



**ORIGINAL RESEARCH PAPER**

**Ophthalmology**

**“USE OF PERSONAL PROTECTIVE EQUIPMENT AMONG THE OPHTHALMOLOGISTS IN THE UNION TERRITORY OF PUDUCHERRY DURING THE COVID-19 PANDEMIC- THE UNFORGOTTEN BATTLE”**

**KEY WORDS:** COVID 19  
personal protective equipment  
Ophthalmologists

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**ABSTRACT**

**Purpose:** Being in close contact with the patients during the examination and various procedures, the Ophthalmologists are always at the increased risk of contracting the novel corona virus. The aim of the study was to assess the use of personal protective equipment and other safety measures among the Ophthalmologists in the outpatient departments and operation theatres during the COVID-19 pandemic and their compliance with the prescribed standard guidelines in place. As the outbreaks of new SARS-CoV-2 variants is on the rise, meticulous safety measures is the need of the hour to prevent contraction and transmission of the infection especially among Ophthalmologists who are in close contact while treating the patients. **Methods:** A questionnaire based study was conducted among the 150 practicing Ophthalmologists of selected medical college hospitals in Pondicherry and the results were analyzed. **Results:** 150 Ophthalmologists participated in the study. The most widely used PPE among Ophthalmologists in OPDs were N95 masks (n=138), slit lamp breath shield (137) and surgical gloves (114). General Ophthalmologists (n=17) were the maximum to be infected by the virus followed by retina specialists (n=5). 94% (n=14) participants were aware of standard guidelines issued by AIOS and AAO about the preferred practices during the COVID-19 pandemic and 40 participants admitted that they were unable to adhere to the guidelines due to various practical difficulties. **Conclusion:** This study shows that incidence of COVID among Ophthalmologists was significantly higher in those participants who did not use personal protective equipment and protective measures meticulously while handling the patients.

**INTRODUCTION:**

The emergence of the novel coronavirus disease in December 2019 (COVID-19) and the subsequent declaration of pandemic by World Health Organization (WHO) on 11<sup>th</sup> March, 2020 has halted the ever-busy human society and threatened every nation. <sup>[1]</sup> A completely different type of acute pneumonia<sup>[2]</sup> with close resemblance to the previous Middle East respiratory syndrome (MERS) and Severe acute respiratory syndrome (SARS) viruses but much more lethal than the two was reported. <sup>[3]</sup> Globally coordinated efforts are needed to fight the pandemic. <sup>[4]</sup>

Meanwhile, the healthcare workers being the frontline warriors are at the highest risk of contracting the virus. The risk is even higher when it comes to Ophthalmologists eye care professions (ECP) who are in close and prolonged contact with the patients who might be asymptomatic carriers during ocular examination. Unlike some businesses and occupations considered as essential services, the ophthalmologists discontinued operations during the lockdown denying many patients—particularly those in need of emergency care or any access to eye care. The ophthalmologists may be susceptible to infection due to close patient proximity during examination such as slit lamp examination, applanation tonometry and the potential contamination of instruments; <sup>[5]</sup> however, medical visits related to systemic and ocular disease or injury where there is significant risk of permanent vision loss because of any postponement of care, as determined by the treating ophthalmologists, are considered essential visits. <sup>[6]</sup>

Moreover, the first medical fraternity to succumb to the deadly virus was an Ophthalmologist Li Wenliang from China. <sup>[7]</sup> Unfortunately, since then many Ophthalmologists across the World succumbed to the virus. Hence meticulous use of personal protective equipment (PPE) by Ophthalmologists is of paramount importance to prevent contracting and transmitting the virus. <sup>[8]</sup> The standard guidelines regarding utilization of PPE and practice pattern for Ophthalmologists are issued by All India Ophthalmology Society <sup>[9]</sup> and American Academy of Ophthalmology. <sup>[10]</sup> However, the adherence to the utilization of personal protective equipment as per the guidelines has been challenging due to the various

practical difficulties and feasibility issues encountered while using PPE. <sup>[11]</sup>

During the month of December 2022, a sudden spurt of cases was witnessed in Japan, United States of America, Republic of Korea, Brazil and China. As the outbreaks of new SARS-CoV-2 variants is on the rise, meticulous safety measures is the need of the hour to prevent contraction and transmission of the infection especially among Ophthalmologists who are in close contact while treating the patients.

However, as of now, not enough evidence is available about the assessment of the use of personal protective equipment (PPEs) and other safety measures among Ophthalmologists practicing in this part of country. Hence, current study was aimed at assessing the use of PPEs among the ophthalmologists with an objective to ascertain and analyse their adherence to the standard guidelines issued by AAO and AIOS from time to time.

**SUBJECTS & METHODS:**

A cross-sectional study was conducted by the department of Ophthalmology, at a tertiary care teaching hospital in Pondicherry, India, among 150 ophthalmologists including faculty, residents and fellows selected from few randomly selected medical colleges' hospitals, included in the study. Considering the then prevailing Covid appropriate guidelines, a convenient sampling was used based on the number of Ophthalmologists engaged in practicing and who were fulfilling the inclusion criteria viz., those between 24-65 years age, were included in the final sample size.

The study was approved by the institutional scientific research committee and ethics committee after following the principles of the Declaration of Helsinki.

A questionnaire comprising of 36 questions was circulated via WhatsApp as Google forms among the selected Ophthalmologists, resident ophthalmologists and fellows from the selected medical institutions after explaining the details of the study to them and confidentiality was maintained. A pre-tested and validated questionnaire by Lauren .M. Wasser et al <sup>[12]</sup> was used with additional

modifications to suit our demographic profile. An informed consent was obtained from the study participants after thorough explanation about the objectives of the study. The study was conducted during February to April 2021.

Data collection was done through Google forms, which consisted of the participants baseline information including, designation, PPE utilization pattern while practicing the occupation, the clinical practice patterns during the pandemic, and various safety parameters undertaken in their practice and their COVID infection status.

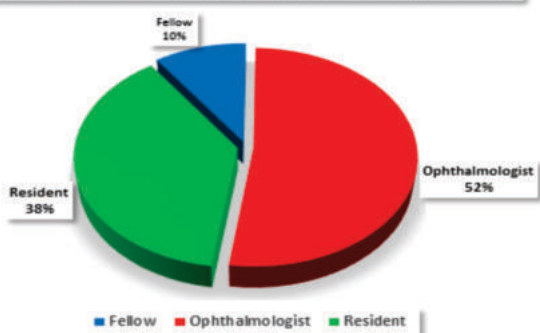
**Statistical Analysis:**

The data was collected, compiled, and entered in MS Excel program. The collected data was subjected to analysis. The results are explained in descriptive statistics involving categorical variables in proportions and percentages and continuous variables in Mean (SD) or Median (IQR) whichever is applicable. For categorical comparisons Chi-square test, Fisher's exact test was used. Statistical Package for the Social Sciences (SPSS) version 21.0 was used to analyse the data.

**RESULTS:**

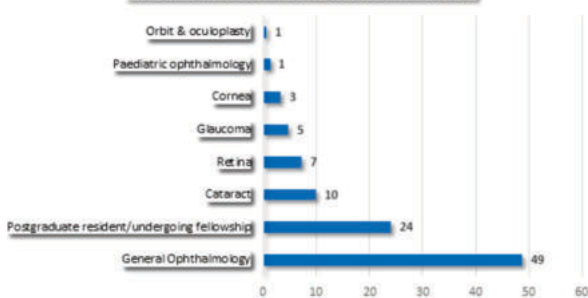
There are total 150 participants (ophthalmologists), as depicted in (FIGURE 1), more than half i.e. 78 (52%) are consultants, followed by 57 (38%) residents and 10 (15%) fellows. Subspecialty wise, maximum 73(49%) are general ophthalmologists, 36(24%) are undergoing fellowship, 15(10%) are into cataract specialty, 11(7%) are retina fellows, 7(5%) are glaucoma, 5(3%) are cornea fellows and one each from pediatric ophthalmology and orbit and oculoplasty (FIGURE 2). The years of experience of the participants was between six months being minimum, to thirty years being the maximum. The number of surgeries done per week varies between less than ten per day in the months of April to October 2020 to more than 30 cases per day during the months of December to March 2021 based on the COVID peak in the country. Maximum participants, 107(71.3%) reported that they have undertaken active measures to decrease the number of patients that they operate on during the COVID peak months.

Pie chart showing distribution of subjects as per designation (n=150)



**Figure 1 :** Pie chart showing distribution of subjects as per designation

Chart showing proportions of various subspecialties (%)



**Figure 2:** Chart showing proportions of various subspecialties (%)

The average time spent for each surgery was less than thirty minutes as reported by 104(69.3%) of the participants and more than one hour as reported by nine (6%) of the participants. A total of 127 (85%) participants reported that they are most exposed to infection while performing surgeries in Operation Theatres.

The preferential personal protective equipment used by the participants are as shown in TABLE 1 and FIGURE 3. The Full PPE kit is used by only 3 participants in the OT. A total of 132 (88%) of the participants reported some form of discomfort while using the PPE, while 115 (76.7%) participants said that the patients had to undergo a COVID test before their surgery. The most employed diagnostic test is RTPCR test before surgery, by 61 (40.7%) participants while 32 (21.3%) did not ask for any COVID tests before surgery. If a patient posted for surgery turns out to be COVID positive, 53(35.3 %) of the participants said that the surgery would be postponed to a later date after the patient becomes RTPCR negative and 89 (59.3%) said that they would continue doing an emergency surgery with all personal protective equipments.

**Table 1 :** Distribution of participants as per the use of PPEs

PPE used by the participants*	N	%
N95 masks	138	21.0
Slit lamp breath shield	137	20.8
Surgical gloves	114	17.3
Face shield	86	13.1
Surgical cap	81	12.3
Surgical mask	42	6.4
Protective eye goggles	37	5.6
Nitrite gloves	19	2.9
Full PPE kit	3	0.5
Cloth mask	1	0.2

\*multiple responses



**Figure 3:** PPEs used by the participants

The number of patients seen in OPD varies between <25/week in the months of June to September 2020 to >75/day during the months of January to March 2021 based on the COVID peak. A total of 86 (57.3%) participants mentioned that they followed active measures to decrease the number of patients who came to OPD/ clinic and 134 (89.3%) participants said that patients were screened for COVID symptoms before entering OPD with 120 (80%) of the participants were issued a COVID-19 questionnaire before admission of the patients. A total of 124 (82.7%) said that temperature check was done for the patients and attenders before entering the hospital and 53 (35.3%) participants were allowed one attender for each patient only if necessary. A total of 115 (76.6 %) participants reported that they are with maximum exposure to infection during slit lamp examination and 82 (54.7%) participants examined patients in OPD without AC and windows open while sixteen 16 (10.7%) used AC with closed windows in their OPD. A liquid hand sanitizer was used by 133 (88.7%) participants and 52 (34.7%) participants among them reported some form of complication while using hand sanitizer. While examining patients in OPD, 30 (20%) participants washed their hands after seeing every

patient and 121 (80.7%) participants of them used liquid hand wash. An alcohol sanitizer was used by 90 (60%) participants for sanitizing the slit lamp, lenses, gonioscopes and other instruments used in OPDs for examining the patients.

Out of 150 participants, 22 (14.7%, 9 Ophthalmologists, 8 Residents, and 5 fellows) of them reported to be COVID positive at some point of time in the year 2020 (FIGURE 4 & TABLE 2). Out of 22 positives, 17 (11.3%) of them were <40 years and 5 (3.3%) of them were between 40 to 50 years of age moreover, out of the 22 participants who were COVID positive, 17 (11.3%) of them were general ophthalmologists and 5 (3.3%) were Retina fellows and the reason behind Retina fellows to be at increased risk of infection can be attributed to the prolonged exposure with the patients during Indirect Ophthalmoscopy in OPD and performing long retinal surgeries in operation theatres. A total of 16 (10.6%) of those positives for COVID did not take any active measures in reducing the number of cases coming to hospitals during the peak of COVID and they saw >75/week patients on an average. All 22 (14.7%) positive for COVID, allowed attenders inside OPD, 15(10%) of them used AC inside OPD with closed windows. A total of 20 (13.2%) used <5 personal protective equipments (PPEs) while examining the patients and only three of them used surgical gloves in OPD.

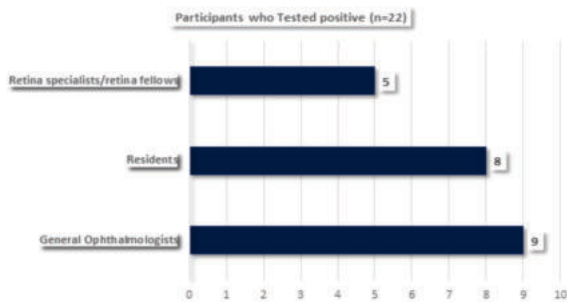


Figure 4: Participants who tested positive

Table 2: Distribution of participants as per their status of positivity for Covid 19

Designation	Participants who Tested positive (n=22)	Sig.
Ophthalmologists	9	Chi sq=2.161 P=0.339 Non significant
Residents	8	
Retina specialists /retina fellows	5	

**DISCUSSION:**

The rapid and extensive spread of the COVID-19 pandemic has become a major cause of concern for the healthcare profession. As evident from the results of this study, the ophthalmologists are at higher risk of acquiring and transmitting the virus. The effective official implementation of practical and protective guidelines can be challenging. Ophthalmology practice combines high-volume outpatient and community clinics, elective surgeries, and emergency services.

This study revealed that most of the participants were informed by their superiors regarding official COVID guidelines and updates regarding practice pattern during the pandemic(FIGURE 5). But still the practical difficulties were faced by Ophthalmologists in using various personal protective equipment remains significant that prevents them from adhering to the standard guidelines. The findings are similar to the study conducted by Khaled Safadi et al<sup>[13]</sup> which concluded that standard ophthalmic practice protocols should be modified to accommodate new insights in the COVID 19 pandemic(9). Moreover, in a study conducted by Jui En Lin<sup>[14]</sup> it was found that Ophthalmologists are at a higher risk of contracting COVID-19 infection, as they have close

contact with patients during ocular examinations and also due to the high patient volume in outpatient department.

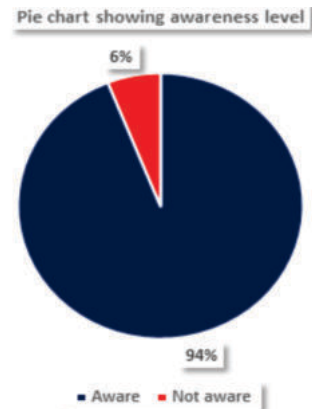


Figure 5: Pie chart showing awareness levels

The current study reported about the risk of contracting infectious disease like COVID due to prolonged and close contact with patients, many of whom may be asymptomatic carriers of SARS-CoV-2, these findings are similar to the study conducted by Lauren M. Wasser et al<sup>[12]</sup> which concluded that ophthalmologists must prioritize their own health and safety as they continue to care for their patients, moreover, the All India Ophthalmological Society has published the standard guidelines for Ophthalmic practice during the Covid 19 pandemic for various Ophthalmology subspecialties (1). The meticulous use of personal protective equipment (PPE) by ophthalmologists was recently emphasized in updates published by the All India Ophthalmological Society<sup>[15]</sup> and American Academy of Ophthalmology. FIGURE 6 shows the protective equipment that can be easily used in the OPDs while examining patients as per standard guidelines. The need of enhancing capacity building of the consultants regarding the basic guidelines to prevent the disease by adopting practical approaches like regular training programs and this very fact is also similar to the findings of the study conducted by Pranav.d.Modi et al<sup>[16]</sup> which concluded that there is a need for regular educational interventions and training programs on infection control practices for COVID-19 across all healthcare professions.



Figure 6: PPE used in our OPD setup as per standard guidelines

The study revealed that the most important of all the PPE are N95 masks, surgical gloves and slit lamp breath shield and the common discomfort experienced by the participants while using the PPE are shortness of breath, visual disturbances, fogging, blurring, dry eyes, sweating, tiredness after talking

to patients with masks, bruising of skin over the nose and cheeks and headache which are also reported by other studies.<sup>[13-15]</sup> Moreover, the dryness, itching and peeling of skin were also reported after hand sanitizer use as similar to the previous study in this context.<sup>[15,16]</sup>

Given the current status of COVID 19 in our country, it was suggested that partial ambulatory services should be emphasized with tele consultation facilities should be made in all hospitals for non-emergency ophthalmic conditions to prevent the patient load. Moreover, if a patient posted for an elective surgery turns out to be positive, the surgery can be postponed to a later date, preferably after 14 days. In case of emergency surgery it can be carried out with all personal protective equipment with minimum OT staffs and a short time.

As the History repeats itself, those who cannot remember the past are condemned to repeat it. As the outbreaks of new SARS-CoV-2 variants is on the rise, meticulous safety measures is the need of the hour to prevent contraction and transmission of the infection especially among Ophthalmologists who are in close contact while treating the patients.

**CONCLUSION:**

This study clearly shows that incidence of COVID among Ophthalmologists were significantly higher (15%) among those who did not use personal protective equipment and protective measures meticulously while examining patients. Among Ophthalmologists, the retinal surgeons were at a higher risk of acquiring the infection, the reason being the prolonged exposure with the patients during Indirect Ophthalmoscopy in OPD and performing long duration retinal surgeries in OT. Since Ophthalmologists are at higher risk of contracting the virus, they should prioritize their own health as they continue to serve people in this pandemic by proper and adequate utilization of the personal protective equipment and following other safety measures.

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