

Prevalence of incidental and total human immunodeficiency virus, hepatitis B and hepatitis C seropositivity among patients posted for cataract surgery at a tertiary care center in India

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Purpose: To study 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 north India. **Methods:** It was a cross-sectional study done for 30 months duration. All the patients posted for cataract surgery underwent comprehensive ophthalmic evaluation followed by routine hematological workup, including viral markers for HIV, Hepatitis B surface antigen (HBsAg), and anti-HCV. Data were analyzed by the Statistical Package for Social Science (SPSS Version 20). **Results:** A total of 7,316 individuals underwent cataract surgery from Jan 2016 to August 2018, 4,073/7,316 (55.7%) were males. The prevalence for HIV was 58/7,316 (0.8%), HBsAg was 151/7,316 (2.1%), and HCV was 11/7,316 (0.1%); 28/58 (48.3%) HIV positives were unaware of their seropositivity till testing, as were 37/151 (24.5%) of HBsAg positives, and 4/11 (36.4%) HCV positives. There was a significant relationship between the mean age in the patients with HIV ($P = 0.002$) and anti-HCV ($P = 0.045$). A majority of the seropositive patients were found to be illiterate (45.6%), followed by educated up to high school level (29.1%), and graduate (25.0%). **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.

Key words: Cataract, HBsAg, HCV, HIV, viral seropositivity

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.^[1] Peribulbar anesthesia was the common mode of anesthesia for cataract surgery and entailed the use of a sharp 24-gauge needle to administer it.^[2,3] The incidence of needle-prick injury in ophthalmological practice was reported as 0.06–0.08 per 1,000 surgeries in our country.^[4]

There is a small possibility of the spread of blood-borne infection from the patient to another patient or the operating surgeon and para-medical staff in the case of inadvertent breach of aseptic precautions. The most frequently reported blood-borne infection was hepatitis B (HBV), followed by hepatitis C (HCV), and human immunodeficiency virus (HIV).^[5,6] The World Health Organisation (WHO) reported HIV infection in 36.8 million people all over the world.^[7] The corresponding numbers for HBV and HCV

infections were 251 and 70 million, respectively.^[8] A majority of seropositive individuals were asymptomatic; many were unaware of their seropositivity.^[3] Every fluid in the body, including aqueous and tears, was prone to shed viral load.^[9,10]

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.^[11-13] There were a few studies demonstrating the positive virus serology among patients posted for cataract surgery from India.^[3] The aim of our study was to find the prevalence of HIV, HBV, and HCV seropositivity in the patients undergoing cataract surgery and to guide them for appropriate treatment, and thus, ensure their health and of their care-takers.

Methods

This was a cross-sectional hospital-based study done in the tertiary care center, Regional Institute of Ophthalmology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, U.P over 2.5 years from January 2016 to June 2018. All

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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 consent for 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.^[14] All blood parameters were investigated in a National Accreditation Board for Hospitals (NABH) certified laboratory. The cost of viral serology testing was Rs. 250 (\$3.5) for the hospital for each patient.

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 like age, gender, education, 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

A total of 8,067 cataract patients were operated on in the above study period of January 2016 to August 2018. Of these, 7,316/8,067 (90.7%) were adults; 4,073/7,316 (55.7%) were males, while 3,243/7,316 (44.3%) were females. Their ages ranged from 19 to 88 years;

212/7,316 (2.9%) were found to be seropositive for one of the viruses. The average age for seropositive patients was 56.1 years (SD 12.3 years); 128/212 (60.4%) seropositive were males, 84/212 (39.6%) were females. The prevalence for HIV was 58/7,316 (0.8%), HBsAg was 151/7,316 (2.1%), and HCV was 11/7,316 (0.1%). Five were positive for HIV + HBV, two for HIV + HCV, and one for HBV + HCV. The maximum number of individual viral positivity reported was of HBV followed by HIV and HCV. The details of their number and percentages are shown in Fig. 1.

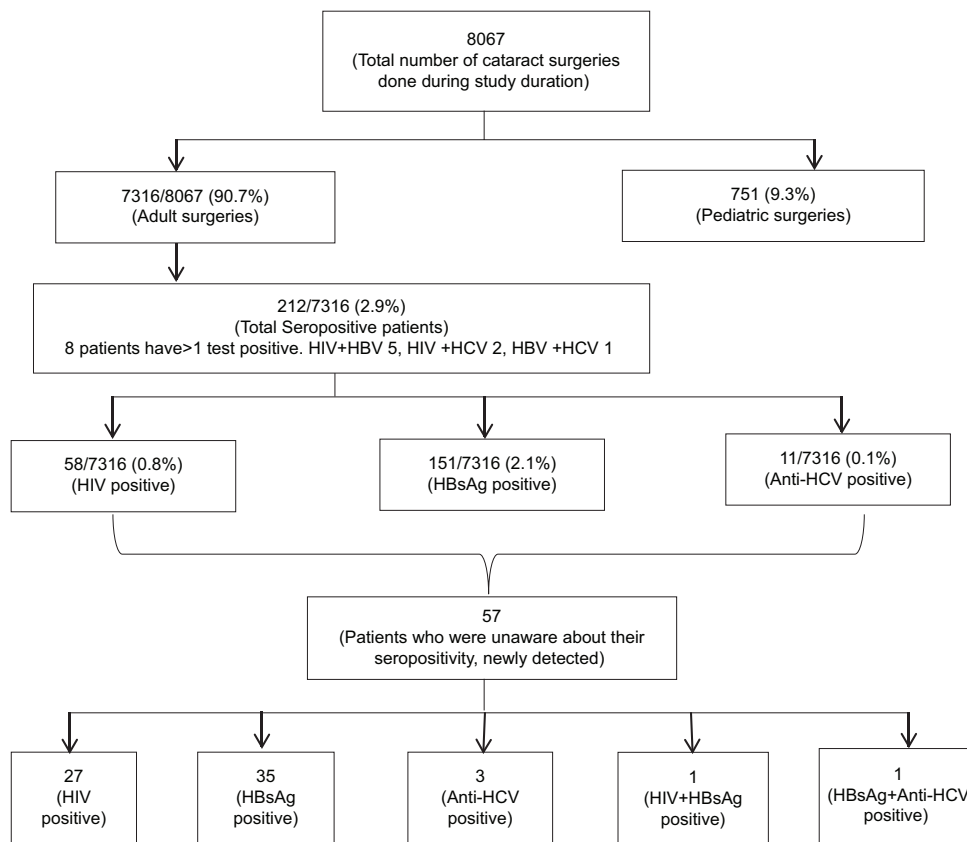


Figure 1: Flow chart showing number and percentage of incidental and total human immunodeficiency virus (HIV), hepatitis B (HBV), and hepatitis C (HCV) positivity

Table 1: Age and gender distribution among the human immunodeficiency virus (HIV), hepatitis B (HBV), and hepatitis C (HCV) seropositive cases

HIV	Negative	Positive	Total	P	Gender	Negative	Positive	Total	P
Age group									
<40 years	7 (25%)	21 (75%)	28	<0.001	Male	86 (67.2%)	42 (32.8%)	0	0.028
41-60 years	84 (70.6%)	35 (29.4%)	119	Chi-square value	Female	68 (81%)	16 (19%)	0	Chi-square value
>60 years	63 (96.9%)	2 (3.1%)	65	51.51	Total	154	58	212	4.82
Total	154	58							
HBsAg	Negative	Positive	Total	P	Gender	Negative	Positive	Total	P
Age group									
<40 years	20 (71.4%)	8 (28.6%)	28	<0.001	Male	38 (29.7%)	90 (70.3%)	0	0.717
41-60 years	39 (32.8%)	80 (67.2%)	119	Chi-square value	Female	23 (27.4%)	61 (72.6%)	0	Chi-square value
>60 years	2 (3.1%)	63 (96.9%)	65	46.72	Total	61	151	212	0.131
Total	61	151	212						
HCV	Negative	Positive	Total	P	Gender	Negative	Positive	Total	P
Age group									
<40 years	28 (100%)	0	28	0.175	Male	123 (96.1%)	5 (3.9%)	0	0.299
41-60 years	110 (92.4%)	9 (7.6%)	119	Chi-square value	Female	78 (92.9%)	6 (7.1%)	0	Chi-square value
>60 years	63 (96.9%)	2 (2.1%)	65	3.48	Total	201	11	212	1.08
Total	201	11	212						

Of the 212, 67 (31.6%) were being detected seropositive for the first time. The patients reported they were unaware of their seropositivity status till then. They were unaware of their viremia so we termed them as incidentally detected seropositive; 28/58 (48.3%) HIV positives were unaware of their status, as were 37/151 (24.5%) of the HBsAg positives and 4/11 (36.4%) HCV positives. Among those who were detected for the first time, one was HIV and HBsAg positive while another one was HBsAg and HCV positive.

The correlation between age group, gender, and seropositive is described in Table 1. 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.

Among the seropositive patients, a majority of them were found to be illiterate (45.6%) followed by educated up to the high school level (29.1%), and graduate (25.0%). 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.

Discussion

The prevalence of HIV-, HBV-, and HCV-infected patients in India is not insignificant.^[15-17] A recent article in this journal on the preferred practice patterns of the ophthalmologists while operating on the seropositive patients had stated that ophthalmologists considered needle-prick injury an occupational hazard and most took extra precautions while performing cataract surgery on known HIV-positive patients.^[3] The United Nations AIDS (UNAIDS) program had a target of 90-90-90: By 2020, 90% of all the people living with HIV will know their HIV status; by 2020, 90% of all the people with diagnosed HIV infection will receive sustained ART, and by 2020, 90% of all the people receiving ART will have viral

suppression.^[18] Global burden of disease HIV collaborators have stated that the achievement of the new ambitious goals for HIV enshrined in Sustainable 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.^[20]

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.^[21] 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.*^[22] 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 0.8% and of HBsAg was 2.1% 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.^[24,25]

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.^[26,27]

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.^[28,29] Similarly, in a study by Arif *et al.*^[30] 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.*,^[31] 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.^[32] A majority of our patients were from rural backgrounds and illiterate, so any of the above reasons may be responsible for their infection.

Since one of our seropositive patients was an intensive care unit worker, he may have been infected by a patient during his career over the past 23 years.

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. Our study strongly recommends viral marker testing in every case of cataract surgery, especially in districts having a high prevalence of HIV.^[33]

The cost of cataract surgery in India in high volume settings has been reported to be Rs. 1,000 (\$15) to Rs. 4,000 (\$42).^[34] The additional cost of Rs. 250 (\$3.5) for the testing would not greatly add to the cost of surgery, but it would increase the safety for the patient and caregivers. 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, and the pediatric patients were also excluded from our study. We relied on old medical records available and history obtained from the patients. 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. The false-positive and negatives of the serotesting were also not considered.

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. This assumes significance in the Coronavirus disease (COVID-19) pandemic. 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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Conflicts of interest

There are no conflicts of interest.

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