



Effects of the COVID-19 Pandemic on Turkish Ophthalmologists

İşılav Kavadarlı*, Melek Mutlu**

*Dünyagöz Hospital, İstanbul, Turkey

** University of Health Sciences Turkey Gaziosmanpaşa Training and Research Hospital, Clinic of Ophthalmology, İstanbul, Turkey

Abstract

Objectives: To assess the effects of the coronavirus disease-2019 (COVID-19) pandemic on Turkish ophthalmologists.

Materials and Methods: In this survey study, an online questionnaire consisting of 40 questions was directed to actively working ophthalmologists. The questions asked about demographic characteristics, working conditions and schedule, follow-up of ophthalmology patients, and levels of knowledge and anxiety about the pandemic.

Results: This study included 161 ophthalmologists (78 women and 83 men). They were predominantly consultant ophthalmologists (71%), with 128 living in metropolitan areas. More than half (54.4%) reported decreased weekly working hours, 52.5% were attending routine outpatient clinics, 52.8% were working in COVID-19-related units, 67.1% were performing only emergency operations, and 52% reported disrupted follow-up of chronic eye patients. Sixty-four percent thought that ophthalmologists were in the high-risk group, and nearly all participants used masks while working (99%). Additionally, 91% expressed high anxiety regarding the pandemic, most commonly due to the risk of transmitting the disease to family (83%), and 12.5% considered their level of knowledge about the pandemic to be insufficient. Forty-six percent of the participants thought that daily life conditions would normalize in 2 to 5 months.

Conclusion: Close proximity during patient examination causes ophthalmologists concern about their risk. The increasing number of COVID-19 cases resulted in a proportional decrease in the number of patients and surgeries in ophthalmology clinics in our country. As a result, ophthalmologists are unwillingly appointed to high-risk units. The COVID-19 pandemic has caused a substantial increase in anxiety levels among Turkish ophthalmologists.

Keywords: COVID-19, pandemic, ophthalmologist, anxiety

Introduction

Coronavirus disease-2019 (COVID-19) is an acute respiratory disease caused by a novel coronavirus severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) first detected in Wuhan, China in December 2019. It is highly infectious and was recognized by the World Health Organization as an emergency pandemic that threatens public health due to its rapid international spread (<http://www.euro.who.int/en/healthtopics/emergencies/pages/news/>

[news/2020/01/2019-ncov-outbreak-is-an-emergency-of-international-concern](https://www.euro.who.int/en/healthtopics/emergencies/pages/news/2020/01/2019-ncov-outbreak-is-an-emergency-of-international-concern)).

Infected patients most commonly present with symptoms such as fever, dry cough, weakness, myalgia, and dyspnea. Transmission is thought to occur either through droplets from close contact with an infected person or by touching contaminated surfaces.^{1,2} This virus, which navigates from mouth and nasal mucosa to the respiratory tract, has also been detected in conjunctival swabs and tears and reported to cause conjunctivitis.^{3,4} Moreover, conjunctival congestion was

Address for Correspondence: İşılav Kavadarlı, Dünyagöz Hospital, İstanbul, Turkey

E-mail: isilay@kavadarli.com ORCID-ID: orcid.org/0000-0002-0057-8828

Received: 25.04.2020 Accepted: 23.07.2020

Cite this article as: Kavadarlı I, Mutlu M. Effects of the COVID-19 Pandemic on Turkish Ophthalmologists. Turk J Ophthalmol 2021;51:95-101

reported in 9 (0.8%) of 1,099 COVID-19 patients studied in China.⁵

As ophthalmologists, being in close proximity with the patient during biomicroscopic examination and possible contamination from used devices constitute high risk of infection and carriage of SARS-CoV-2. The purpose of this study was to evaluate Turkish ophthalmologists' knowledge, anxiety level, working conditions, and preventive measures related to the COVID-19 pandemic by online survey.

Materials and Methods

In this survey study, which was carried out using an online questionnaire (docs.google.com/forms), participants were not required to provide personal identity information data and were informed that the information they provided would be used solely for research purposes. The questions were directed to actively working ophthalmologists who volunteered for the study between 8 and 14 April 2020. These questions were categorized under the main topics of demographic features, characteristics of the institutions at which ophthalmologists were working, procurement and use of protective equipment, follow-up of ophthalmology patients, and levels of knowledge and anxiety about the COVID-19 pandemic.

Demographic data collected included age, gender, city, number of people in household, presence of chronic disease, and smoking status. Questions related to the institutions in which the ophthalmologists were working included the type of hospital, their title and years of professional experience, adequacy of equipment, change in the number of operations and outpatient visits, and exposure to COVID-19 patients. The use of masks, safety glasses, and gloves as protective equipment, installation of a protective shield on the biomicroscope, and cleaning of microscopes were also questioned. With respect to ophthalmology patients, the participant's approach to patients presenting with conjunctivitis, follow-up of chronic eye diseases, and their approach to patients using contact lenses were among the questions. Perceived adequacy of the participants' knowledge and their sources of information about the COVID-19 pandemic were questioned. In addition, there were questions about pandemic-related concerns such as infection and transmission anxiety, level of risk for ophthalmologists, and an estimate of how long the pandemic would last. Of the total 40 questions, 11 were yes/no questions, 24 required the participant to select the most suitable response option, and 5 allowed the participant to select multiple response options. The answers were collected by a single person and analyzed using the Microsoft Excel program.

Results

This study included 161 participants, of whom 78 were women and 83 were men, with 36.2% between 35 and 44 years of age (Figure 1). In terms of other demographic

features, 13.1% were living alone, 20% had chronic diseases, and 9.4% were smokers. Regarding their institutions, 34% were working in private hospitals, 25.2% in education and research hospitals, 24.5% in state hospitals, and 15.1% in university hospitals. The majority of the participants (71.3%) were consultant ophthalmologists and 61.9% had more than 10 years of professional experience. One hundred twenty-eight of the participants were living in one of 30 metropolitan cities, with the highest number being from Istanbul (n=46). Most participants (76.9%) stated that there were COVID-19 cases in their institutions, and 52.8% were working in high-risk units/schedules such as night shifts, emergency rooms, and COVID-19 clinics. Among those who were working in these units, 80% lived in metropolitan cities, 80% were ≤45 years old, 41% were working in state hospitals, 36% in education and research hospitals, 17% in university hospitals, and 5% in private hospitals. Moreover, 22% were both attending routine ophthalmology clinics and working in units with a high risk of COVID-19 transmission.

Reduced weekly working hours was mentioned by 54.4% of the participants, while 52.5% were attending routine outpatient clinics. Although 67.1% of the participants were performing only emergency surgeries, 5.3% continued elective surgeries as necessary. Expectedly, 88% of those continuing elective surgeries worked in private hospitals. When asked whether protective equipment was sufficient in their institution, more than half of the participants (53.7%) said that protective equipment was generally sufficient despite some shortcomings (Figure 2). Of these, 40% were working in units that were risky in terms of COVID-19, 31% worked in private hospitals, and 50% were those continuing to perform elective surgeries. Regarding protective measures against infection and transmission, 91.8% had installed a biomicroscope shield for protective purposes, 55% were using protective glasses, 99.4% were using masks during examinations, 80% were providing masks to examined patients, 57.2% were changing gloves after every patient, and 82% were disinfecting their biomicroscopes after each

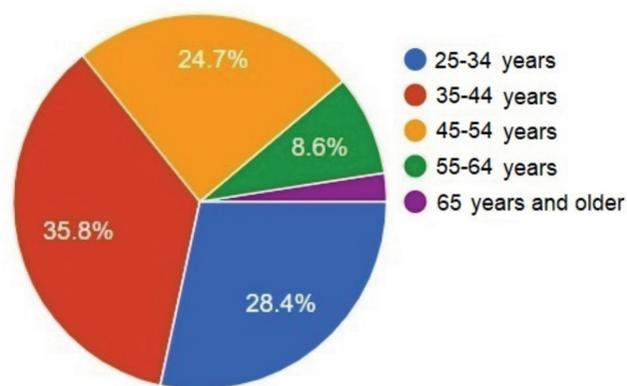


Figure 1. Age distribution of the participants

patient examination. The most commonly used mask type was surgical masks (67.5%), whereas others masks were FFP2 (20%) and FFP3 (12.5%). Most participants (75%) were not allowing patients' relatives in the examination room.

When asked whether they had concerns about COVID-19 and questioned additional symptoms when examining patients with conjunctivitis, 93.1% of the participants answered yes. More than half (51.9%) of the participants reported that the follow-up of patients with chronic eye diseases was disrupted during the pandemic (Figure 3). When asked which patients they considered most affected during the pandemic, the most frequent responses were patients with age-related macular degeneration and diabetic macular edema (Figure 4). Regarding their approach to contact lens users, 56.9% of participants strongly urged patients to use glasses instead of contact lenses, 33.1% only recommended the use of glasses, and 10% did not recommend the use of glasses at all to their patients.

Although 64.2% of the participants considered ophthalmology to be among the high-risk medical branches, 34.6% believed themselves to be in the medium risk group. When asked whether they would perform surgery on a patient diagnosed with COVID-19, 55.6% said they would perform urgent procedures with the necessary precautions, 24.4% said they would refer the patient to another institution, and 30.6% said they would insist on conservative treatment options.

The presence of anxiety during the pandemic was mentioned by 91.3% of the participants, and the most common reason cited for this anxiety was the risk of transmitting the disease to family members (83.1%) (Figure 5). Of those expressing concern about transmitting the disease to family, 43.1% were concerned and 23.8% were very concerned. Fifty-seven percent of the very concerned participants were working in high-risk COVID-19 units, while 84% of those who were not worried about the pandemic were living alone. Furthermore, 53.8% stated that they could not stay elsewhere, 23.7% could stay in another house if provided, and 22.4% could stay in guesthouses during the pandemic.

Perceived level of knowledge about the COVID-19 pandemic was rated as sufficient by 33.1%, partially sufficient by 54.4%,

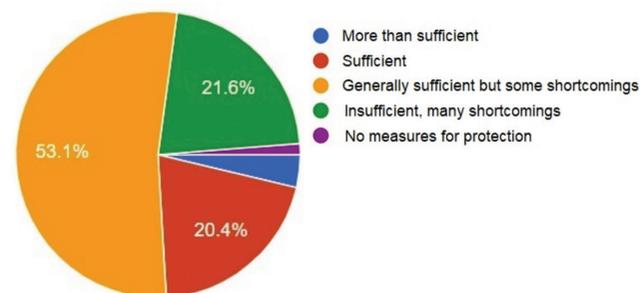


Figure 2. The participants' perceptions about the protective equipment and precautions against the COVID-19 pandemic in their institutions
COVID-19: Coronavirus disease-2019

and insufficient by 12.5% of the participants. The most common sources of information were scientific articles (78.1%), Ministry of Health guidelines (60%), social media (45%), and hospital education programs (31.3%). None of the participants answered yes when asked if they believed the pandemic was being exaggerated, and 35.8% stated that the pandemic warranted even more attention. While 61.9% were satisfied with the information provided by national health specialty associations, 24.4% did not know about them. The largest proportion of participants (46%) estimated that conditions would normalize in 2 to 5 months (Figure 6).

Discussion

The novel coronavirus was first identified as the cause of an outbreak of pneumonia in China on January 7, 2020. The virus spread rapidly worldwide, escalating to a pandemic due to international travel by patients and carriers, and as of April 26, 2020, SARS-CoV-2 had been detected in nearly 2.8 million people and resulted in the deaths of 190,871 people worldwide (<https://covid19.who.int/>). The first case in our country was announced on March 11, 2020 and the numbers of confirmed cases and deaths as of April 14, 2020 were reported as 65,111 and 1,403, respectively (<https://covid19.saglik.gov.tr/>).

The rapid spread of COVID-19 impacted healthcare globally. Health workers in units with high risk of transmission required both more efficient protective equipment and changes in working conditions. In this study, 54% of the participants said that their weekly working hours were reduced, 52% were attending routine outpatient clinics, and 52% were working in risky units related to COVID-19. The decrease in the number of ophthalmology outpatient appointments and increase in the burden of work in COVID-19 units is likely due to the fact that most of the ophthalmologists lived in metropolitan cities and non-emergency hospital visits, especially to ophthalmology clinics, were reduced.

During the SARS epidemic of 2003, 21% of cases were reported to be healthcare professionals.⁶ Likewise, a report published in China in February 2020 stated that 6 of 1,716 infected health workers died (<https://www.who.int/dg/speeches/detail/whodirector-general-s-remarks-at-the-media-briefing-on-covid-2019outbreak-on-14-february-2020>).⁷ Among these victims was Dr. Li Wenliang, the ophthalmologist who was infected by an asymptomatic patient followed up for glaucoma (<https://www.aao.org/headline/coronavirus-kills-chinese-whistleblower-ophthalmol>).

The close proximity of ophthalmologists to the patient during biomicroscopic examination increases the risk of infection. In this study, 64% of the ophthalmologists reported that they thought they were in a high-risk branch of medicine. Similarly, in a survey of 100 people working in ophthalmology clinics in the UK, 80% thought they were in

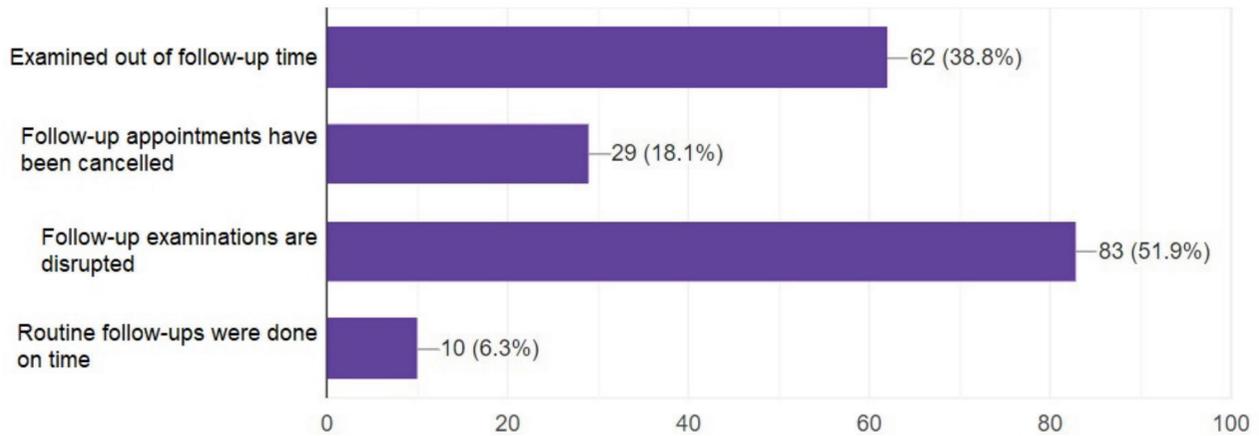


Figure 3. Follow-up periods of the patients with chronic eye diseases

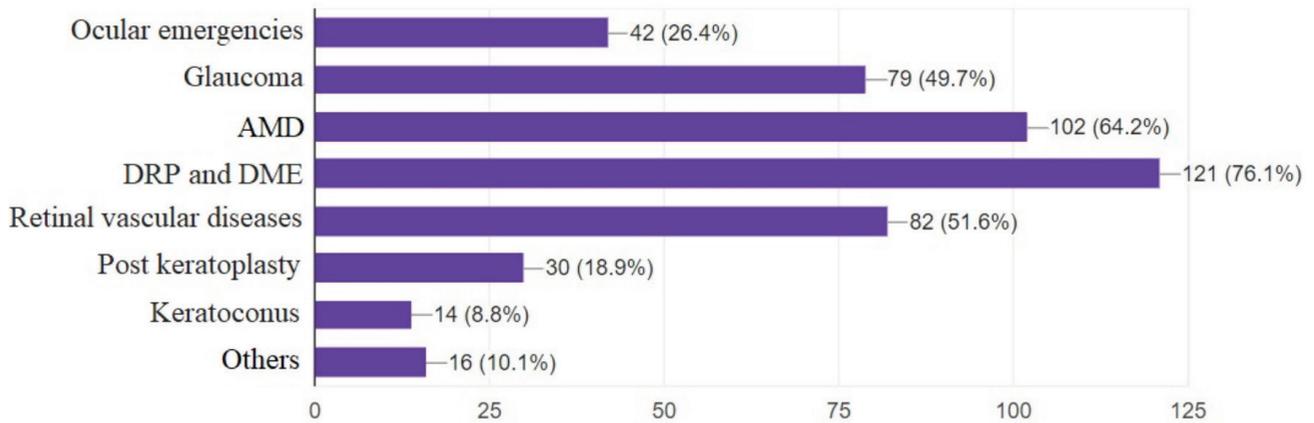


Figure 4. Ophthalmic patient groups considered to be most affected during the pandemic
 AMD: Age-related macular degeneration, DRP: Diabetic retinopathy, DME: Diabetic macular edema

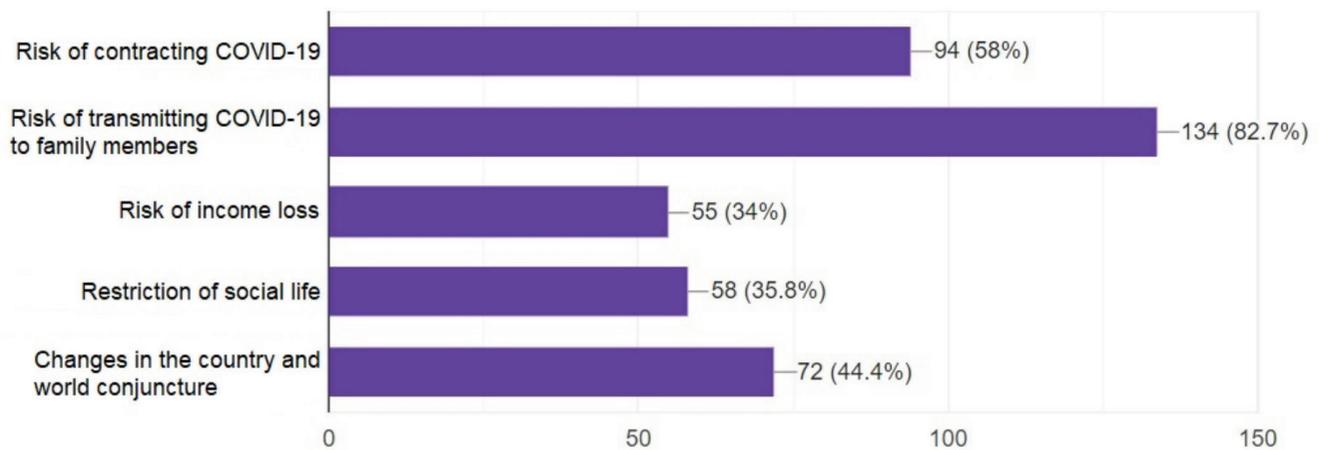


Figure 5. Reasons for the participants' anxiety related to the COVID-19 pandemic
 COVID-19: Coronavirus disease-2019

the high-risk group.⁸ Furthermore, in the same survey, 55% of respondents found the guidelines insufficient and 79% were not trained for efficient use of personal protective equipment (PPE). The study also revealed that most respondents did not trust guidelines that did not recommend ophthalmology practitioners to routinely use PPE, and that there was insufficient explanation regarding the use of protective glasses, gowns, and FFP3 masks in patient examinations at close proximity (closer than 1 m). Consequently, eye hospitals started using acetate shields on all biomicroscopes for protection and provided FFP3 to all healthcare workers. In the present study, nearly all participants were using masks during examination (67% surgical masks), 80% provided masks to patients, 55% wore protective glasses, and 91% had installed protective shields on their biomicroscopes. Only 21% thought that their clinics were insufficient in terms of PPE. We believe that close cooperation between ophthalmology clinics, healthcare associations, and the Ministry of Health is required to eliminate these shortcomings. The use of masks, protective glasses, and a biomicroscope shield has been recommended in the guideline published by the American Academy of Ophthalmology (AAO) (<https://www.aao.org/headline/d6e1ca3c-0c30-4b20-87e0-7668fa5bf906>).

In a meta-analysis on the use of masks by healthcare workers, it was reported that surgical masks would provide protection from large droplets, whereas N95 masks would be protective in procedures such as bronchoscopy and intubation that cause aerosol scattering.⁹ Romano et al.¹⁰ recommended the use of FFP3 masks during ophthalmologic examinations of diagnosed or suspected COVID-19 cases. Although there are guideline-based recommendations for the use of mask types and PPE in ophthalmology practice, there is no definite consensus whatsoever.

Although 93% of the participants in our study reported that they would question patients presenting with conjunctivitis about additional COVID-19 symptoms, currently there is no consensus in the literature on ocular surface transmission of SARS-CoV-2. Xia et al.³ investigated tear and conjunctival

swab samples from 30 patients with coronavirus pneumonia using SARS-CoV-2 polymerase chain reaction (PCR) test and reported positive results only in the samples obtained from the one patient who had conjunctivitis. In another study conducted by Zhou et al.¹¹, PCR tests of conjunctival swab samples taken from 69 patients with COVID-19 pneumonia yielded only 1 positive and 2 possibly positive results, while the PCR result of the one patient with accompanying conjunctivitis was negative. On the other hand, Wu et al.¹² reported ocular symptoms such as hyperemia, chemosis, and epiphora in 12 of 38 COVID-19 patients with clinical symptoms, with positive PCR results for nasopharyngeal samples in 28 cases and nasopharyngeal and conjunctival swab samples in 2 cases. In the same study, although 11 patients with ocular symptoms had positive nasopharyngeal specimens, only 2 had positive conjunctival swab samples. In addition, levels of blood inflammatory markers were higher in the patients with ocular symptoms.¹² Despite detection of the virus in conjunctival swab and tear samples, currently there is no scientific evidence linking the virus and ocular symptoms directly. Consequently, it may be suggested that directing patients to eye clinics due to red eye may be the source of transmission.

Fifty-two percent of the participants in this study said that the follow-up of patients with chronic eye diseases was disrupted during the pandemic; only 6% said they were continuing routine follow-up as usual. The participants also speculated that this would mostly impact patients with age-related macular degeneration and diabetic macular edema. These diseases most commonly affect the older population, which is also among the high-risk groups with respect to COVID-19. This patient group has high mortality and has been advised not to go to hospitals except in emergencies to reduce the risk of infection.¹³

In another study conducted in China, it was reported that 34 previously asymptomatic COVID-19-positive patients became symptomatic after non-ocular surgeries, with lung tomography findings compatible with pneumonia in all patients and a mortality rate of 20% during the postoperative period.¹⁴ Although the proportion of ophthalmologists performing elective surgeries was low in our study, it suggests that patients should be carefully evaluated for COVID-19 preoperatively. Guides regarding the procedures and surgeries classified as urgent during the pandemic have been published by both the Turkish Ophthalmological Association (TOA) and AAO (<https://koronavirus.todnet.org/pandemi-nedeni-ile-acil-kabul-edilen-gz-ameliyatlar>), (<https://www.aao.org/headline/list-of-urgent-emergent-ophthalmic-procedures>). While the TOA guidelines were found to be satisfactory by the majority of the participants, 24% did not know about the guidelines.

Fifty-seven percent of the participants in this study stated that they strongly recommended patients use glasses instead of contact lenses. Although not proven, the possibility of virus

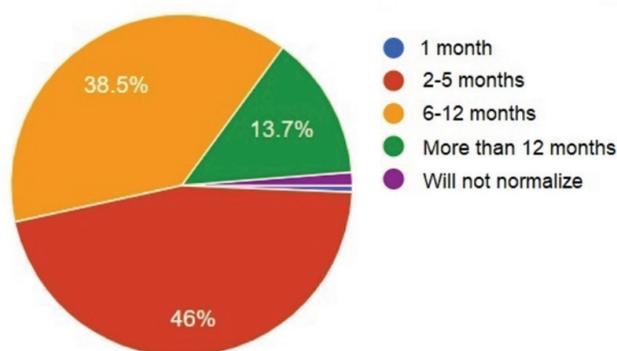


Figure 6. Participants' expectations of the time until normalization of conditions caused by the COVID-19 pandemic
COVID-19: Coronavirus disease-2019

transmission through the eye suggests that glasses may offer more protection against transmission through droplets, and hence may be more appropriate to use during the pandemic. Despite the fact that contact lens disinfection solutions have a virucidal effect, the information on this subject remains hypothetical. Patients continuing to use contact lenses should be informed in detail in accordance with the information from the TOA manual and other sources (<https://koronavirus.todnet.org/kon>).¹⁵

Ninety-one percent of the participants stated that their anxiety level increased due to the pandemic and they were mostly worried about infecting their families. In a survey of 1,210 people conducted in China, 54% of the participants expressed being moderately to severely affected psychologically, 75% experienced anxiety due to the risk of infecting their families, and the use of masks decreased the level of anxiety.¹⁶ The high anxiety level in the present study may be related to the participants being highly educated and working in units with high COVID-19 risk. Likewise, Qiu et al.¹⁷ observed that the level of pandemic-related stress was higher in those with higher education level.

Study Limitations

In this study, the most frequently used sources of information were scientific articles and Ministry of Health guidelines, indicating that the participants were trying to obtain the most accurate information possible. Fifty-four percent of the participants considered their level of knowledge about the pandemic as partly sufficient, whereas 12% considered it insufficient. This may be attributed to factors such as the rapid progression of the pandemic, the occupational stress experienced by health professionals, and the inability to sufficiently keep up with the flow of information. None of the participants thought that the pandemic was being exaggerated, and in fact the majority thought that more attention should be given to the COVID-19 pandemic. This indicates that awareness of the pandemic is high among ophthalmologists. The majority of the participants expected the pandemic to last up to 6 months.

Conclusion

Because ophthalmologists are always in close proximity to the patient, they are in the risk group for COVID-19. With the ongoing pandemic, anxiety levels have increased, work conditions have changed, and urgent examinations and interventional procedures have been prioritized. It is therefore necessary to provide up-to-date information on the use of PPE and procure materials. Although it is uncertain when the pandemic will end, following guidelines is immensely important for not only ourselves but also our patients.

Ethics

Ethics Committee Approval: Obtained.

Informed Consent: Obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: I.K., M.M., **Design:** I.K., M.M., **Data Collection or Processing:** I.K., **Analysis or Interpretation:** I.K., M.M., **Literature Search:** I.K., M.M., **Writing:** I.K., M.M.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

- Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, Qiu Y, Wang J, Liu Y, Wei Y, Xia J, Yu T, Zhang X, Zhang L. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395: 507-513.
- Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun*. 2020;109:102433.
- Xia J, Tong J, Liu M, Shen Y, Guo D. Evaluation of coronavirus in tears and conjunctival secretions of patients with SARS-CoV-2 infection. *J Med Virol*. 2020;92:589-594.
- Cheema M, Aghazadeh H, Nazarali S, Ting A, Hodges J, McFarlane A, Kanji JN, Zelyas N, Damji KF, Solarte C. Keratoconjunctivitis as the initial medical presentation of the novel coronavirus disease 2019 (COVID-19). *Can J Ophthalmol*. 2020;55:125-129.
- Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DSC, Du B, Li LJ, Zeng G, Yuen KY, Chen RC, Tang CL, Wang T, Chen PY, Xiang J, Li SY, Wang JL, Liang ZJ, Peng YX, Wei L, Liu Y, Hu YH, Peng P, Wang JM, Liu JY, Chen Z, Li G, Zheng ZJ, Qiu SQ, Luo J, Ye CJ, Zhu SY, Zhong NS; China Medical Treatment Expert Group for Covid-19. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020;382:1708-1720.
- Johnston LB, Conly JM. Severe acute respiratory syndrome: What have we learned two years later? *Can J Infect Dis Med Microbiol*. 2004;15:309-312.
- Coronavirus kills Chinese whistleblower ophthalmologist. *American Academy of Ophthalmology*. <https://www.aaopt.org/headline/coronavirus-kills-chinese-whistleblower-ophthalmol>. Accessed 15 Feb 2020 <https://www.aaopt.org/headline/coronavirus-kills-chinese-whistleblower-ophthalmol>
- Minocha A, Sim SY, Than J, Vakros G. Survey of ophthalmology practitioners in A&E on current COVID-19 guidance at three major UK eye hospitals. *Eye (Lond)*. 2020;34:1243-1245.
- Bartoszko J, Farooqi MAM, Alhazzani W, Loeb M. Medical masks vs N95 respirators for preventing COVID-19 in health care workers a systematic review and meta-analysis of randomized trials. *Influenza Other Respir Viruses*. 2020;14:365-373.
- Romano MR, Montericchio A, Montalbano C, Raimondi R, Allegrini D, Ricciardelli G, Angi M, Pagano L, Romano V. Facing COVID-19 in ophthalmology department. *Curr Eye Res*. 2020;45:653-658.
- Zhou Y, Zeng Y, Tong Y, Chen C. Ophthalmologic evidence against the interpersonal transmission of 2019 novel coronavirus through conjunctiva. *medRxiv*. 2020.
- Wu P, Duan F, Luo C, Liu Q, Qu X, Liang L, Wu K. Characteristics of ocular findings of patients with coronavirus disease 2019 (COVID-19) in Hubei Province, China. *JAMA Ophthalmol*. 2020;138:575-578.
- Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y, Zhao Y, Li Y, Wang X, Peng Z. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*. 2020;323:1061-1069.
- Lei S, Jiang F, Su W, Chen C, Chen J, Mei W, Zhan LY, Jia Y, Zhang L, Liu D, Xia ZY, Xia Z. Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. *EClinicalMedicine*. 2020;21:100331.

15. Jones L, Walsh K, Willcox M, Morgan P, Nichols J. The COVID-19 Pandemic: Important considerations for contact lens practitioners. *Cont Lens Anterior Eye*. 2020;43:196-203.
16. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, Ho RC. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health*. 2020;17:1729.
17. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *Gen Psychiatr*. 2020;33:e100213.