

Prevalence of COVID-19 Infection Among Asymptomatic Ophthalmic Surgical Patients Undergoing Ophthalmic Procedures at University of Abuja Teaching Hospital, Gwagwalada, Abuja

Abstract

Purpose: The aim of this article is to determine the prevalence of COVID-19 infection among asymptomatic ophthalmic patients undergoing ophthalmic procedures at University of Abuja Teaching Hospital, Gwagwalada, Abuja, Nigeria. **Materials and Methods:** A retrospective review of records of all consecutive ophthalmic patients who had pre-operative reverse transcriptase–polymerase chain reaction testing for COVID-19 screening before an elective surgical procedure between July 2020 and January 2021 was done. A semi-structured questionnaire was used to extract the following information from eligible patients' case records: age, gender, results of COVID-19 tests, type of ophthalmic surgical procedure done, and ocular examination findings and diagnosis. **Results:** Out of the 150 patients scheduled for surgical procedures within the study period, only 14 (9.3%) returned a positive test result. These patients had their surgeries postponed and were asked to return with negative results 2 weeks later. No association was found between gender, age, or type of surgical procedure and the prevalence of COVID-19 infection. **Conclusion:** This study found that 1 in 11 patients scheduled for elective ophthalmic procedure was a carrier of COVID-19 infection, highlighting the need for regular pre-operative testing in order to reduce the risk of spread of infection to healthcare workers and other hospitalized patients.

Keywords: COVID-19, ophthalmic procedure, RT–PCR

Introduction

The number of coronavirus infections (COVID-19) continues to increase globally. As of January 2022, there have been more than 300 million confirmed cases and over 5 million have died due to complications arising from coronavirus infection.^[1] In Nigeria, there have been over 137,000 confirmed infections, of which more than 1,600 have died.^[2] One major reason for the continued spread of the virus is that many infected patients are asymptomatic while spreading the virus. The percentage of asymptomatic coronavirus infection among confirmed cases globally stands at about 40.5% and may be responsible for the spread of the virus among healthcare workers and other hospitalized patients.^[3]

The global pandemic has led to delays, reduction, or cancellation of elective procedures because of the need to limit unnecessary interaction between patients and healthcare workers that can result in exposure to the virus.^[4] The need for limiting

interactions is further buttressed by a study that found a prevalence of 3% among the tested asymptomatic health workers.^[5] Furthermore, health institutions have adopted the policy of testing for COVID-19 infection in all patients undergoing elective surgeries and procedures to reduce the risks of transmission to healthcare workers and other hospitalized patients. Identifying patients with active, yet asymptomatic, COVID-19 infection is critical to protecting healthcare workers.^[4]

A study by Chatterjee *et al.*^[6] showed that ENT surgeons and dentists who examine and carry out procedures in the airways and oral cavities are at greatest risks of infection, further highlighting the need for use of protective measures (personal protective equipment kits, face shields, and N95 masks) during such examinations and procedures. Ophthalmologists and other eye care workers are also at increased risks of infection because studies have shown that SARS-CoV-2 is found in the conjunctival sac, thus increasing the risk of infection during ocular examination.^[7]

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This study was conducted to evaluate the relative frequency of asymptomatic COVID-19 infection among patients undergoing elective ophthalmic procedures at the Department of Ophthalmology, University of Abuja Teaching Hospital, Gwagwalada, Abuja, Nigeria.

Materials and Methods

Study location

The study was carried out at the Ophthalmology Department of University of Abuja Teaching Hospital (UATH), Gwagwalada, Abuja, Nigeria.

Study design

The study is a retrospective observational case series evaluating records of all ophthalmic patients who underwent COVID-19 reverse transcriptase–polymerase chain reaction testing (RT–PCR) as pre-operative screening before ophthalmic surgical procedures between July 2020 and January 2021.

Study population

Records of all consecutive ophthalmic patients who underwent pre-operative screening for COVID-19 before scheduled elective ophthalmic surgical procedures within the study period were included.

Inclusion criteria

1. All patients who underwent pre-operative screening for COVID-19 before scheduled elective surgical procedures.
2. The COVID-19 testing method used was the RT–PCR testing method.
3. The patients for scheduled elective surgical procedures were asymptomatic with no symptoms suspicious for COVID-19, such as fever, cough, difficulty in breathing, and loss of smell present.

Exclusion criterion

1. All patients who had elective surgical procedures without COVID-19 test results like infants who were not routinely tested and individuals with missing COVID-19 test results were excluded.

Data collection procedure

Records of all consecutive ophthalmic patients who had pre-operative COVID-19 screening before an elective surgical procedure between July 2020 and January 2021 were reviewed. Information extracted included demographics characteristics, ocular examination findings, and diagnosis as well as type of surgical procedure. The results of RT–PCR testing for COVID-19 were also extracted. A positive result for detection of COVID-19 was defined as a positive RT–PCR result. A semi-structured questionnaire made up of four sections was used to extract data from eligible patients' case records. Section A obtained information about age and gender, Sections B and

C were used to obtain information on results of COVID-19 tests and type of ophthalmic surgical procedure done, respectively. Section D dealt with ocular examination findings and diagnoses.

Departmental COVID-19 testing protocol

Pre-operative screening of all patients took place at the molecular laboratory of University of Abuja Teaching Hospital; all patients scheduled for elective ophthalmic surgical procedure were given a referral slip to the molecular laboratory for RT–PCR COVID-19 testing. A trained technician collected oropharyngeal and nasopharyngeal swabs and transferred them into a transport medium for RT–PCR testing. Tests were performed between 24 and 48 h prior to surgery. All test results became invalid after 72 h, and repeat screening was done to reduce potential interval exposure risk and to reduce the interval between testing and surgery, during which a prior exposure may have converted to active infection.

In case a patient's test results were positive, the Departmental Policy was to cancel the surgical procedure, counsel the patient regarding the nature of the infection, then refer immediately to the Hospital's COVID-19 facility for management, and ask them to report back to the Ophthalmology Department after 2 weeks with a repeat COVID-19 RT–PCR test result.

Ethical considerations

This study was conducted in accordance with the tenets of Helsinki Declaration, and ethical approval (FCT/UOATH/HREC/185) was obtained from the University of Abuja Teaching Hospital, Health Research Ethics Committee (UATHHREC).

Study definitions

- Asymptomatic patients are patients who do not have symptoms of COVID-19 but may have been infected.
- Pre-symptomatic patients are patients who have been infected with the COVID-19 virus but have not yet developed symptoms.
- Elective surgical procedure is an ophthalmic surgical procedure that has been scheduled in advance.
- Positive screening result implies oropharyngeal and/or nasopharyngeal swabs taken from a patient that has tested positive for RT–PCR COVID-19 viral antigen.
- Cataract lens opacity causing significant visual impairment as assessed by the patient.
- Pterygium is a triangular fibrovascular subepithelial ingrowth of degenerative bulbar conjunctival tissue over limbus onto the cornea.
- Glaucoma is a chronic, progressive optic neuropathy characterized by glaucomatous optic nerve damage, characteristic visual field loss as damage progresses with intraocular pressure as a key modifiable risk factor.

Data analysis

Extracted data were collected on standardized forms following strict regulations. The raw data were entered into Microsoft

Excel and data validated. Comprehensive statistical analysis was done using SPSS Statistical Software version 21 (IBM Corp. 2012. IBM SPSS Statistics for Windows, Version 21.0, Armonk, NY, USA). Results of screening were presented as the number and percentage of patients with a positive screening result. Some of the data were represented as the median and interquartile range. Significance was set at $P < 0.05$. To generate P -values, the χ^2 test and sometimes Fisher's exact test were utilized for categorical data.

Results

Data for 150 patients scheduled for elective ophthalmic surgery who underwent COVID-19 testing and met the inclusion criteria were analyzed.

The median age was 57.00 years with interquartile range 40.75–66.25, and the age range was 3–86 years. Ninety-six (64%) of the patients were males, whereas the age group

61–80 years had the highest proportion of patients 56 (37.3%) [Table 1].

Majority of the patients (106, 70.7%) had elective cataract surgery [Figure 1].

Results of COVID-19 RT–PCR test revealed that 14 (9.3%) had a positive test result. These patients had their surgeries postponed and were asked to repeat the test and return with negative results 2 weeks later.

Majority of the patients who tested positive [9 (64.3%)] became negative after 2 weeks.

Majority of the patients [5 (35.7%)] with positive COVID-19 test results were in the age groups 41–60 (5 patients) and 61–80 [6 (42.8%)]; however, there was no significant association between COVID test results and the age group of the patients ($P = 0.836$) [Table 2].

Eight (8.3%) males and six (11.1%) females tested positive for COVID-19 but there was no significant association found between COVID-19 test results and gender, as shown in Table 3 ($P = 0.575$).

Majority of the patients with positive COVID-19 test results were scheduled for cataract surgery [12 (11.3%) patients], whereas none of the patients scheduled for Pterygium excision had a positive result. There was no significant association between positive COVID-19 test results and type of surgical procedure for which patients were scheduled [Table 4] ($P = 0.417$).

Table 1: Sociodemographic characteristics

Variables	Frequency	Percentage
Gender		
Male	96	64.0
Female	54	36.0
Total	150	100
Age category (years)		
≤20	6	4.0
21–40	31	20.7
41–60	52	34.7
61–80	56	37.3
>80	5	3.3
Total	100	100

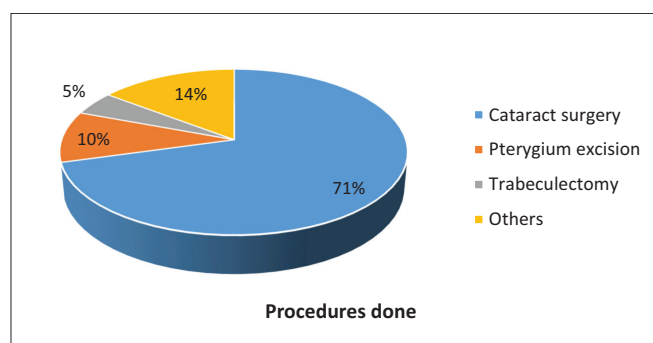


Figure 1: Type of procedure done

Discussion

This study was conducted to evaluate the prevalence of asymptomatic COVID-19 infection among patients undergoing elective ophthalmic surgical procedure in our facility to have an idea of the magnitude of asymptomatic cases visiting our facility. The study found a prevalence of 9.3%, indicating that 1 in 11 patients scheduled for elective ophthalmic surgical procedure may be an undetected carrier of COVID-19 infection. Ophthalmologists and other eye care workers are at increased risk of infection because studies have shown that SARS-CoV-2 is found in the conjunctival sac, thus increasing the risk of infection during ocular examination.^[7]

A recently conducted meta-analysis revealed that globally about 40% of individuals infected with COVID-19 are

Table 2: Relationship between COVID-19 test results and age group

Variable		COVID-19 test results			Test value	P-value
		Negative	Positive	Total		
Age group (years)	≤20	5 (83.3%)	1 (16.7%)	6 (100.0%)	1.389*	0.836
	21–40	29 (93.5%)	2 (6.5%)	31 (100.0%)		
	41–60	47 (90.4%)	5 (9.6%)	52 (100.0%)		
	61–80	50 (89.3%)	6 (10.7%)	56 (100.0%)		
	>80	5 (100.0%)	0 (0.0%)	5 (100.0%)		
Total		136 (90.7%)	14 (9.3%)	150 (100.0%)		

*Fisher's exact test

Table 3: Relationship between COVID-19 test results and gender

Variable	COVID-19 test results			Test value	P-value
	Negative	Positive	Total		
Sex	F	48 (88.9%)	6 (11.1%)	0.315*	0.575
	M	88 (91.7%)	8 (8.3%)		
Total		136 (90.7%)	14 (9.3%)		

* χ^2 test**Table 4: Relationship between COVID-19 test results and type of procedure**

Variable	COVID-19 test results			Test value	P-value
	Negative	Positive	Total		
Procedure done	Cataract surgery	94 (88.7%)	12 (11.3%)	2.838*	0.417
	Pterygium excision	15 (100.0%)	0 (0.0%)		
	Trabeculectomy	6 (85.7%)	1 (14.3%)		
	Others	21 (95.5%)	1 (4.5%)		
Total		136 (90.7%)	14 (9.3%)		

* χ^2 test

asymptomatic.^[3] Another study by Oran and Topol^[8] involving a large cohort of countries who pooled results of asymptomatic patients found a very high prevalence of between 40% and 45%, and the patients were likely to transmit the virus to others for a longer time. A study by Heneghan *et al.*^[9] has shown that there is not a single reliable study to determine the number of asymptomatic patients. They found that between 5% and 80% of patients testing positive for COVID-19 may be asymptomatic, and some asymptomatic patients may become symptomatic over time (pre-symptomatic).^[9] The studies discussed earlier highlight the potential infection transmission risks faced by many healthcare workers while carrying out their duties and responsibilities.

This study found a prevalence of 9.3% (approximately 1 in 11) among 150 asymptomatic patients scheduled for elective ophthalmic surgical procedure in our facility, consistent with findings of the study by Goel *et al.*^[10] in New Delhi who found a prevalence of 8.4% among 355 asymptomatic patients planned for various ophthalmic procedures and Singh *et al.*^[11] who found a prevalence of 7.3% among 218 asymptomatic patients posted for elective ophthalmic surgeries in tertiary centres in India. Kannan *et al.*,^[12] however, found a lower prevalence of 2.2% among 413 asymptomatic patients scheduled for elective vitreoretinal surgeries. Singer *et al.*^[4] found a much lower prevalence (0.13%) of COVID-19 infection among 4751 population of asymptomatic patients undergoing scheduled procedures in a large medical centre in the USA. The higher prevalence observed in our study may be due to the small sample size studied.

In a study by Gruskay *et al.*^[13] in an orthopaedic hospital in New York City in which 99 patients underwent testing for COVID-19, 12 (12.1%) tested positive. Of the 12 patients who tested positive for COVID-19, 7 (58.3%) were asymptomatic. The prevalence of asymptomatic patients among the 99 tested is therefore 7.1%, close to the prevalence found in our study.

A few studies have highlighted the role of asymptomatic transmission of COVID-19 infection among healthcare workers,^[3] especially those directly involved in patient care.^[14] Burrer *et al.*^[15] in the USA, studying the characteristics of healthcare workers with COVID-19 infection, discovered that out of the 9282 healthcare workers infected with COVID-19, 55% had been exposed to the infection in a hospital setting, highlighting the need for serious attention to be given to the role of asymptomatic carriers of COVID-19 virus in the spread of the disease.^[15]

It is almost impossible to identify asymptomatic individuals with COVID-19 infections without conducting testing; hence, pre-operative COVID-19 testing for elective ophthalmological procedure is an effective way of protecting healthcare workers from COVID-19 infections from asymptomatic surgical patients. This will also reduce morbidity and mortality for infected patients undergoing surgical procedures as studies have shown that COVID-19-infected patients undergoing elective surgical procedures may have higher risk of morbidity and mortality than the general population, and surgery may accelerate disease progression.^[16] Some other studies have recommended testing for only symptomatic patients or patients undergoing high-risk surgeries such as organ transplantation.^[17]

Our study found no association between age, gender, or type of surgical procedure and the prevalence of COVID-19 infection in the population studied. Sobotka *et al.*^[18] reviewed data from 10 European countries and found that among the working age group, women had more COVID-19 infection than men and they attributed this to the larger number of female healthcare workers in these countries. Currently, there is no medical evidence suggesting any biological reasons for which adult working class women contract the infection more.

Limitations of the study include the fact that being a hospital-based study, the asymptomatic rates in the hospital may not be a true representation of that in the community and it may be

difficult to ascertain that the patients were truly asymptomatic. Secondly, the findings from this study should be interpreted with caution due to the small sample size. The RT–PCR test, though being the gold standard for COVID-19 testing, does not demonstrate proof of potential viral transmission (infectivity). The viral nucleic acid positivity merely indicates that the viral load in a sample has reached a certain limit.

Conclusion

Our study found no association between gender, age, or type of surgical procedure and the prevalence of COVID-19 infection. One in 11 patients scheduled for elective ophthalmic surgical procedure may be an undetected carrier of COVID-19 infection, highlighting the need for regular pre-operative testing in order to reduce the risk of spread of infection to healthcare workers and other hospitalized patients. This is because the asymptomatic apparently healthy patient undergoing elective ophthalmic surgery could be a source of COVID-19 transmission to the healthcare workers.

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Conflicts of interest

There are no conflicts of interest.

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