (HIV), Hepatitis B (HBV), and Hepatitis C (HCV) Viral Seropositive among the Patients Posted for Cataract Surgery at a Tertiary Care Hospital

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Abstract

Background: Treatment of cataract is the most popular surgery around the world. However, there is a safety issue regarding such surgical interventions in areas of high endemicity for HIV infections, viral hepatitis B (HBV) and C (HCV). In India, most of the patients undergoing cataract surgery were not routinely tested for viral seropositivity. Occult carriers of viral infections were prone to infecting others and were deprived of proper treatment.

Aim: The present study was done to find out the prevalence of human immunodeficiency virus (HIV), hepatitis B (HBV), and hepatitis C (HCV) viral seropositive among the patients posted for cataract surgery at a tertiary care center in Bihar India.

Methodology: A cross-sectional hospital-based study was done among 800 cataract patients in the Department of Ophthalmology, B.M.I.M.S., Pawapuri, Nalanda, Bihar, India over of 1 year (November 2021 to October 2022). All the patients planned for elective cataract surgery were tested for HBsAg, HCV, and HIV.

Result: Out of the total 800 cataract patients who were operated, 720 were adults, 480 were male, 60% were educated up to high school, 70% were employed, 60% were hindu by religion, 70% were staying in rural area and 60% were belonging to lower socio-economic status category. Among the 720 adult patients, the prevalence of HIV, HBV and HCV was found to be 0.69% (50), 2.08% (150) and 0.14% (10) respectively. There was a significant association with the mean age in the patients with HIV (P < 0.001) and HBsAg seropositive (P < 0.001). There was a significant association between HIV and male gender (P = 0.028). There was no association between gender and HBsAg and HCV positivity.

Conclusion: Viral seropositivity was significant among the patients posted for cataract surgery. The eye care providers could refer these patients for counseling and further management for the patient's and their caretaker's benefit.

Keywords: Cataract, HBsAg, HCV, HIV, Viral Seropositivity.

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Introduction

Hepatitis is described as an infection with swelling and inflammation of the liver that if progresses, may lead to cirrhosis or cancer. Sometimes people contract hepatitis with limited or no symptoms but often it leads to jaundice, anorexia (poor appetite) and diarrhea. Hepatitis is caused by a wide variety of causatives like alcohol, poison and autoimmunity but most cases of hepatitis are reported by viruses. [1] Hepatitis B (HBV) and Hepatitis C (HCV) are one of the viral types of Hepatitis that lead to irritation, inflammation and swelling of the liver capable of causing acute and chronic form of hepatitis. [2] Worldwide 2 billion people have been infected with HBV and 350 million (5-15% of the total cases) are carriers of the virus. [3]

According to WHO estimates, HCV prevalence is 3% of world population with 170 million cases. Almost 50% of all cases become chronic carriers at risk of liver cirrhosis and liver cancer [4]. HBV can be contracted through the blood, semen, vaginal fluids, and other body fluids of an infected individual having hepatitis B infection. [2] HCV however, can only be contracted through blood-to-blood contact. [5] The transmission risk of these diseases is more among patients receiving blood transfusions or injection drug users. [6] Unfortunately, once inflicted, these infections show poor response to the available treatment modalities.

Therefore, precautionary methods are considered the best way to avoid spreading of this disease. Unlike HCV, several vaccines have been developed for HBV that provide long lasting immunity to individuals. [7] It is the most important precautionary measure of HBV as a vaccinated individual may never contract Both infections. the infection. [8] especially the risk of HCV, can be further avoided by use of disposable syringes, screened blood transfusion, avoidance of sexual abuse, antiseptic shaving and use of proper antiseptic measures in hospitals, clinics and operation theaters. [6]

According to WHO, cataract is the leading cause of blindness worldwide with more than 18 million cases. [9] Treatment of cataract is the most popular surgery around the world. [10] In order to reduce prevalence of cataract-related blindness and meet Vision 2020 objectives, many African countries are increasingly using humanitarian surgical missions. This practice provides eye care to a large number of low-resource populations. However, there is a safety issue regarding such surgical interventions in areas of high endemicity for HIV infections, viral hepatitis B (HBV) and C (HCV). On a global scale, the number of people infected by HBV in 2015 was estimated at 257 million and 71 million for HCV. [11] In India, most of the patients undergoing cataract surgery were not routinely tested for viral seropositivity. Occult carriers of viral infections were prone to infecting others and were deprived of proper treatment. [12,13] There were a few studies demonstrating the positive virus serology among patients posted for cataract surgery from India. [14]

The present study was done with the aim to find out the prevalence of human immunodeficiency virus (HIV), hepatitis B (HBV), and hepatitis C (HCV) viral seropositive among the patients posted for cataract surgery at a tertiary care center in Bihar India.

Methods

It was a cross-sectional hospital-based study done among 800 cataract patients operated in the Department of Ophthalmology, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India over the period of 1 year (November 2021 to October 2022). All the patients planned for elective cataract surgery were tested for HBsAg, HCV, and HIV. Congenital and developmental cataracts (involving the pediatric age group) were excluded from the study.

The protocol was approved by the Institutional Ethical Committee and strictly adhered to the Declaration of Helsinki. Preoperatively, all cataract patients underwent comprehensive ocular examination and laboratory investigations. All the patients were requested to sign informed for consent serological evaluation for HBV, HCV, and HIV by rapid diagnostic antibody test kit as recommended by the National AIDS Control Organization (NACO). The patients who were illiterate had the consent readout along with a caregiver and their thumb impressions were obtained. Other laboratory investigations included complete blood count/hemogram and random blood sugar. The HIV was again tested with the Enzyme Linked Immuno-Sorbent Assay (ELISA) test kit. The HIV was considered positive only when both the tests were reported positive in accordance with the NACO guidelines.¹⁵ All blood parameters were investigated in

a National Accreditation Board for Hospitals (NABH) certified laboratory.

Post-test counseling was given to the seropositive cases and they were referred to the antiretroviral therapy (ART) center for registration and baseline investigations. The information recorded was kept confidential. Patients' demographic details gender, education. like age. and occupation were collected. The patients were asked if they had been tested for viral markers earlier, whether they were aware if they had seropositivity. Those who were detected positive were questioned on the previous health care visits, history of blood transfusion, intravenous drug use, and sexual preferences and partners.

The details were recorded on proforma and data were analyzed by using the SPSS (Statistical Package for Social Science) version 25:0. Qualitative data variables were expressed by using frequency and percentage (%). Quantitative data variables were expressed by using mean, SD, etc. The Chi-square test was used to find the association between HBV, HCV, and HIV with age group (years) and gender. The P value <0.05 was considered significant.

Results

Variables		Frequency	Percentage	
Age (in years)	≤ 18	80	10	
	19-40	320	40	
	41-60	240	30	
	≥ 61	160	20	
Gender	Male	480	60	
	Female	320	40	
Education	Illiterate	240	30	
	Up to High school	480	60	
	Graduate	80	10	
Occupation	Employed	560	70	
	Unemployed	240	30	
Religion	Hindu	480	60	
	Others	320	40	
Place of stay	Rural	560	70	
	Urban	240	30	
Socio-Economic Status	Upper	80	10	

Table 1: Distribution of study subjects according to their demographic details (n=800)

Middle	240	30
Lower	480	60

Out of the total 800 cataract patients who were operated, 720 were adults, 480 were male, 60% were educated up to high school, 70% were employed, 60% were hindu by religion, 70% were staying in rural area and 60% were belonging to lower socio-economic status category.

Table 2: Prevalence of HIV, HBV and HCV among the study subjects (n=720)

Viral Markers	Total	Positive	Percentage
HIV	720	50	0.69 %
HBV	720	150	2.08 %
HCV	720	10	0.14 %
*	11		

*multiple reponses

A total of 200 (2.7%) patients were found to be positive for at-least one viral marker. Among the 7200 adult patients, the prevalence of HIV, HBV and HCV was found to be 0.69% (50), 2.08% (150) and 0.14% (10) respectively. Among the seropositive patients, a majority of them were found to be illiterate (45%) followed by educated up to the high school level (30%), and graduate (25%). One of the patients who had completed his graduation and was discovered seropositive for HBsAg was a para-medical professional who worked in the intensive care unit.

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Table 3: Associatio	n of Seropositive	e patients with	age and gender (n=20	0)

Age	Negative	Positive	Total	Р	Gender	Negative	Positive	Total	Р
group									
	A. HIV								
≤40	9 (30%)	21 (70%)	30	χ2 =	Male	84 (70%)	36(30%)	120	χ2 =
41-60	77 (70%)	33(30%)	110	51.51	Female	64 (80%)	16(20%)	80	4.80
>60	57 (95%)	3 (5%)	60	p=<0.001					p= 0.028
Total	150	50	200		Total	148	52	200	
	B. HBsAg								
≤40	9 (30%)	21(70%)	30	χ2 =	Male	30 (25%)	90(75%)	120	χ2
41-60	33 (30%)	77(70%)	110	46.72	Female	20 (25%)	60(75%)	80	=0.130
>60	8 (13.3%)	52(86.7%)	60	p=<0.001					p=0.717
Total	50	150	200		Total	50	150	200	
С. НСУ									
≤40	30(100%)	0	30	$\chi 2 = 3.50$	Male	110(95.65%)	5(4.35%)	115	χ2=1.08
41-60	102(92.72%)	8(7.28%)	110	p=0.175	Female	80(94.11%)	5(5.89%)	85	p=0.299
>60	58(96.66%)	2(3.34%)	60						
Total	190	10	200		Total	190	10	200	

There was a significant association with the mean age in the patients with HIV (P < 0.001) and HBsAg seropositive (P < 0.001). There was a significant association between HIV and male gender (P = 0.028). There was no association between gender and HBsAg and HCV positivity.

Table 4: Details of viral exposure among seropositive patients (n=200)

Variables	Yes	No
Previous Healthcare visits	80	40
History of Blood Transfusion	60	30
History of Intra-venous drug usage	60	30

40% were having previous health visits followed by History of Blood Transfusion and History of Intra-venous drug usage with 30% each.

Discussion

Cataract surgery is the most frequently performed surgery all over the world. Last year, more than 5.9 million cataract extractions were done in India.16 Peribulbar anesthesia was the common mode of anesthesia for cataract surgery and entailed the use of a sharp 24-gauge needle to administer it. [14,17] The incidence of needle-prick injury in ophthalmological practice was reported as 0.06–0.08 per 1,000 surgeries in our country. [18]

Global burden of disease HIV collaborators have stated that the achievement of the new ambitious goals enshrined Sustainable for HIV in Development Goal 3 and the 90-90-90 UNAIDS targets will be challenging. It would need continued efforts from governments, international agencies, and all health care providers in the next 15 years to end AIDS by 2030.[19] In 2017, UNAIDS published a progress report indicating that the global community had reached 70-77-82 of the individuals in each category. [19]

Ophthalmologists can help achieve the 90-90-90 UNAIDS target, which is a WHO goal, by helping in the first 90, and then, help guide them toward achieving the second one. They can help in identifying the seropositive patients, who can then be counseled and referred for further treatment. Their close contacts can be counseled after the patient's consent and also tested for seropositivity. In Gujarat, of 3,884 married people living with HIV, 1,279 (33%) did not have their partners tested for HIV. Factors including index cases being male, illiterate, aged >25 years, belonging to key populations, substance use, and being in advanced

clinical stages were more likely to be associated with partner non-testing. [20] In Gujarat, non-disclosure of HIV status (due to fear of marital discord) and lack of awareness and risk perception were the key barriers to testing.

The process of taking consent for viral seropositivity and the post-test counseling would go a long way to increase the awareness of the diseases, not just among the patients, but even health care providers and caregivers. Nearly half of the HIV of these seropositive cases were unaware of the infection and its source. Through this study, we also tried to highlight the possible source of infection, but our results were based only on the history obtained from the patients. Maddali MV et al. [21] have stated that India can halve the epidemiological burden of HIV over 15 years with the achievement of the UNAIDS 90-90-90 targets. The eye care providers can play a small but not insignificant part in this.

Eye doctors can link patients to HBV and HCV programs. They can help increase awareness, guide patients to appropriate treatment, and help prevent complications. They can help health providers to look for the cause of the infection, and thus, ways to prevent its further spread.23 HBV vaccination is available. Ophthalmologists and other health care providers should be encouraged to take the HBsAg vaccine. Those who were HIV seropositive can be referred to the local ART centers and counseled about the precautions and care to be taken to prevent further spread of the infection and development of complications. They should be advised about the importance of compliance to ART which is free in India. In our study, the overall prevalence of HIV was 0.6% and of HBsAg was 1.88% among the patients presenting for cataract surgery. The average estimated prevalence of HBV, HCV, and HIV in the general population in India is 3-4, 0.094-15, and 0.3%,

respectively, although regional variations were seen. [22,23]

The prevalence of viral infection was found to be higher in the age group between 50 and 60 years in our study. This may be because people in that decade of life present commonly for cataract surgery. Ahmad et al. and Naeem et al. both from Karachi, Pakistan, reported the highest number of seropositive cases in the age group 50-85 years and 55-64 years, respectively. [24,25] In our study, the males were more affected than the females for seropositivity, even after accounting for a slight preponderance of males among all hospital-operated cataracts. This could be due to more social mobility in the males, and thus, greater vulnerability to get infected. [26,27] Similarly, in a study by Arif et al. [28] done in Aligarh, Uttar Pradesh (the same state as this study), a greater number of male patients were found to be seropositive in comparison to the female patients. According to Verma et al. [29] the history of injection from a local practitioner and history of dental extraction were two common risk factors for the HCV infection. Approximately 70% of the health care providers in rural India received no formal training for practicing medicine. [30] A majority of our patients were from rural backgrounds and illiterate, so any of the above reasons may be responsible for their infection. In India, there were numerous cataract surgeries performed in the eye camps in the winter season in this state and there is a mindset that cataract surgery is a one-day admission surgery. Viral seropositivity is not always checked in many situations. [31]

Limitation of Study

The limitation of our study was that it was a single-center study. It included patients from the local geographical area, therefore, seroprevalence and its pattern may vary in different regions. A large multicenter study would be needed to know the distribution of the types of seropositive cases in different regions. We did not include surgeries other than cataracts. There may be a chance that patients did not disclose their knowledge about viral seropositivity because of social stigma or fear of denial of care. The lack of detailed data on the mode of transmission was another limitation of the study.

Conclusion

Since both incidentally detected and total seropositivity were significant in our study. we recommend mandatory screening of viral markers before cataract surgery. This could also help in the early detection and treatment of patients living with viral load. It would help protect them, their contacts, and health care providers. Viral infections can no longer be neglected in ophthalmic care as the tear film and aqueous have the viral load. The pandemic would make it easier to convince the patients, their caregivers, and the health care providers about the importance of viral seropositivity and the benefits accrued from testing.

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