



Survey of the Impact of the COVID-19 Pandemic on Ophthalmology Clinical Practice in Turkey

© Melisa Zişan Karşlıođlu*, © Cem Öztürkmen**, © Cem Kesim*, © Ayşe Yıldız Taş*,
© Pınar Günel Karadeniz***, © Afsun Şahin*

*Koç University Faculty of Medicine, Department of Ophthalmology, İstanbul, Turkey

**Göznuru Eye Hospital, Gaziantep, Turkey

***Sanko University Faculty of Medicine, Department of Biostatistics, Gaziantep, Turkey

Abstract

Objectives: To investigate the effect of the novel coronavirus disease 2019 (COVID-19) pandemic on the clinical practice of ophthalmologists in our country.

Materials and Methods: A questionnaire consisting of 22 questions was delivered to 250 ophthalmologists via e-mail and a smartphone messaging application. A total of 113 ophthalmologists completed the survey. The questions included the participants' demographic data (age, years in practice, institution, and city), changes in their working conditions and institutional preventive measures implemented during the pandemic, their personal COVID-19 experiences, the prevalence of telemedicine applications, and their attitudes toward these practices.

Results: Nearly half (47.8%) of the 113 ophthalmologists were 36 to 45 years old. In terms of years in practice, the largest proportion of respondents (28.3%) had 6-10 years of experience. Most of the participants worked in private/foundation universities (37.2%), while 22.1% worked in education and research clinics. Participants working at public universities most often reported that they or a close contact had to work in COVID wards (89.5%). Triage was performed in 51.5% of ophthalmology outpatient clinics, with 88.0% of these participants reporting that patients with fever, cough, or dyspnea were directed to the pandemic clinic without ophthalmological examination. All participants working in public hospitals, education and research clinics, and public university hospitals had postponed elective surgeries, whereas 12.5% of those working in private practice and 20.5% of those working in private/foundation universities reported that they continued elective surgeries. While 80.8% of the participants did not conduct online interviews or examinations, 40.4% stated that they considered telemedicine applications beneficial. Seventy-seven percent of participants expressed concern about a decrease in their income during the pandemic, with this being especially common among participants working in private practice (87.5%) and private/foundation university hospitals (85.7%).

Conclusion: Ophthalmologists across our country have been affected by this pandemic at a level that will change their clinical approach. We think that ophthalmologists impacted by the difficulty of providing personal protective equipment and economic concerns should be supported more during the pandemic.

Keywords: COVID-19 pandemic, ophthalmology clinical practice, survey

Address for Correspondence: Afsun Şahin, Koç University Faculty of Medicine, Department of Ophthalmology, İstanbul, Turkey

Phone: +90 505 671 32 24 E-mail: afsunshahin@gmail.com **ORCID-ID:** orcid.org/0000-0002-8963-5146

Received: 22.08.2020 **Accepted:** 05.11.2020

Cite this article as: Karşlıođlu MZ, Öztürkmen C, Kesim C, Yıldız Taş A, Günel Karadeniz P, Şahin A. Survey of the Impact of the COVID-19 Pandemic on Ophthalmology Clinical Practice in Turkey. Turk J Ophthalmol 2021;51:269-281

Introduction

The novel coronavirus disease 2019 (COVID-19) pandemic is a global health problem. This highly contagious virus, called “severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)”, causes severe acute respiratory failure, with an incubation period ranging from 2 to 14 days.¹ Due to the high rates of transmission and asymptomatic carriers, a substantial proportion of health workers are at risk of infection.² Unfortunately, ophthalmology practice requires prolonged close contact with patients in high-volume outpatient clinics, and the literature clearly states that care must be taken regarding SARS-CoV-2 transmission through the ocular surface.³ For this reason, ophthalmologists are in a branch at higher risk of COVID-19 infection.⁴ In fact, Dr. Li Wenliang, an ophthalmologist working in Wuhan, China, the starting point of the pandemic, died of this infection before it was even called an epidemic.⁵

At the time of this writing, the COVID-19 pandemic has infected more than 12 million people worldwide and killed more than 550 thousand patients, and although its impact has abated in many countries, the pandemic continues. When the first case was reported in our country on March 11, 2020, strict measures were implemented in many areas, resulting in community-wide social and occupational reorganization. Even during quarantine periods when all citizens were expected to physically isolate themselves from the outside world, the health sector and all healthcare professionals continued to provide service, even beyond COVID-19 treatments. However, many drastic revisions in these health services were introduced, and these changes were also reflected in ophthalmology clinical practice practices (COVID-19 Novel Coronavirus Disease, Infection Control Measures in Health Institutions, Ministry of Health, <https://covid19bilgi.saglik.gov.tr>).

In line with the COVID-19 guidelines published by the Turkish Ministry of Health, the Turkish Ophthalmological Association also prepared guidelines for physicians and patients. The Turkish Ophthalmological Association made important suggestions in its article titled “Guide to Protection Principles for Ophthalmologists” published on its official website (Göz hekimleri için korunma prensipleri rehberi [English not available], Turkish Ophthalmological Association, <https://koronavirus.todnet.org>).

These recommendations can be summarized as frequent hand washing, wearing surgical masks and protective goggles or visors, surface disinfection, social distancing except for examination, questioning symptoms before examination, and especially wearing a mask (N95) when in contact with people with diagnosed or suspected COVID-19. In a message dated March 28, 2020, the Ocular Infection Society of the Turkish Ophthalmological Association shared methods to create a barrier between patient and physician during biomicroscopic examination and emphasized the need to reduce patient density and regularly ventilate outpatient waiting rooms. In a message dated March 30, 2020, the Turkish Ophthalmological

Association Glaucoma Society reported that there was no clear preference in terms of intraocular pressure measurement technique, although some scientists argued that non-contact methods may disperse micro-aerosol particles and were therefore not recommended. They also emphasized that in contact tonometry methods, probes that come into contact with the patient must be effectively disinfected. Similarly, they recommended cleaning instruments such as gonioscopes and pachymetry devices with an appropriate surface disinfectant. In a post dated April 24, 2020, the Contact Lens Society stated that there is no harm in continuing to use contact lenses if normal personal hygiene rules and restrictions are followed independent of COVID-19 infection.

Although many guidelines have been published in a short time, it is not known exactly how many of these recommendations are being reflected in the ophthalmology clinical practice in our country and to what extent they are applied. The aim of this study was to conduct a survey investigating the effects of the COVID-19 pandemic on the clinical practices of ophthalmologists in our country.

Materials and Methods

Approval was obtained from the Ministry of Health Scientific Research Platform and the Human Clinical Research Review Ethics Committee to conduct the study in accordance with the ethical principles and practices stated in the Declaration of Helsinki (Sanko University Clinical Research Ethics Committee 2020/10, decision no: 01, date: June 18, 2020). This cross-sectional study was conducted using a 22-item questionnaire we created using a special survey program (QualtricsSM, Boston, United States) and practically and quickly sent to practicing ophthalmologists via e-mail or a smartphone messaging application using the same program (Appendix 1). According to this program, a respondent cannot fill in the questionnaire more than once and their responses are instantly sent to the researcher’s registered account, allowing rapid target-oriented analysis of the collected data. The obtained data were completely anonymous, containing no participant identifying information, and user privacy was observed. Qualtrics is a commonly used application worldwide that has been shown to be secure in terms of user privacy.

Parameters Evaluated in the Survey

The questionnaire included items asking about the participants’ demographic data such as age, years in practice, institution and city, changes in working conditions during the pandemic, provision of personal protective equipment (PPE) by their institution, disinfection practices, whether they or a close contact had COVID-19 infection, and their level of anxiety regarding COVID-19 infection. There were also items regarding the pre-examination patient questioning practices in their ophthalmology outpatient clinic, approach to elective surgeries, their personal approach to patients in follow-up units (cornea, glaucoma, retina, etc.), as well as their recommendations regarding contact lens use and intraocular pressure measurement

technique. Finally, we included items to evaluate the prevalence of telemedicine practices in our country, the participants' general attitude toward this practice, and pandemic-induced economic concerns.

Statistical Analysis

Statistical analyses were performed using the “data and analysis” module in the Qualtrics application. Percentage values were given as descriptive statistics.

Results

Demographic Data

The questionnaire was sent to 250 ophthalmologists via e-mail and a smartphone messaging application. A total of 113 ophthalmologists completed the questionnaire, although 23 participants did not answer all of the items. Of the 113 participants, 47.79% (n=54) were 36-45 years old and 23.01% (n=26) were 46-55 years old (Figure 1). In terms of years in practice, 28.32% (n=32) of the participants had been working for 6-10 years, followed by 20.35% (n=23) in each the 1-5 years and ≥21 years categories (Figure 1). The largest proportion of participants worked in private or foundation universities (37.17%, n=42), while 22.12% (n=25) worked in education and research clinics (Figure 1). When the participants' cities were evaluated, 22.12% (n=25), 11.5% (n=13), and 1.77% (n=2) of the participants were working in the three largest cities

in Turkey (İstanbul, Ankara, and İzmir, respectively) and the remaining 64.6% (n=73) were working in places other than these three major cities.

Changes in Working Conditions and Institutional Precautionary Measures

Of the 101 participants answered the questions in this part of the survey, 89.11% (n=90) reported that their institutions had implemented rotating shift schedules during the period between the detection of the first case in Turkey on March 11, 2020 and the relaxation of the restrictions on May 11, 2020. However, 85.15% (n=86) stated that they continued to provide outpatient clinic services through the appointment system (Figure 2).

Nearly all (98.02%, n=99) of the 101 ophthalmologists who answered the questions under this subheading had access to adequate hand sanitizer and 83.17% (n=84) had access to protective equipment such as surgical masks, gloves, goggles, visors, and aprons (Figure 2). Of the 99 ophthalmologists who answered the question about whether they had access to specialty masks such as FFP2 or FFP3 in their institutions, 42.42% (n=48) said they could get them immediately upon request and 35.35% (n=35) said they could only obtain them when they would be in contact with diagnosed or suspected COVID-19 patients, while 22.22% (n=22) reported that they could not obtain specialty masks through their institutions and had purchased them by their own means.

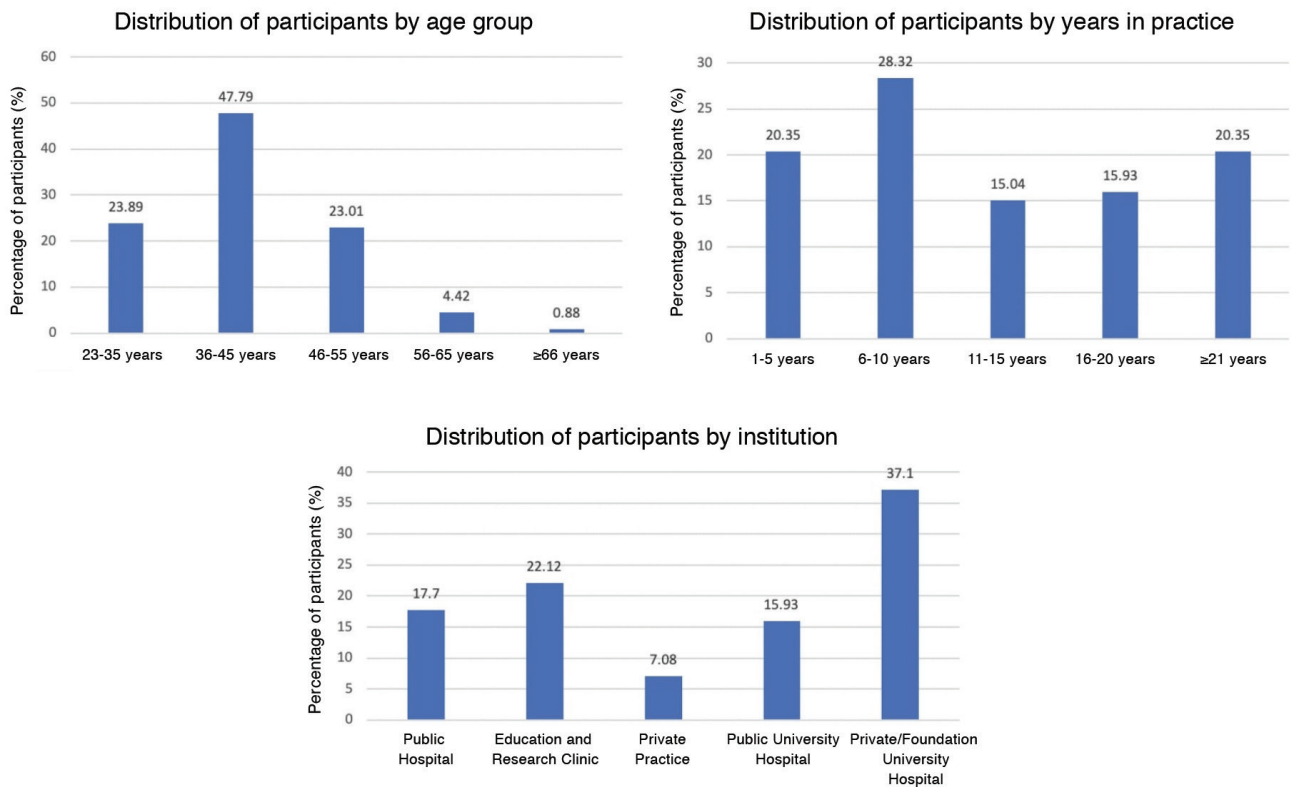


Figure 1. Distribution of participants according to age, years in practice, and employing institution

According to the responses from the 101 participants who answered the questions about the precautions taken in outpatient clinics, the recommended seating arrangement for maintaining social distance in outpatient clinic waiting rooms could be implemented in 64.36% (n=65) of institutions and that examination room precautions such as wearing a visor to prevent virus transmission or positive pressure air filtration were implemented in 68.32% (n=69) of institutions (Figure 2). Of these 101 participants, 66.34% (n=67) stated that they admitted patients to the examination room alone unless the patient could not communicate for themselves, while 33.66% (n=34) said that they also admitted patient relatives into the examination room provided that they maintained social distance. The 99 ophthalmologists who answered the question about environmental disinfection indicated that disinfection was done after each patient in 34.34% (n=34) and after a patient with diagnosed or suspected COVID-19 in 51.52% (n=51) of the institutions. The remaining 14.14% (n=14) reported that environmental disinfection was not performed.

COVID-19 Contact

Of the 107 participants who responded to the items evaluating COVID-19 contact during the pandemic, 10.28% (n=11) said that they or a close contact had been infected, with the highest rate of infection in self or a close contact reported by participants working in public hospitals (26.3%, 5/19). During this period, 89.5% (17/19) of the participants working in public hospitals and 75% (18/24) of the participants working in education and research clinics stated that they or a close contact had to work or take shifts in a COVID-19 ward.

Of the 107 ophthalmologists who answered the multi-part item evaluating anxiety, 67.29% (n=72) reported that they feared COVID-19 infection, 79.44% (n=85) reported that thinking about it made them uneasy, and 30.84% (n=33) reported that they feared dying due to COVID-19 (Figure 3). When the anxiety levels of the participants were analyzed according to age range, we determined that the distribution of responses did not differ by age (Figure 4).

Symptom Inquiry Before Eye Examination

The participants were asked whether they questioned patients about COVID-19 symptoms before starting ophthalmological examinations. Of the 101 participants who responded to this question, 51.49% (n=52) said that patients were asked about symptoms upon admission and before beginning the examination, and of these participants, 88% (n=44) referred patients with fever, cough, or dyspnea and 76% (n=38) referred patients with a history of overseas travel directly to the pandemic outpatient clinic without performing ophthalmological examination.

Approach to Surgery

Of the 107 participants who answered the question about the decision to perform surgery, 19.63% (n=21) stated that they did not perform any surgeries, 39.25% (n=42) were continuing to perform emergency surgeries but postponed elective cases for at least 1 month, and 32.71% (n=35) continued to perform emergency surgeries but postponed elective cases for at least 3 months (Figure 5). Of the 8.41% (n=9) of participants who continued elective surgeries unconditionally, 88.8% (n=8) worked at private or foundation universities. Elective surgeries were postponed by all ophthalmologists working in public hospitals, education and research clinics, and public university hospitals, whereas 12.5% (1/8) of those working in private practice and 20.5% (8/39) of those working in private or foundation universities continued elective surgeries unconditionally.

Approach to Cornea and Contact Lens, Uvea, Retina, Glaucoma, Ocular Oncology, Strabismus, and Oculoplasty Unit Patients

Of the 107 participants who answered the relevant question in the survey, 83.18% (n=89) said that they followed up with unit patients, and of the 87 participants who answered the following multi-part question, no postponement of follow-up appointments was reported by 59.77% (n=52) for ocular oncology, 58.62% (n=51) for uvea, 50.57% (n=44) for retina, 48.28% (n=42) for glaucoma, and 34.48% (n=30) for cornea and contact lens patients. High proportions of participants reported

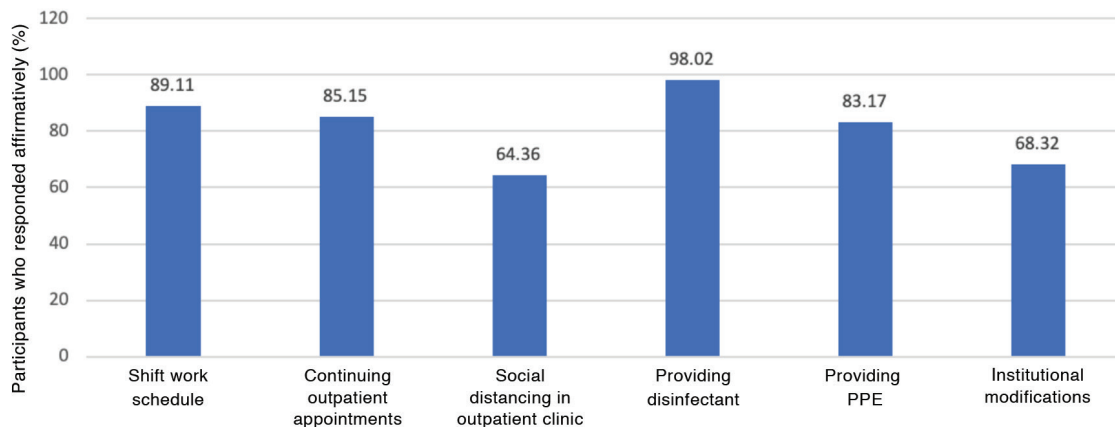


Figure 2. Operational changes and preventive measures taken in the participants' institutions (PPE: Personal protective equipment)

postponing follow-up appointments for oculoplastic (67.82%, n=59) and strabismus (62.07%, n=54) patients.

Of the 107 participants who responded to the question about contact lens use, 44.86% (n=48) did not recommend the use of contact lenses, while 55.14% (n=59) recommended the use of contact lenses under appropriate hand washing and hygiene conditions. Among the methods of intraocular pressure measurement, non-contact tonometry was most preferred (73.83%, n=79) and applanation tonometry was least preferred (9.35%, n=10).

Approach to Telemedicine Applications

In the survey, 80.8% (n=80) of the 99 participants who answered the question evaluating telemedicine practices stated that they did not conduct online appointments or examinations during the pandemic. The proportion of participants who did conduct online appointment/examinations was highest among ophthalmologists working in private practice (37.5%, 3/8) and private or foundation university hospitals (35.1%, 13/37). Regardless of whether they used telemedicine applications or not, 40.4% (n=40) of all participants reported that they found them useful (Figure 6).

Economic Concerns

Finally, 76.99% (n=87) of the 113 participants stated that they were concerned about a decrease in their income during the pandemic. This concern was expressed most often by ophthalmologists working in private or foundation university hospitals (88.9%, 37/42) and those in private practice (87.5%, 7/8). When the anxiety about loss of income was evaluated based on city, we observed that this concern was felt by both of the participants working in İzmir (100%, n=2), 76% (19/25) of those working in İstanbul, 58.3% (7/13) of those working in Ankara, and 80.8% (59/73) of those working in other cities.

Discussion

The worldwide COVID-19 pandemic has not yet been brought under control, treatment protocols must be frequently updated, and there is not yet a vaccine to protect against

infection; therefore, the problem of SARS-CoV-2 infection remains a pressing current issue. Many countries are conducting their own studies to evaluate the situation during periods of rising COVID-19 infections and enable the development of action plans for all types of scenarios that may cause this to happen. There are a few studies in the literature evaluating changes, new approaches, or influences during this period in the field of ophthalmology.

According to the survey we created for this study, between when the first case was officially reported in our country on March 11 and when the “new normal” was introduced on May 11, it was determined that PPE supply, changes in working schedules and settings, psychological trauma, and economic concerns caused by the COVID-19 pandemic were strong determinants of ophthalmologists’ clinical approaches.

Different countries around the world are conducting various studies to investigate the national effects of the pandemic. Survey studies provide insight on prospective beneficial changes by enabling the concurrent evaluation of many different issues, such as the organization of operations or emotional states of individuals in the sector being studied. In a survey from India, Nair et al.⁶ evaluated ophthalmology practice through a 9-item questionnaire that was sent to a total of 1260 ophthalmologists through social media platforms during a 21-day quarantine period and remained open to responses for 48 hours. It was reported that 61.52% of the participants worked in the private sector and 14.8% were affiliated with an institution. Although the number of employees in the private sector was quite high, the authors determined that 72.5% of all ophthalmologists did not examine any patients during the quarantine period and postponed elective cases, and 82.9% of those who saw patients only saw emergency cases. In addition, 77.5% of all ophthalmologists participating in the survey provided consultancy services via telephone, e-mail, video, or social media platforms, and 59.1% expressed feeling they were more at risk when examining patients compared to clinicians in other branches. Over half (57.8%) of the participants said that they did not know when elective surgeries would resume, while

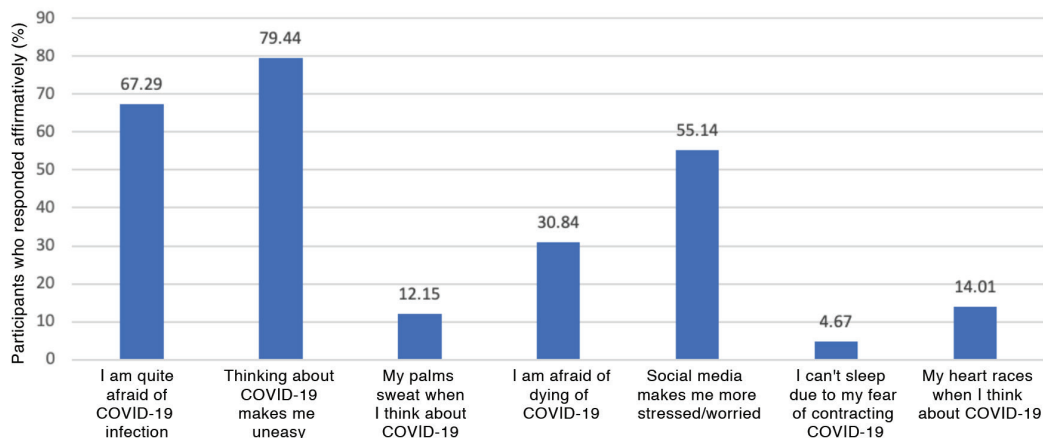


Figure 3. Evaluation of psychological anxiety due to novel coronavirus disease 2019 (COVID-19)

62.8% stated that they did not know what protective measures and screening strategies to use and were waiting for updated guidelines about this in order to resume. In terms of change in wards, it was reported that 27.5% of the ophthalmologists were temporarily assigned to emergency departments.⁶ In contrast, in our study we used a 22-item questionnaire to also evaluate ophthalmologists' economic concerns, use of PPE, and changes in working conditions and operations in their institutions. While 19.63% of ophthalmologists in our country stated that

they did not perform any elective surgeries, most (88.8%) of the 8.41% who did not postpone any surgeries were employees in private or foundation universities, which demonstrates the impact of economic concerns on the decision to perform surgery. In addition, although telemedicine applications were performed at a much lower rate than in India (only 19.39%), 40.81% of our ophthalmologists considered these applications beneficial.

In a survey by Khanna et al.⁷ evaluating only the psychological effects of the pandemic on ophthalmology

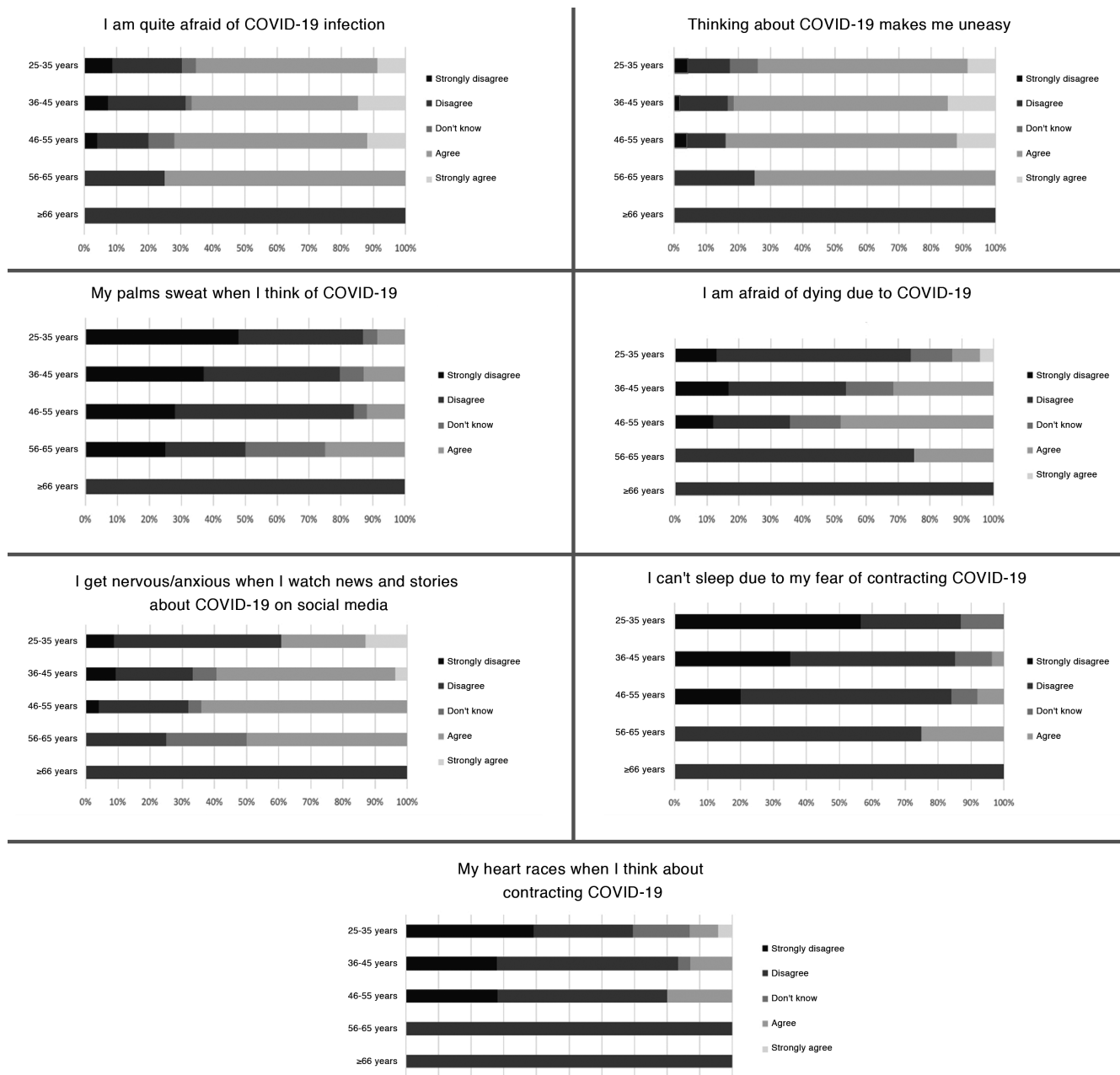


Figure 4. Distributions of COVID-19-related anxiety according to age group (COVID-19: Novel coronavirus disease 2019)

residents and specialists, it was determined that 32.6% of the 2,355 participants had very mild depression and 21.4% had mild depression, and these values were higher than the 10% prevalence of common mental disorders reported in the general Indian population. In addition, it was found that depression was more common in young ophthalmologists and decreased by 3% with each year increase in age. In our study, 67.2% of all ophthalmologists reported serious anxiety related to the COVID-19 pandemic, but there was no significant difference in anxiety levels according to age.

In New York City, one of the places most affected by the pandemic, a survey was done to assess COVID-19 exposure among medical residents in different institutions.⁴ The study included 2306 residents in 24 different specialties in a total of 91 training programs. Of these, 101 of the physicians had positive COVID-19 test results, 163 were presumed positive (consistent symptoms and clinical picture but not tested), and 76 had negative test results despite suspicious symptoms. The remaining 1,748 residents had no suggestive symptoms and

thus were not tested. Over one-quarter (27.3%) of the residents had been assigned to work in COVID-19 wards, with the largest proportion of these being residents of anesthesiology. Based on the residents' positive test results, it was noted that anesthesiology, emergency medicine, and ophthalmology were branches at higher risk of transmission. Among all participants, 1832 residents (79.4%) used a standard surgical mask or N95 mask depending on the patient's condition, 323 residents (14%) only used standard surgical masks, and 31 residents (5.7%) were always able to obtain N95 masks. In general, 1314 residents (56.9%) reported that the PPE they used was substandard. In that study, the total proportion of residents with confirmed or suspected COVID-19 was calculated as 11.5%, whereas 10.28% of the ophthalmologists in our study reported that they or a close contact had been diagnosed as having COVID-19. While 27.3% of all residents had a change in where they were assigned to work during the pandemic, a large proportion of the ophthalmologists who participated in our survey (63.55%) were assigned to work in COVID wards. In terms of PPE, we noted that 22.2% of the

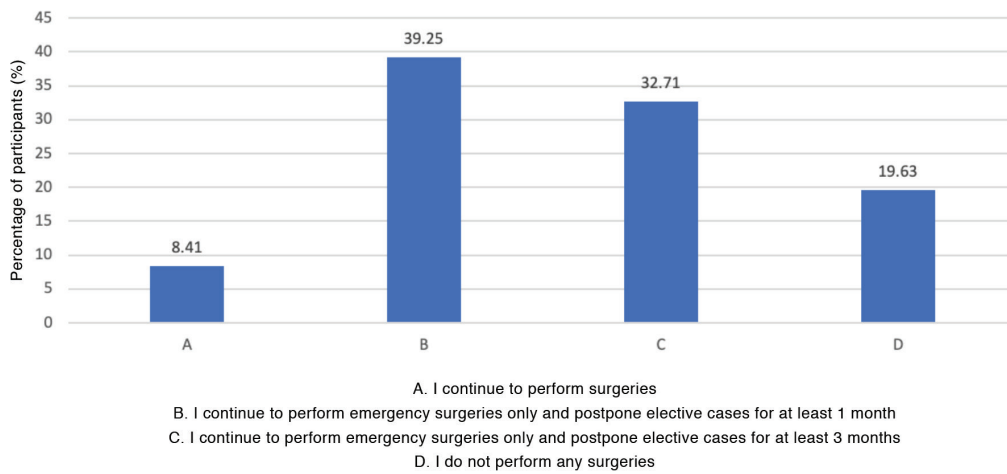


Figure 5. Approaches to patients with surgical indications

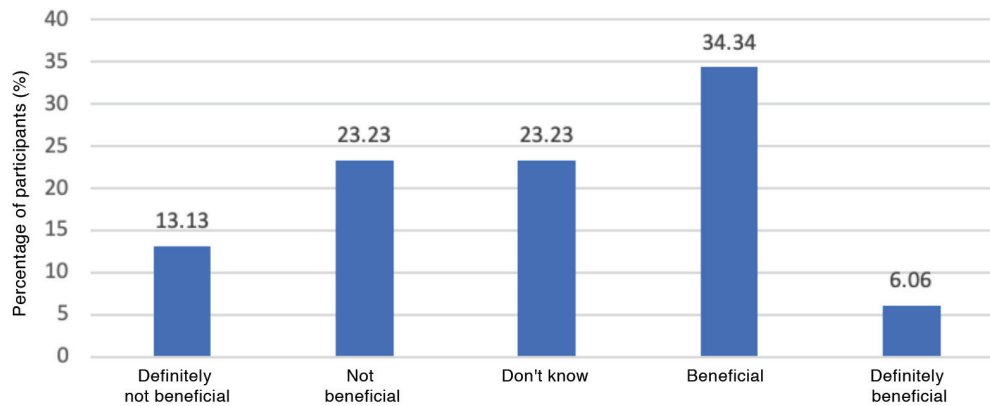


Figure 6. Attitude toward health services provided by online video calls or examinations

ophthalmologists in our country could only request standard surgical masks from their institutions and 42.4% could request N95 masks depending on the patient's status.

Minocha et al.⁸ conducted a survey via Google Forms including a total of 100 people (80 ophthalmologists, 11 optometrists, 8 nurses, 1 healthcare professional) working in ophthalmology clinics of 3 major hospitals in the UK to evaluate their perceived risk of contracting COVID-19, the comprehensibility and reliability of national public health regulations, and the recommended PPE and training in its use in the relevant hospitals. Eighty percent of the participants reported that they felt at risk of COVID-19 transmission because they worked in an ophthalmology clinic, while 55% said public health institutions did not provide adequate information or guidance in terms of identifying patients with COVID-19 or at risk of having COVID-19, and 79% reported that they had not been trained in the use of PPE. In our study, 67.2% of Turkish ophthalmologists expressed severe anxiety about their risk of contracting COVID-19, but because the survey did not include any questions about PPE training or Ministry of Health COVID-19 treatment guidelines, we did not evaluate these.

In a study conducted in Israel, Wasser et al.⁹ assessed changes in ophthalmologists' clinical and surgical approaches using a 17-item questionnaire on SurveyMonkey.com early in the pandemic, when a government-issued official regulation was not yet in place. No limitations in the number of outpatients and elective surgery appointments were reported by 52.7% and 69.9% of the participating ophthalmologists, respectively. In addition, 46.4% of the participants questioned patients before eye examination, 60.5% were aware of COVID-19 guidelines, and 50.6% were able to obtain PPE from their institution. However, when asked at what level they would recommend providing outpatient services or performing surgery, 62.9% and 72.7% of the participants respectively supported only evaluating emergency cases. In our study, only 8.41% of Turkish ophthalmologists stated that they did not postpone elective surgeries, while 39.25% stated that they postponed elective surgeries for at least 1 month and 32.71% for at least 3 months. We noted that patients were questioned before undergoing an eye examination in 51.49% of institutions. A fairly high percentage (77.7%) of ophthalmologists participating from across the country reported that they had access to PPE when needed.

Our study has strengths and shortcomings. During the "new normal" period in our country, we also received surveys related to the COVID-19 pandemic in the field of ophthalmology. However, the questions in these surveys did not investigate the effect of the pandemic on ophthalmologists' clinical practice and the results have not yet been published to the best of our knowledge. In this context, there has been no previous assessment of how pandemic-induced concerns among physicians and healthcare professionals affect ophthalmology clinical practice and to what degree institutions influence the physician's behavioral model. A shortcoming of our study is the small number of

ophthalmologists that participated in the survey. However, despite the small sample size, the fact that the frequency of responses to some questions approached 80% shows that the COVID-19 pandemic affects ophthalmology practice in our country. This suggests that more extensive studies are needed.

Conclusion

The COVID-19 pandemic has caused significant changes in ophthalmologists' clinical practices, and these changes may persist for some time after the pandemic. Based on our results, we believe that psychological and economic support as well as institutional modifications and personal protective measures are necessary for Turkish ophthalmologists to act in accordance with national and international guidelines in their clinical approaches and choices.

Ethics

Ethics Committee Approval: Approval was obtained from the Ministry of Health Scientific Research Platform and the Human Clinical Research Review Ethics Committee to conduct the study in accordance with the ethical principles and practices stated in the Declaration of Helsinki (Sanko University Clinical Research Ethics Committee 2020/10, decision no: 01, date: June 18, 2020).

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: C.Ö., A.Ş., Design: M.Z.K., C.Ö., A.Ş., Data Collection or Processing: M.Z.K., C.K., A.Y.T., P.G.K., Analysis or Interpretation: M.Z.K., C.K., A.Ş., Literature Search: C.K., A.Y.T., Writing: M.Z.K., A.Ş.

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

- Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. *Int J Antimicrob Agents.* 2020;55:105924.
- Chang D, Xu H, Rebaza A, Sharma L, Dela Cruz CS. Protecting health-care workers from subclinical coronavirus infection. *Lancet Respir Med.* 2020;8:13.
- Lu CW, Liu XF, Jia ZF. 2019-nCoV transmission through the ocular surface must not be ignored. *Lancet.* 2020;395:39.
- Breazzano MP, Shen J, Abdelhakim AH, Glass LRD, Horowitz JD, Xie SX, de Moraes CG, Chen-Plotkin A, Chen RW; New York City Residency Program Directors COVID-19 Research Group. New York City COVID-19 resident physician exposure during exponential phase of pandemic. *J Clin Invest.* 2020;130:4726-4733.
- Petersen E, Hui D, Hamer DH, Blumberg L, Madoff LC, Pollack M, Lee SS, McLellan S, Memish Z, Praharaj J, Wasserman S, Ntoumi F, Azhar EI, Mchugh TD, Kock R, Ippolito G, Zumla A, Koopmans M. Li Wenliang, a face to the frontline healthcare worker. The first doctor to notify the emergence of the SARS-CoV-2, (COVID-19), outbreak. *Int J Infect Dis.* 2020;93:205-207.
- Nair AG, Gandhi RA, Natarajan S. Effect of COVID-19 related lockdown on ophthalmic practice and patient care in India: Results of a survey. *Indian J Ophthalmol.* 2020;68:725-730.

7. Khanna RC, Honavar SG, Metla AL, Bhattacharya A, Maulik PK. Psychological impact of COVID-19 on ophthalmologists-in-training and practising ophthalmologists in India. *Indian J Ophthalmol.* 2020;68:994-998.
8. 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.
9. Wasser LM, Assayag E, Tsessler M, Weill Y, Becker-Cohen M, Zadok D. Response of ophthalmologists in Israel to the novel coronavirus (2019-nCoV) outbreak. *Graefes Arch Clin Exp Ophthalmol.* 2020;258:1419-1426.

Appendix 1. Effect of the COVID-19 pandemic on ophthalmology clinical practice questionnaire

Question 1. How old are you?

- 23-35
- 36-45
- 46-55
- 56-65
- 66 years or older

Question 2. How many years have you been working as an ophthalmologist?

- 1-5
- 6-10
- 11-15
- 16-20
- 21 years or more

Question 3. What type of institution do you work in?

- Public hospital
- Education and research clinic
- Private practice
- Public university hospital
- Private/foundation university hospital

Question 4. What city do you work in?

- İstanbul
- Ankara
- İzmir
- Other (please write)

Question 5. Are you concerned that your income will decrease during the pandemic?

- Yes
- No

Question 6. Have you or someone close to you been diagnosed with COVID-19?

- Yes
- No

Question 7. Have you or someone close to you had to work/take shifts in a ward for patients with COVID-19?

- Yes
- No

Question 8. Please choose the expression that best represents your opinion about the following statements.

	Strongly disagree	Disagree	I don't know	Agree	Strongly agree
- I'm quite afraid of COVID-19 infection					
- Thinking about COVID-19 makes me uneasy					
- My palms sweat when I think of COVID-19					
- I am afraid of dying due to COVID-19					
- I get nervous or anxious when I watch news and stories about COVID-19 on social media					
- I can't sleep due to my fear of contracting COVID-19					
- My heart races when I think about contracting COVID-19					

Question 9. What is your approach toward the use of contact lenses during the pandemic?

- I definitely do not recommend using them
- I recommend using them if the user can provide appropriately hygienic conditions.

Question 10. Which method do you use to measure intraocular pressure during the pandemic?

- Non-contact tonometry
- Applanation tonometry
- Finger tension

Question 11. What is your approach to patients who have a surgical indication during the pandemic?

- I continue to perform surgeries
- I continue to perform emergency surgeries only and postpone elective cases for at least 1 month
- I continue to perform emergency surgeries only and postpone elective cases for at least 3 months
- I do not perform any surgeries

Question 12. Do you see patients in follow-up units (glaucoma, retina, cornea, etc.)?

- Yes
- No

Question 13. How long do you postpone routine follow-up appointments of patients in follow-up units (glaucoma, retina, cornea, etc.)?

	I do not postpone them	1 month	3 months
Glaucoma			
Uvea			
Retina			
Cornea and contact lens			
Ocular oncology			
Strabismus			
Oculoplasty			

Question 14. Please answer “Yes” or “No” to the following questions.

	Yes	No
- Was a rotating shift work schedule implemented in the institution where you work between when the first COVID-19 case was reported in our country on March 11, 2020 to when social restrictions were eased on May 11, 2020?		
- Do you continue to provide outpatient services through the appointment system?		
- Are you able to apply the recommended seating arrangements to maintain social distance in the waiting room of the outpatient clinic?		
- Do you have access to a sufficient amount of disinfectant for hand hygiene in your institution?		
- Do you have access to sufficient personal protective equipment (e.g., masks, gloves, goggles, visors, coveralls) to prevent virus transmission in your institution?		
- Have any modifications been made in the outpatient clinic rooms in your institution to prevent virus transmission (e.g., installing shields on examination units, positive pressure air filtration)?		

Question 15. Do you admit patient relatives into the outpatient examination rooms together with patients?

- Yes, I admit patient relatives provided they maintain social distance
- No, I admit patients only into the examination room unless they are not able to communicate for themselves

Question 16. Do you apply triage at outpatient admission?

- Yes
- No

Question 17. In your admission triage practice, what happens if a patient has fever (>38 °C), cough, and dyspnea?

- I refer the patient to the “pandemic outpatient clinic” without performing ophthalmological examination.
- I provide the patient a mask and perform a routine ophthalmological examination, but postpone the elective examinations (optical coherence tomography, topography, computerized visual field testing).
- I provide the patient a mask and perform all kinds of ophthalmological examinations and imaging.

Question 18. In your triage practice, what happens if a patient has traveled to one of the international pandemic zones in the last 14 days or has contact with someone who has?

- I refer the patient to the “pandemic outpatient clinic” without performing ophthalmological examination.
- I provide the patient a mask and perform a routine ophthalmological examination, but postpone the elective examinations (optical coherence tomography, topography, computerized visual field testing).
- I provide the patient a mask and perform all kinds of ophthalmological examinations and imaging.

Question 19. How is environmental disinfection achieved after the outpatient clinic in your institution?

- The examination unit, instruments used, and door handles are disinfected by the cleaning staff after each patient.
- The examination unit, instruments used, and door handles are disinfected by the cleaning staff not after every patient, but after patients with confirmed or suspected COVID-19.
- Environmental disinfection is not performed.

Question 20. Do you have adequate access to specialty masks (FFP2, FFP3) other than surgical masks in your institution?

- I can obtain them immediately upon request.
- I can only obtain them when I will come into contact with confirmed or suspected COVID-19 patients.
- I cannot obtain specialty masks other than surgical masks in my institution.

Question 21. Do you use an online video call/examination application with your patients through your institution?

- Yes
- No

Question 22. Do you think that online video calls/examination applications are beneficial to the health service received by the patient? Please choose from the expressions below which best represents your opinion.

- Strongly disagree
- Disagree
- I don't know
- Agree
- Strongly agree