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Investigation of the Effect of COVID-19 Pandemic on the Clinical Attitudes and Habits of Ophthalmologists: A Survey Study

COVID-19 Pandemisinin Oftalmologların Klinik Tutum ve Alışkanlıklarına Etkisinin Araştırılması: Bir Anket Çalışması

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ABSTRACT Objective: While the coronavirus disease-2019 (COVID-19) pandemic is rapidly spreading all over the world in a short time, ophthalmological examinations that require to be in close contact with patients have increased the risk of disease infection for ophthalmologists. In this study, it is aimed to examine various personal protective equipment and clothes used by ophthalmologists to protect themselves in ophthalmology and analyze the changes in their attitude and approaches towards patients during the pandemic period. **Material and Methods:** During a 3-month period beginning from the pandemic in Turkey, a 22-question survey about ophthalmologists' use of mask, clothes, biomicroscope breathing shield, protective glasses, gloves, the habit of giving contact lens, surgical practices in the clinic, number of patients, attitude towards patients, contacts with the confirmed COVID-19 patients and COVID-19 duties apart from ophthalmology have been prepared and sent to all opthalmologists working in Turkey and the obtained data were analyzed. **Results:** A hundred and twelve voluntary ophthalmologists have participated in the study. While all participants were putting on masks in the clinic, 79.6% of them were wearing protective clothes, 64.5% of them were putting on face shields and 96.4% of them were using a biomicroscope breathing shield. While 44% of the participants have been in non-ophthalmology COVID-19 duty, 92% of participants' giving contact lenses, and the surgical routine of 93% of them have changed during the pandemic period. Communications with patients, patient numbers, and examination duration have also been affected by the pandemic period at varying degrees. **Conclusion:** In the pandemic period, many ophthalmologists have been on the pandemic duty aside from their fields and this period has affected at varying rates the duration of ophthalmologists' communication and examination, their patient number, and their routines such as giving contact lens and surgical practice.

Keywords: COVID-19; ophthalmologists; survey; contact lens; pandemic

ÖZET Amaç: Koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] pandemisi kısa süre içerisinde tüm dünyada hızla yayılırken, hastalarla çok yakın temas gerektiren oftalmolojik muayeneler de oftalmologlar açısından hastalık bulaş riskini artırmaktadır. Bu çalışmada, oftalmologların kendilerini korumak adına göz polikliniğinde kullandıkları çeşitli kişisel koruyucu kıyafet, ekipmanlar ile pandemi sürecinde hastalara karşı yaklaşım ve tutum değişikliklerinin incelenmesi hedeflenmiştir. **Gereç ve Yöntemler:** Türkiye'de pandemi başlangıcından itibaren 3 aylık dönem içerisinde oftalmologların poliklinikte maske, kıyafet, biyomikroskop nefes kalkanı, koruyucu gözlük, eldiven kullanımı, kontakt lens verme alışkanlıkları, cerrahi uygulamalar, hasta sayıları, hastalara karşı tutumları, geçirilmiş COVID-19 enfeksiyon öyküleri, COVID-19 pozitif hasta temasları ve oftalmoloji dışı aldıkları COVID-19 görevleri hakkında 22 soruluk anket hazırlanarak, Türkiye'de görev yapan ve ulaşılabilen tüm oftalmologlara gönderilerek, elde edilen veriler analiz edildi. **Bulgular:** Çalışmaya, 112 gönüllü oftalmolog katılmıştır. Katılımcıların tamamı poliklinikte maske kullanırken, %79,6'sı koruyucu kıyafet, %64,5'i yüz koruyucu ekipman, %96,4'ü biyomikroskop nefes kalkanı kullanmakta idi. Katılımcıların %44'ü oftalmoloji dışı COVID-19 görevinde bulunurken, %92'sinin kontakt lens verme, %93'ünün ise cerrahi rutini pandemi sürecinde değişmiştir. Hastalarla olan iletişim, hasta sayıları, muayene süreleri de değişen oranlarda pandemi sürecinden etkilenmiştir. **Sonuç:** Oftalmologların, kişisel koruyucu ekipman ve kıyafetler konusunda tutum ve davranışları değişkenlikler göstermektedir. Pandemi sürecinde birçok oftalmolog, alanları dışında pandemi görevlerinde bulunmuşlardır ve bu süreç oftalmologların hastalarla olan iletişim ve muayene sürelerini, hasta sayılarını, oftalmologların kontakt lens verme ve cerrahi uygulama gibi rutinlerini değişen oranlarda etkilemiştir.

Anahtar Kelimeler: COVID-19; oftalmologlar; anket; kontak lens; pandemi

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Coronavirus disease-2019 (COVID-19) is an infective disease that occurred in Wuhan, China, which has caused a worldwide pandemic and affected people deadly and has been caused by the pathogen severe acute respiratory syndrome-coronavirus-2 which is a new member of the Coronaviridae family.[1] The most common ways of COVID-19 infection are cough, sneezing, and droplet inhalation. Contamination can also occur by direct contact with the secretions of the mucous membranes of the mouth, nose or eye. The transmission of infection occurs not only with the infected individual but also as a result of contact of asymptomatic carriers and contaminated surfaces with the respiratory modes. The aerosols occurring during medical procedures also carry a risk for infection.[2] The need for close contact with patients during ophthalmological examination also increases the risk of COVID-19 infection for ophthalmologists, and due to these reasons, the ophthalmologists have taken various measures to protect themselves.[3]

The first confirmed case of COVID-19 has been reported in Turkey on March 12, 2020.[4] We have observed many differences between clinics in terms of ophthalmologists' attitudes and behavior and the protective equipments they used during 3 months period after the COVID-19 case emerged and we aim to analyze these differences with this survey study. In the COVID-19 pandemic that could result in mortality, it was observed that Turkish ophthalmologists started to use personal protective equipment to a large extent, accepted few patients to reduce the viral load in outpatient clinics and operating rooms, and took part in the encounter against the necessary COVID-19 polyclinics and units. In this study, it is aimed to examine various personal protective equipment and clothes used by ophthalmologists to protect themselves in ophthalmology and analyze the changes in their attitude and approaches towards patients during the pandemic period.

MATERIAL AND METHODS

The study has been approved by the Non-invasive Research Ethics Committee of Health Sciences University Samsun Training and Research Hospital (date: 05.06.20 process: 2020/08). The study followed the principles of the Declaration of Helsinki. The study has been based on the 22-question questionnaire with which the precautions of the ophthalmologists to prevent the transmission of infection and their approaches towards the patients during the COVID-19 pandemic period are questioned and the study has been prepared by the four experienced ophthalmologists' clinic observations and suggestions (Table 1).

Then, the intelligibility and conceptual suitability of all questions have been prepared and confirmed by four experienced ophthalmologists taking into consideration the working conditions and literature review of ophthalmologists in Turkey and around the world. Afterwards, questions have been turned into multi-choice questionnaires by using Google Forms. Then the questionnaires have been sent to all accessible ophthalmologists by e-mail and WhatsApp in Turkey.

The survey opened to access on June 6, 2020 has been kept open for data entry for 15 days, and the data has been obtained as Microsoft-excel file via Google forms and transferred to the IBM-SPSS V.21 data analysis program. The answers obtained were analyzed by another researcher, hiding who they came from. A total of one hundred and twelve Turkish ophthalmologists voluntarily participated in the survey.

STATISTICAL ANALYSIS

The statistical analysis was performed using SPSS version 21.0 (Statistical Package for the Social Sciences) software (SPSS, Inc, Chicago, IL, USA). Descriptive statistics were used. Quantitative variables were expressed as mean and standard deviation, while qualitative variables were presented as percentages. Among the categorical variables, the chi-square test was applied. p values of <0.05 were considered statistically significant.

RESULTS

Fifty-eight of 112 ophthalmologists participating in the study are male (51.8%) and 54 (48.2%) are female. The average age of the participants is 42.38±10.45 years (range 24-67). Ophthalmologists working actively in primary, secondary, and tertiary

TABLE 1: Questionnaires and percentages of given answers.

Answer options		Answers (n=112)
Question 1: Age	For all	42.38±10.45 years
Question 2: Gender	Male	58 (51.8%)
	Female	54 (48.2%)
Question 3: Title	Ophthalmology resident	14 (12.5%)
	Specialist physician	67 (59.8%)
	Assistant professor	11 (9.8%)
	Associate professor	14 (12.5%)
	Professor	6 (5.3%)
Question 4: The institution you work?	Public hospital in the first or second care	21 (18.8%)
	Public hospital in the tertiary care	38 (33.9%)
	University hospital	26 (23.2%)
	Private hospital-clinic	27 (24.1%)
Question 5: Do you have any chronic diseases which can depress the immune system or do you use any drugs?	Yes	11 (9.8%)
	No	101 (90.2%)
Question 6: In the ophthalmologic examination?	I don't use mask	0 (0%)
	I only use surgical mask	69 (61.6%)
	I use N95 or equivalent mask	23 (20.5%)
	I use both surgical mask and the mask equivalent to N95	20 (17.9%)
Question 7: Do you use protective clothes during the examination (you can mark multi-choice)?	I don't use	24 (21.4%)
	I use forma	69 (61.6%)
	I use apron	50 (44.6%)
	I use coveralls	0 (0%)
	I use bone	36 (32.1%)
Question 8: Do you use biomicroscope breathe shield?	I don't use	4 (3.6%)
	I have begun to use in the period of COVID-19	93 (83%)
	I was using before COVID-19	5 (4.5%)
	I was also using it beforehand, but I have begun to use a larger shield	10 (8.9%)
Question 9: Do you use gloves in the examination of eyelid and conjunctiva (you can mark multi-choice)?	I don't use gloves, but I wash or disinfect my hands after some patient examinations	16 (14.3%)
	I use gloves, and change it after each patient	51 (45.5%)
	I use, but I change it after some patients	13 (11.6%)
	I don't use, but I wash my hands in each patient examination	22 (19.6%)
	I don't use, but I use sanitizer at each patient	17 (15.2%)
Question 10: Do you use face guard (you can mark multi-choice)?	I don't use anything	39 (35.5%)
	I use protective glasses	22 (20%)
	I use plastic face shield	20 (18.2%)
	I use glasses with refractive purpose.	32 (28.5%)
	I use both protective glasses and face shield	5 (4.5%)
Question 11: How many days did you do ophthalmology practice in a month during the flexible working shifts?	I didn't do	4 (3.6%)
	1 -5 days	35 (31.3%
	5-10 days	37 (33%)
	10-15 days	24 (21.4%)
	My working system didn't change	12 (10.7%)
Question 12: Have you had COVID-19 infection?	Yes	2 (1.8%)
	No	110 (98.2%)

devamı→

TABLE 1: Questionnaires and percentages of given answers.*(devamı)*

Answer options		Answers (n=112)
Question 13: Have you ever gotten tested for COVID-19?	Yes	37 (33%)
	No	75 (67%)
Question 14: Did your duration of patient examination decrease?	It didn't change	39 (34.8%)
	It little decreased	43 (38.4%)
	It decreased	24 (21.4%)
	It decreased very much	6 (5.4%)
Question15: Do you do cleaning on the biomicroscope after the patient examination ?	It is cleaned with the sanitizer after each patient	32 (28.6%)
	The cleaning is done over five times a day	29 (25.9%)
	The cleaning is done under five times a day	29 (25.9%)
	The cleaning is never done	22 (19.6%)
Question16: How did your surgical routines change during COVID-19?	I didn't perform surgery	60 (52.6%)
	I only got emergency cases	32 (28.6%)
	I continued by decreasing the elective cases	12 (10.7%)
	I continued routine surgery	8 (7.1%)
Question 17: How did your routines about giving contact lens change?	I didn't write any prescription for contact lens	49 (43.8%)
	I wrote a prescription without testing contact lens	36 (32.1%)
	I decreased the frequency of testing and giving contact lens	18 (16.1%)
	My routine of giving contact lens didn't change	9 (8%)
Question18: Did the duration of the speech with your patients change?	It didn't	30 (26.8%)
	It little reduced	60 (53.6%)
	It reduced	20 (17.9%)
	It reduced very much	2 (1.8%)
Question19: How is the use of mask of the patients during the examination?	I didn't examine any patient without mask	91 (81.3%)
	I asked some patients to take off their mask	21 (18.8%)
	I asked all patients to take off their mask	0 (0%)
Question 20: Did the number of patients you examined change in the ophthalmology clinic during the months March, April and May in 2020?	It didn't change	0 (0%)
	It little decreased	16 (14.3%)
	It decreased	42 (37.4%)
	It decreased very much	54 (48.2%)
Question 21: Did you work in any units related to COVID-19 except from the ophthalmology clinic (you can mark multi-choice)?	I didn't	56 (50%)
	I worked in a COVID-19 clinic	43 (38.4%)
	I worked in a COVID-19 service	41 (36.6%)
	I worked in a COVID-19 intensive care unit	0 (0%)
Question 22: Did you contact with COVID-19 patient you know in the ophthalmology clinic?	Yes	18 (16.1%)
	No	94 (83.9%)

COVID-19: Coronavirus disease-2019.

health care facilities and university hospitals and third and fourth-year residents in ophthalmology residency programs were included in the study. Along with the questionnaire asked to the participants, the demographic data of the participants, and the responses to the questions are shown in Table 1. The age and gender distribution of the participants is shown in Table 2. Table 3 shows the distribution of the participants according to the institution, age, gender, title, and immunosuppression of question 6 where the habits of participants' mask use are questioned.

DISCUSSION

Considering the recommendations of ophthalmology societies around the world, it is observed that there is no clear consensus on the use of protective masks and

TABLE 2: Age and gender distributions of the participants.

Age groups	Male n (%)	Female n (%)	Total n (%)
<30 years	6 (10.3)	9 (16.7)	15 (13.4)
31-40 years	18 (31)	17 (31.5)	35 (31.3)
41-50 years	16 (27.6)	21 (38.9)	37 (33)
51-60 years	13 (22.4)	3 (5.6)	16 (14.3)
>60 years	5 (8.6)	4 (7.4)	9 (8)
Total	58 (51.8)	54 (48.2)	112 (100.00)

TABLE 3: The distribution of mask usage habit among ophthalmologists according to institution, age, title, gender and immunosuppression status in the outpatient clinic.

		Question 6: In the ophthalmologic examination				
		I don't use mask	I only use surgical mask	I use N95 or equivalent mask	I use both surgical mask and the mask equivalent to N95	p values Chi-square test
Institution	Public hospital in the first or second phase (n=21)	0 (0%)	11 (52.4%)	6 (28.6%)	4 (19%)	0.156
	Public hospital in the third phase (n=38)	0 (0%)	18 (47.4%)	10 (26.3%)	10 (26.3%)	0.186
	Private hospital-clinic (n=27)	0 (0%)	20 (74.1%)	4 (14.8%)	3 (11%)	<0.001*
	University hospital (n=26)	0 (0%)	20 (76.9%)	3 (11.5%)	3 (11.5%)	<0.001*
Age	<30 year (n=15)	0 (0%)	10 (66.7%)	2 (13.3%)	3 (20%)	0.022*
	30-40 year (n=35)	0 (0%)	21 (60%)	9 (25.7%)	5 (14.3%)	0.003*
	40-50 year (n=37)	0 (0%)	20 (54.1%)	7 (18.9%)	10 (27%)	0.023*
	50-60 year (n=16)	0 (0%)	10 (62.5%)	4 (25%)	2 (12.5%)	0.039*
	60> (n=9)	0 (0%)	8 (88.9%)	1 (11.1%)	0 (0%)	0.020*
Title	Research assistant (n=14)	0 (0%)	9 (64.3%)	2 (14.3%)	3 (21.4%)	0.046*
	Specialist physician (n=67)	0 (0%)	45 (67.2%)	13 (19.4%)	9 (13.4%)	<0.001*
	Asistant professor (n=11)	0 (0%)	6 (54.5%)	1 (9.1%)	4 (36.4%)	0.178
	Associate professor (n=14)	0 (0%)	7 (50%)	6 (42.9%)	1 (7.1%)	0.109
	Professor (n=6)	0 (0%)	2 (33.3%)	1 (16.7%)	3 (50%)	0.607
Gender	Male (n=58)	0 (0%)	38 (65.5%)	14 (24.1%)	6 (10.3%)	<0.001*
	Female (n=54)	0 (0%)	31 (57.4%)	9 (16.7%)	14 (25.9%)	0.001*
Immunosuppression status	Yes (n=11)	0 (0%)	9 (81.8%)	1 (9.1%)	1 (9.1%)	<0.003*
	No (n=101)	0 (0%)	60 (59.4%)	22 (21.8%)	19 (18.8%)	<0.001*

*p<0.05.

personal protective equipment. In a study by Nguyen et al., according to the COVID-19 guideline of ophthalmology societies recognized by the International Councel Of Opthalmology, the Canadian Ophthalmological Society (COS), All India Ophthalmological Society (AIOS), Société Française d'Ophthalmologica, Società Ophthalmologica recommend ophthalmologists to use N95 masks in ophthalmological examinations, while societies such as Royal College of Ophthalmologists (RCOphth) in the UK, Deutsche Ophthalmologische Gesselschaft think that only the use of surgical masks is sufficient to prevent COVID-19 infection in ophthalmological examination.[5]

While all ophthalmologists participating in this study have put on masks in the clinic, 61.6% of them have put on only surgical masks, 20.5% have put on N95 or its equivalent, and 17.9% of them have put on double masks. In the meta-analysis of a limited number of studies comparing the protection of N95 and surgical masks on healthcare professionals, it has been shown that surgical and N95 masks do not have

superiority to each other in processes without aerosol production. However, while the use of N95 masks is recommended in the guideline in aerosol-generating medical procedures, there is no consensus on the use of N95 masks in non-aerosol generating procedures.[6] Another point that attracted attention in the study is that the use of surgical masks in private hospitals, clinics, and universities was significantly more common than N95 masks (Table 3). The financial burden and difficulties in providing N95 masks may have limited the supply of it in these institutions. When the use of mask was probed according to the ophthalmologists' academic title, it was seen that the usage rate of N95 increases as the academic title increases. Academic title, increasing age, financial possibility, and ease of access to N95 mask may have been decisive at that point. The mortality of COVID-19 infection increases in direct proportion to age.[7] For this reason, elderly ophthalmologists should be more careful about using personal protective equipment, but when the use of N95 masks according to age groups is questioned, it makes a peak between the ages of 40-50 which is interesting and decreases to 0 if he is over 60. The fact that the majority of ophthalmologists aged fifty and older put on the only surgical mask may have been effective in the idea that examination and treatment can be protective by avoiding the aerosol-generating process.

While 21.4% of the participants in the study have not worn any protective clothes, 61.6% worn the forma, 44.6% worn the gown, 32.1% put on the hair net, and no ophthalmologist has worn protective coveralls. Healthcare professionals are more exposed to body fluids and secretions of infected patients than the general population. For this reason, healthcare professionals should use personal clothing and equipment to protect themselves. However, even though there are several studies in the literature regarding which cloth is more protective in patient examination against the COVID-19 pandemic, the level of evidence of these studies are very low and a clear guideline has not been formed yet.[8]

While 3.6% of the ophthalmologists in the study have not used the biomicroscope breathing shield, 83% have stated that they have started using it during the COVID-19 pandemic period, 4.5% of ophthalmologists continued to use their shields, 8.9% preferred to use a larger shield. The studies have suggested that the breathing shields mounted on the biomicroscope significantly inhibit infectious particles; even larger shields provide more effective protection and should be used in biomicroscopes.[9,10] Societies such as RCOphth, COS, Sociedad Española de Ophthalmología, AIOS also recommend the use of biomicroscope breathing shields in ophthalmological examinations.[5]

Cleaning slit lamp biomicroscopes with alcohol or sodium hypochlorite after examining the patient may also be beneficial in preventing infection among patients.[11] Indeed, in this study, 80% of the participants clean the slit lamp biomicroscopes with disinfectants. But, since it takes time and requires possible labor, the frequency of cleaning the biomicroscope may vary. While 28.6% of the participants clean biomicroscope after each examination, 25.9% of them do under 5 times a day, 19.6% of them were doing no cleaning between cases.

In a questionnaire study conducted in Germany and published in Contact Lens & Anterior Eye, it has been observed that patients are expected to put on a mask during the COVID-19 pandemic period and eye care practitioners prefer high protective equipment.[12]

In another similar survey study conducted in Turkey at the similar dates among ophthalmologists, 18 percent of the participants had COVID-19 test, while 82% didn't. Among the tested participants 9 percent of them had COVID-19 infection positive.[13]

In the study, approximately 50 percent of the participants use gloves while the other 50 percent of them prefer to sterilize their hands periodically with disinfectant or hand washing. In recent studies, no evidence of COVID-19 has been detected in swab specimens taken from tear compared to nasopharyngeal swab specimen, and in the specimen taken from the nose, a significantly higher viral load has been detected compared to the specimen taken from the throat.[14,15] For these reasons, it can be thought that transmission with tear can be less likely compared to the transmission with nasopharyngeal secretions. Use of gloves is recommended in the case of direct pa-

tient contact by World Health Organization, but these gloves should be changed frequently, and the use of gloves should not replace hand hygiene and hand disinfection, which should be applied frequently.[16] Similarly, the American Academy of Ophthalmology and many other ophthalmology societies emphasize the importance of hand hygiene and recommend the use of disposable gloves and hand and surface cleaning.[5] However, to the best of our knowledge there is no clinical study comparing the use of gloves and disinfectant for ophthalmological examination and evaluating the risks of viral infection.

In this study, approximately 65% of ophthalmologists state that they use eye protection equipment. While 20% of the participants have worn protective glasses, 18.2% of them have worn plastic face shields, 28.5% of them have worn refractive glasses, and 4.5% of them have worn both protective glasses and face shields. Chu and his colleagues have concluded in a meta-analysis that using eye protection equipment is useful in reducing the virus load.[17] However, there is no study published comparing the efficacy of protective glasses, protective face shield, or refractive glasses.[8]

Flexible working shifts have been applied within the scope of COVID-19 measures in Turkey and the healthcare personnel working in public institutions in this process have gone to flexible practices at certain intervals. As a result of this practice, 90% of the participants have worked in the clinics or health care facility less than 15 days in a month during the pandemic period. While ophthalmologists who have been infected with COVID-19 constitute 1.8% of the participants, 98.2% of them have stated that they have not been infected with COVID-19. But, when looking at these rates, it should be taken into consideration that only 33% of the participants have had the COVID-19 test and asymptomatic carriers may have been missed out. When looking at the immunity of the community against COVID-19 in Turkey on the same dates, similar rates with community incidence have been seen.[4]

The number of patients seen by all ophthalmologists who participated in the study has decreased in the first 3 month period when COVID-19 emerged in Turkey. In this study 48.2% of the participants have stated that their number of patients has decreased very much, while 37.4% of them stated that it decreased and 14.3% of them stated it decreased little. In addition, approximately 65% of doctors have stated that the examination duration per patient has decreased, and 75% of them have stated that the duration of talking with the patient has decreased during the examination period. COVID-19 transmission anxiety also has reduced the social relation's duration between the patient and the doctor.

While 81.3% of ophthalmologists participating in the study do not examine any patients who do not wear masks, 18.8% of them only ask some patients to take off their masks for eye and face examinations. The use of a surgical or cloth mask not only protects but also greatly reduces the spread of the virus by infected patients or asymptomatic carriers and the use of the mask is recommended for the community in the scope of COVID-19 measures.[18]

During the COVID-19 pandemic period, ophthalmologists also have taken charge in the diagnosis and treatment of COVID-19 infections which is apart from the ophthalmology field, leaving their professional fields in order to meet the emergency personnel needs of the hospitals and healthcare system. In Turkey, 44% of ophthalmologists who participated in this study have been on active COVID-19 duty and while 36.6% of them have worked in COVID-19 diagnostic clinic, 36.6% of them have worked in COVID-19 inpatient services. However, no ophthalmologist has worked in the intensive care unit. In addition to this, 16.1% of the participants have examined their patients whose COVID-19 infection test result is positive in the clinic. In order to alleviate the burden imposed by pandemic on the health system, the surgical habit has been changed and elective surgery has been postponed in Turkey as well as in the world.[19-21] Of the ophthalmologists participating in the study, 52.6% have not performed any surgery during the pandemic process, 28.6% have performed only emergency surgery cases, and only 7.1% have continued routine surgery cases.

Another point that draws attention in this study is the contact lens practice of ophthalmologists.

While 43.8% of the participants have not prescribed any contact lens during the pandemic process, 32.1% of them have written prescriptions without trying contact lenses, 16.1% of them have reduced the frequency of giving contact lenses, and only 8% of them have continued their routine contact lens practices. Contact lens examination may also include face-to-face contact, direct contact to the eyelids, and patient-to-patient contact. For these reasons, contact lens examination has been also pushed into the background by ophthalmologists during the pandemic period.[11] Choosing to wear glasses rather than contact lenses as much as possible seems to be a wise choice in the pandemic process, but in cases that contact lenses should be used, daily disposable contact lenses should be preferred if possible, and maximum attention should be paid to lens and hand hygiene during use.[22]

Limitations of this study are first, only almost 2 percent of ophthalmologists working in Turkey participated in this study, second this study was conducted at the early stages of the pandemic and shows the attitudes and habits of ophthalmologists at the early period which can change during the course of the pandemic and third the densities of the disease vary over the pandemic time according to geographic regions, which can effect the results, and may be the subject of other studies.

CONCLUSION

As a result, ophthalmologic examinations increase the risk of viral infection for ophthalmologists during the COVID-19 period because it is required to be in a close contact. During this period, the ophthalmologists also have been trying to protect themselves with various personal protective equipment and clothes. There is not a certain consensus regarding the use of personal protective equipment and clothes in the ophthalmology practice. Due to these reasons, the attitude and behaviors of the ophthalmologists vary. In the pandemic period, many ophthalmologists have been on the pandemic duty aside from their fields and this period has affected at varying rates the duration of ophthalmologists' communication and examination, their patient number, and their routines such as giving contact lens and surgical practice.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Onur Gökmen;* ***Design:*** *Onur Gökmen, Gökhan Özgür;* ***Control/Supervision:*** *Onur Gökmen, Gökhan Özgür;* ***Data Collection and/or Processing:*** *Onur Gökmen, Gökhan Özgür;* ***Analysis and/or Interpretation:*** *Onur Gökmen, Gökhan Özgür;* ***Literature Review:*** *Onur Gökmen;* ***Writing the Article:*** *Onur Gökmen;* ***Critical Review:*** *Onur Gökmen, Gökhan Özgür, Erol Havuz, Özlem Beyazyıldız;* ***References and Fundings:*** *Onur Gökmen, Gökhan Özgür, Erol Havuz, Özlem Beyazyıldız;* ***Materials:*** *Onur Gökmen, Gökhan Özgür.*

REFERENCES

1. Zhai P, Ding Y, Wu X, Long J, Zhong Y, Li Y. The epidemiology, diagnosis and treatment of COVID-19. Int J Antimicrob Agents. 2020; 55(5):105955. [Crossref] [PubMed] [PMC]
2. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci. 2020;3;12(1):9. [Crossref] [PubMed] [PMC]
3. Parke DW 2nd. Ophthalmology after coronavirus disease 2019 (COVID-19): transition back to patient care. JAMA Ophthalmol. 2020;1;138(6):599-600. [Crossref] [PubMed]
4. World Health Organization [İnternet]. © 2020 WHO. Coronavirus disease (COVID-2019) situation reports. Erişim linki: [Link] (Erişim tarihi: 01 July 2020)
5. Nguyen AX, Gervasio KA, Wu AY. Differences in SARS-CoV-2 recommendations from major ophthalmology societies worldwide. BMJ Open Ophthalmol. 2020;7;5(1):e000525. [Crossref] [PubMed] [PMC]
6. Bartoszko JJ, Farooqi MAM, Alhazzani W, Loeb M. Medical masks vs N95 respirators for preventing COVID-19 in healthcare workers: a systematic review and meta-analysis of randomized trials. Influenza Other Respir Viruses. 2020;14(4):365-73. [Crossref] [PubMed] [PMC]
7. Dowd JB, Andriano L, Brazel DM, Rotondi V, Block P, Ding X, et al. Demographic science aids in understanding the spread and fatality rates of COVID-19. Proc Natl Acad Sci U S A. 2020;5;117(18):9696-8. [Crossref] [PubMed] [PMC]
8. Verbeek JH, Rajamaki B, Ijaz S, Sauni R, Toomey E, Blackwood B, et al. Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. Cochrane Database Syst Rev. 2020;15;4(4): CD011621. Update in: Cochrane Database Syst Rev. 2020;15;5:CD011621. [PubMed] [PMC]
9. Poostchi A, Kuet ML, Pegg K, Wilde C, Richardson PS, Patel MK. Efficacy of slit lamp breath shields. Eye (Lond). 2020;34(7):1185-6. [Crossref] [PubMed] [PMC]
10. Liu J, Wang AY, Ing EB. Efficacy of slit lamp breath shields. Am J Ophthalmol. 2020;218: 120-7. [Crossref] [PubMed] [PMC]
11. Zeri F, Naroo SA. Contact lens practice in the time of COVID-19. Cont Lens Anterior Eye. 2020;43(3):193-5. [Crossref] [PubMed] [PMC]
12. Pult H. COVID-19 pandemic: survey of future use of personal protective equipment in optometric practice. Cont Lens Anterior Eye. 2020;43(3):208-10. [Crossref] [PubMed] [PMC]
13. Erdem B, Gok M, Bostan S. The evolution of the changes in the clinical course: a multicenter survey-related impression of the ophthalmologists at the peak of the COVID-19 pandemic in Turkey. Int Ophthalmol. 2021. [Crossref] [PubMed] [PMC]
14. Seah IYJ, Anderson DE, Kang AEZ, Wang L, Rao P, Young BE, et al. Assessing viral shedding and infectivity of tears in coronavirus disease 2019 (COVID-19) patients. Ophthalmology. 2020;127(7):977-9. [Crossref] [PubMed] [PMC]
15. Zou L, Ruan F, Huang M, Liang L, Huang H, Hong Z, et al. SARS-CoV-2 viral load in upper respiratory specimens of infected patients. N Engl J Med. 2020;19;382(12):1177-9. [Crossref] [PubMed] [PMC]
16. World Health Organization [İnternet]. © 2020 WHO. Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages. Erişim linki: [Link] (Erişim tarihi: 01 July 2020)
17. Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schunemann HJ, et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. J Vasc Surg. 2020;72(4):1500. [Crossref] [PMC]
18. Worby CJ, Chang HH. Face mask use in the general population and optimal resource allocation during the COVID-19 pandemic. medRxiv [Preprint]. 2020;7:2020.04.04. 20052696. Update in: Nat Commun. 2020;11(1):4049. [Crossref] [PubMed] [PMC]
19. Diaz A, Sarac BA, Schoenbrunner AR, Janis JE, Pawlik TM. Elective surgery in the time of COVID-19. Am J Surg. 2020;219(6):900-2. [Crossref] [PubMed] [PMC]
20. Ali MJ, Hegde R, Nair AG, Bajaj MS, Betharia SM, Bhattacharjee K, et al. All India Ophthalmological Society - Oculoplastics Association of India consensus statement on preferred practices in oculoplasty and lacrimal surgery during the COVID-19 pandemic. Indian J Ophthalmol. 2020;68(6):974-80. [Crossref] [PubMed] [PMC]
21. Cheung SSL, Wong CYK, Chan JCK, Chan CKM, Lam NM, Yuen HKL, et al. Ophthalmology in the time of COVID-19: experience from Hong Kong Eye Hospital. Int J Ophthalmol. 2020;18;13(6):851-9. [Crossref] [PubMed] [PMC]
22. 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(3):196-203. [Crossref] [PubMed] [PMC]