International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Awareness and Care of Contact Lenses as Biomedical Devices During COVID-19: A Case Study from Türkiye

Sinem Sipahioğlu Kara[1], Şükriye Ceren Öcal Dirican[2]

[1]Bilecik Şeyh Edebali University, Vocational School of Health Services, Opticianry, Gülümbe Campus, Bilecik 11210, Türkiye
Corresponding Author Email: *sinem.sipahioglu[at]bilecik.edu.tr*

[2]Istanbul Beykent University, Vocational School of Health Services, Medical Laboratory Techniques, Istanbul, 34520, Türkiye
Email: *cerenocal[at]beykent.edu.tr*

Abstract: ***This cross sectional survey investigated awareness, behaviors and care practices of contact lens users in Türkiye during the COVID-19 pandemic. Data from 178 adult participants were collected using an online questionnaire assessing contact lens use, hygiene behaviors and perceived ocular transmissions risk. Results showed behavioral changes in contact lens and spectacle use during the pandemic, delayed eye examinations, and mixed awareness regarding ocular transmission and hygiene precautions. Findings were generally consistent with reports from other countries. The study highlights the need for stronger patient education bye eye professionals during future infectious disease outbreaks.***

Keywords: Contact Lens, COVID-19, Ocular transmission, Eye health, Contact lens hygiene, Pandemic behavior, Türkiye

1. Introduction

The first modern production of contact lenses (CL) was achieved in Germany in 1888 [1] using tiny lenses made of glass [2]. Today, it is a medical product made from polymer that has a global market. CLs are used by millions of people not only to correct refractive errors but also for therapeutic purposes [3, 4]. One of the negative aspects of technological advancements today is the increase in myopia due to screen addiction; a study by Holden B. and colleagues estimated that 50% of the world's population will have myopia by 2050 [5]. Therefore, the number of CLs users will increase day by day, and it is very important that users have a high level of awareness. COVID-19 first emerged in China in 2019. Then, on March 11, 2020, the World Health Organization (WHO) declared it a global pandemic.

Coronaviruses (CoV) represent a large family of viruses that are enveloped, single-stranded RNA viruses. These viruses can cause a variety of clinical manifestations, including that common cold, influenza, and acute severe respiratory infections. In December 2019, a new strain of coronavirus that causes severe pneumonia was identified [6-8]. When examining the transmission routes of SARS-CoV-2, one of them is indirect contact; in simplified terms, transmission occurs when a person touches a contaminated surface and then touches mucosal areas (such as the mouth, nose or eyes) [8, 9]. When the basic mechanism of infection is examined, it begins with the interaction of the S1 surface glycoprotein of the virus with the angiotensin-converting enzyme 2 (ACE2) receptor located on the host cell membrane [10-12]. The system theoretically increases the expression of the ACE2 receptor in ocular tissues, thereby making the eye more susceptible to SARS-CoV-2. Thus, the ocular passage is considered a point of entry, supporting the hypothesis that the virus can be transmitted via the ocular route. Although this hypothesis has not yet been fully confirmed, it should be remembered that ocular tissues can serve as a viral reservoir as well as a possible entry point [10, 11].

Based on this, the study aims to investigate, using a holistic approach, the impact of the COVID-19 pandemic on the behaviors, hygiene practices, and perceptions of ocular transmission risk of CL and eyeglass users. The main objective of this study is to reveal how the pandemic has shaped the choices of CL users in Türkiye regarding the correction of their refractive errors, and to statistically evaluate the relationships between these factors. Accordingly, the research focuses on the following questions, which form the basis of the study: (1) Has the COVID-19 pandemic caused a significant change in behaviors regarding CL and eyeglass use? (2) How do hygiene practices and the perception of infection risk affect CL usage preferences? (3) To what extent do physical difficulties in using devices to correct refractive errors in the eye (e.g., using with a mask) changes? Answers to these fundamental questions will contribute to understanding individual behaviors during global health crises such as pandemics, laying the foundation for developing more effective patient management and training strategies for eye health professionals. This study offers a significant original contribution when compared to the international literature examining the impact of the COVID-19 pandemic on CL use. Previous studies, conducted in European and Middle Eastern countries, have primarily focused on descriptive aspects of changes in CL use related to hygiene. In contrast, this study, conducted in Türkiye (which lies on both European and Asian continents), statistically examines not only behavioral changes but also the underlying perceptual and cognitive determinants of these changes.

2. Literature Survey

Some studies have shown that CLs use doesn't increase the risk of COVID-19 infection [13-15]. Nevertheless researchers have found evidence that coronaviruses can

remain viable for extended periods on inorganic surfaces such as silicone rubber [13, 16], and it should be noted that CLs contain silicone. This situation has led some health professionals to recommend temporarily discontinuing CLs use during pandemic due to concerns that CL wearers may have an increased risk of COVID-19 [13, 17]. CL wearers have to touch the CL with their hands to insert and remove it, therefore there are some concerns regarding CL use, and the possibility of the virus infecting [7, 8, 18, 19] the eye cannot be completely ruled out[13, 20, 21]. Compared with other studies examining the relationship between the eye and COVID-19, Ma et al. [11] found the presence of both the ACE2 receptor and the serine protease transmembrane protease, serine 2 (TMPRSS2) in conjunctival cells. Another study showed that some ophthalmologists involved in the diagnosis and treatment of COVID-19 patients contracted the virus from asymptomatic individuals, supporting the possibility that the infection may be transmitted through the ocular route [10]. Napoli et al. investigated the infection potential in detail, not only by detecting ACE2 and TMPRSS2 in various ocular tissues, but also by considering the dynamic properties of the tear film and ocular surface [22].

In light of the studies mentioned above, it had been reported that coronavirus infections may also be associated with conjunctivitis in humans [23, 24], as a result of all these studies, the behavior of CL users during the pandemic is important. Studies were conducted in different geographical areas (Greece [25, 26], Spain [13, 27, 28], United Kingdom, France, Netherlands, Germany, Italy, America [28], Jordan [29, 30], Saudi Arabia [31], and Colombia [32]) to determine the level of knowledge among CL users regarding the possibility of COVID-19 transmission through the eyes.
Diego Garcia-Ayuso et al. investigated the behavior of CL users in Spain during COVID pandemic [13], in addition to focusing on CL use and care during the COVID-19 pandemic [27]. A study conducted on CL users show the precautions taken by CL users in Greece after the COVID-19 pandemic [25]. Furthermore, the scope of the study was expanded by the same research group through a survey-based study on the perceived risk of COVID-19 infection among CL users [26]. This study determined the frequency and characteristic of CL use in Colombian during pandemic [32]. As a result of study conducted in Jordan presents the personal subjective attitudes of CL users, behaviors of participants of impact on CL wearing and purchasing [29]. CL wearers need to continue maintaining optimal hygiene practices during the COVID-19 pandemic to minimize CL complications, including microbial keratitis and corneal infiltrative cases. The online survey investigated CL wearers' compliance behaviors, attitudes and concerns in UK and Ireland during pandemic [33]. A study about CL wearers from America and many countries in Europe included data from individuals using soft CLs, the data were extracted to answer questions about CL wearing habits before, during ,and after the pandemic [28]. Another study investigated the methods used to correct vision problems after start of pandemic. According to this study, it was determined that the time spent wearing glasses increased and the number of days spent wearing CL decreased after the start of pandemic. Increases in hourly glasses wear were associated with increased screen time, while increases in daily CL wear were associated with increases mask wearing time, suggesting that glasses can be preferred for screen time activities and CLs for mask wearing [34]. In light of these studies, the knowledge of CL users in Türkiye regarding COVID-19 was evaluated. Unlike other studies in the literature, this study assessed whether there were any changes in CL use during the pandemic and the relationship between CL users and eyeglasses.

3. Methodology

3.1 Study sample and design

This study aimed to evaluate CL usage behavior, hygiene habits, and perception of infection risk during the COVID-19 pandemic. The sample was created using convenience sampling, a type of non-probability sampling method. Data for this study, conducted among CL users in Türkiye, were collected using the Google Forms® survey (Google Inc., CA, USA).

The ethical approval process protocol was approved by the Istanbul Beykent University Ethics Committee (Istanbul, Türkiye). To ensure voluntary participation in this study, a check box was added to the survey before participants answered the questions. Thus, electronic consent was obtained from all participants.

3.2 The questionnaire

The survey questions were prepared in Turkish by the research team and subsequently reviewed by the same team. Simple language that everyone can understand was preferred when preparing the questions. Pilot studies were then conducted to determine whether the questions prepared for the survey were understood by the people who would be administering the survey, and to determine the test duration. Based on feedback received from practitioners following these pilot studies, the research team made improvements to the survey. The responses from these pilot studies were not included in the final data. Furthermore, according to feedback received from this pilot study, it was determined that the time taken to complete the entire survey was approximately between 3 and 5 minutes. A standard form was created for all participants in an effort to reduce the possibility of systematic errors. This survey was prepared and shared with the participants online via social media accounts. Those who voluntarily agreed to participate in this study and completed the questionnaire in full were included. The survey was open to participants aged 18 and over. Another criterion was that participants must be contact lens and glasses users, or contact lens users only. To ensure the study reflected real life conditions, no participants were excluded from the analysis based on demographic variables. However, surveys that were incomplete or contained inconsistent responses were excluded from the analysis. As a result, a total of 178 participants were analyzed.

This survey examines the relationship between contact lens users' habits during the COVID-19 pandemic. The survey consists of 3 sections and 34 questions. The survey consisted of sections on demographics (gender, age, education, etc.), and questions about users' contact lens use during the

COVID-19 pandemic. Users were asked to use a four-point Likert scale to determine the relationship between contact lenses and COVID-19.

3.3 Statistical Analysis

Data analysis was performed using Statistical Package for the Social Sciences (SPSS) statistical software. In descriptive analyses, values such as mean, standard deviation, frequency and percentage were calculated. The internal consistency of the scale was evaluated using Cronbach's alpha. The scale was evaluated according to gender using the t-test. Relationships between categorical variables were determined by evaluating effect size using the chi-square test and Cramer V. Additionally, in this study, the significance level was accepted as $p<0.05$.

4. Results & Discussion

4.1. Participants' demographics

This study employed a convenience sampling method. 178 volunteer CL users over the age of 18 participated in this study. Considering the 18 items on the Likert scale, the recommended sample size should be 5-10 times the number of items, therefore, it is calculated to be between 90-120. Accordingly, the samples size (n=178) is suitable for this analysis. The internal consistency of this 18 items scale was evaluated using the Cronbach's alpha, which was $\alpha=0.701$. This value indicates that the scale has an acceptably reliable level.

Participants' demographics are shown in Table 1. A total of 178 participants with an average age of 28.01 (±8.24) years completed the online questionnaire. 92.7% of CL users have a university degree or higher. Scale values based on gender, as determined by an independent samples t-test, showed no significant difference among CL users. The imbalance in the number of women and men participating in the study limits the power of the t-test, therefore a gender based statistically insignificant result was obtained. ($t(176) =.335$; $p=0.738$) (Table 2).

Table 1: Demographic characteristics of the participants (n = 178)

Characteristics	Groups	N (%)
Gender	Female	160 (89.9%)
	Male	18 (10.1%)
Age	18- 25	91 (51.1 %)
	26-35	58 (32.6 %)
	36-45	22 (12.4 %)
	46-60	7 (3.9 %)
Education	No diploma, just reading and writing	0
	Primary education	1 (0.6)
	High school	12 (6.7 %)
	University	126 (70.8 %)
	Master's Degree or Doctorate	39 (21.9 %)

Furthermore, chi-square analyses revealed a significant relationship between age group and a person's preference for correcting their vision level ($\chi^2=41.447$, sd=6, $p<0.001$, Cramer V=0.341).

Table 2: Results of the independent samples t-test for CL usage scale scores by gender.

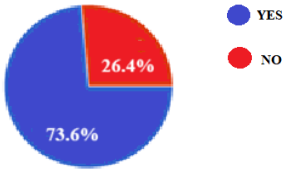
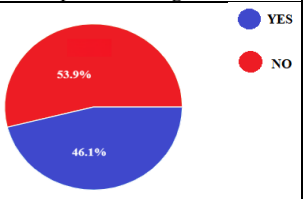
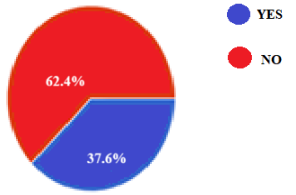
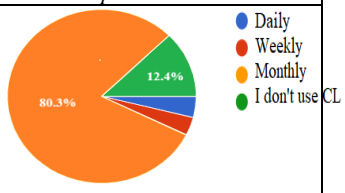
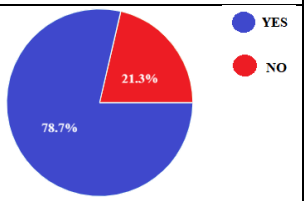
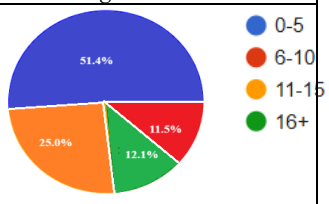
Variable	Groups	N	X	SD	*t test*		
					t	*sd*	*p*
CL	Female	160	2.63	0.4	.335	176	.738
	Male	18	2.6	0.45			

4.2. CL wearers' profile and behaviors

CL and glasses wear during the COVID-19 pandemic

This section of the survey investigated participants' basic knowledge regarding eye health and COVID-19. Nearly 21% preferred only contact lenses, and the remaining participants (78.7%) preferred both glasses and contact lenses. KL users' preferred KL exchange option is monthly. 37.6% of participants said that they started using CL because their glasses fogged up while wearing masks. When asked if they were aware that COVID-19 could be transmitted through the eyes, while 26.4% weren't aware of this. When we asked whether they had gone for an eye exam during the pandemic period, 46.1% of participants had postponed their exams due to COVID pandemic. Due to mask use, many glasses wearers have stopped wearing glasses and started using CL because of the problem of glasses fogging up. The rate of new CL users is 37.6% (Table 3).

Table 3: The relationship between individuals' eye health and the COVID-19 pandemic.

Did you know that COVID-19 can also be transmitted through the eyes?	*Did you postpone your eye exam during the COVID-19 pandemic even though you needed to see an ophthalmologist?*
	
Have you started using contact lenses because your glasses fog up when you wear a mask?	*What is your preferred contact lens replacement interval during the COVID-19 pandemic?*
	
Do you use glasses in addition to contact lenses?	*How many years have you been wearing contact lenses?*
	

4.3 Activity during the COVID-19 pandemic and perceived risk of infection

Two different sets of questions were asked to determine the

relationship between COVID-19 and CL use. Through two different sets of questions, a valid and reliable measurement of CL users' knowledge level regarding COVID-19 was obtained. The scale used was a four point Likert scale consisting of a total of 18 items.

Examining scale results, although 73% knew that COVID-19 could also be transmitted through the eyes, when asked whether they took precautions to protect their eyes to prevent COVID-19 infection, 60 participants (33.70 %) answered "Never" while 43 participants (24.15%) answered "Rarely". The majority of respondents started that wearing glasses is not among the measures taken to protect against COVID-19. 26.40% of participants stated that as a result of wearing glasses, they touched their faces less frequently. A large majority (75%) thought that wearing glasses was not an advantage during the pandemic; in addition, 151 people (84.83%) reported that wearing a mask with glasses was difficult.

When the results are interpreted in terms of hygiene behaviors, participant started that the importance they played on hygiene in terms of eye health increased during the pandemic. However, it should be noted that this increase did not translate into a complete habit. Examining at the answers given to the questions about CL hygiene, the presence of "Sometimes" and "Rarely" options actually heterogeneous. This situation is particularly consistent with the concept of the knowledge-behavior gap, which is frequently discussed in the literature.

In line with these responses, in another question, 90 participants (50.56%) reported that wearing glasses caused additional physical difficulties during the pandemic. The main reason for this is that glasses fog up when wearing a mask, hence 91 participants (51.12%) preferred not to wear glasses while wearing a mask. Although 110 participants (61.79%) preferred using CL instead of glasses during the pandemic, 79 participants (44.38%) reported that they never considered CL use to be a factor that increased the risk of

Table 4: The relationship between individuals' CL and the COVID-19 pandemic

Questions	Often	Sometimes	Rarely	Never
Are you taking precautions to protect your eyes as part of your measures to avoid catching COVID-19?	26	49	43	60
How often do you wear glasses as part of the precautions you take to avoid catching COVID-19?	15	37	56	70
I think wearing glasses causes me to make more contact with face compared to people who don't wear them.	47	56	26	49
I think wearing glasses has been an advantage during the COVID-19 pandemic.	26	40	37	75
I think it's difficult to wear a mask while wearing glasses.	151	19	3	5
I have concerns about using eyeglasses according to necessary hygienic rules during the COVID-19 pandemic.	32	64	45	37
During the COVID-19 pandemic, I paid more attention to eyeglass hygiene.	40	49	39	50
I believe that wearing glasses has led to additional physical challenges during the pandemic.	90	59	18	11
Because the mask fogs up my glasses, I prefer not to wear them as much as possible.	91	40	17	30
During the COVID-19 pandemic, I considered using CLs instead of glasses.	110	22	8	38
Among the precautions you take to avoid catching COVID-19, how often do you use CL?	94	21	23	40
I think wearing CL causes my eyes to come into contact with them more often than people who don't wear them.	47	35	23	73
I think it's difficult to wear a mask while wearing CL.	2	4	11	161
I believe CL is a factor that increases the risk of infection during the COVID-19 pandemic.	29	35	35	79
I have concerns about using CL according to necessary hygienic rules during the COVID-19 pandemic.	30	39	50	59
During the COVID-19 pandemic, I paid more attention to CL hygiene.	51	45	37	45
I think CL use caused additional physical difficulties during the pandemic process.	13	24	36	105
During the COVID-19 pandemic, I considered using glasses more often that CL.	22	14	31	111

infection during the pandemic. 45 participants (25.28%) reported making Never extra effort to maintain proper hygiene when using CL.

Most participants believe that using CLs and masks together is a challenge. Thus, it shows that using CLs is advantageous compared to glasses during the pandemic. When evaluating the physical challenges participants experienced during the pandemic, it was found that those who wore glasses experienced more physical difficulties, particularly due to fogging. CL use was found to cause less physical difficulty compared to glasses. Based on these findings, the reasons behind participants' shift to or consideration of using CLs can be explained.

According to the findings of this study, the effects of CL usage habits, hygiene perception, and risk perception show significant parallels when compared with other studies. Furthermore, this study adds a unique value to the literature by statistically investigating the effect of perceptual factors on the behavior of CL users. A study conducted in Spain on this subject showed that 46% of CL users stopped using them due to the impact of the pandemic. Furthermore, a significant change in the frequency of CL use was also noted [13]. In addition, a study conducted in Jordan reported that 38.8% of participants stopped using CLs [29]. Global analyses conducted in different geographical areas have showed a significant decrease in CL use during the pandemic [35]. This study supports the finding that the pandemic caused a universal behavioral change regarding CL use.

From a hygiene perspective, the literature shows that while there has been limited improvement in hygiene behaviors during the pandemic, full compliance has not been achieved. A study covering the UK and Ireland reported that almost all CL users practiced hand washing while wearing their CL

[33]. A study conducted in Spain indicated that while awareness of hand hygiene was high, regarding CL care [27]. The study from Saudi Arabia indicated that hygiene measures were adequately followed [31]. In the current study, hygiene related behaviors were not measured. Instead, perceptions of these behaviors were measured. Thus, it was determined that perceptions of hygiene and infection risk varied significantly.

5. Conclusion

This study evaluates, from a holistic perspective, the behavioral patterns, hygiene practices, and injection risk perceptions of CL users in Türkiye during the COVID-19 pandemic. The results of this study were compared with the results of similar research conducted in different countries, including Spain, Jordan, Italy, Saudi Arabia, and Greece. The literature shows that a significant portion of participants reduced or stopped using CL during the pandemic. Reasons cited include decreased social life, increased time spent at home, and increased risk of infection due to poor hygiene. When the results of this study were examined, they were found to be consistent with the literature. However, while previous studies have generally remained at a descriptive level, this survey contributes to the literature by analyzing the determining factors of the behavioral changes. The striking finding of this research is that CL use wasn't abandoned despite the impact of the pandemic. Instead, a more flexible and situational usage model was preferred. Another point observed is that participants make choices between eyeglasses and CLs depending on the circumstances, based on their perception of infection risk and comfort of use. Despite the risk of users contracting COVID-19 while inserting and removing CLs, CLs use has remained important. The conclusion to be drawn from this is that, for future pandemics, it is crucial that eye health professionals (doctors, optometrists, opticians) provide more information to CL users regarding eye health. Finally, when the results are evaluated from a public health perspective, this study has important implications. Eye health professionals (doctors, optometrists, opticians) must address people's misconceptions. Properly developed eye health education strategies are necessary for future pandemics.

References

[1] N. Efron and R. M. Pearson, "Centenary celebration of Fick's Eine Contactbrille," *Arch Ophthalmol,* vol. 106, pp. 1370-7, 1988.
[2] P. B. Morgan and N. Efron, "Global contact lens prescribing 2000-2020," *Clinical and Experimental Optometry,* vol. 105, pp. 298-312, 2022.
[3] A. M. Ambroziak, J. P. Szaflik, and J. Szaflik, "Therapeutic use of a silicone hydrogel contact lens in selected clinical cases," *Eye Contact Lens,* vol. 30, pp. 63-7, 2004.
[4] O. Daphna, M. Mimouni, Y. Keshet, M. Ben Ishai, I. S. Barequet, B. Knyazer, E. Mrukwa-Kominek, T. Zarnowski, M. Chen-Zion, and A. Marcovich, "Therapeutic HL-Contact Lens versus Standard Bandage Contact Lens for Corneal Edema: A Prospective, Multicenter, Randomized, Crossover Study," *J Ophthalmol,* vol. 21, 2020.
[5] B. A. Holden, T. R. Fricke, D. A. Wilson, M. Jong, K. S. Naidoo, P. Sankaridurg, T. Y. Wong, T. J. Naduvilath, and S. Resnikoff, "Global Prevalence of Myopia and High Myopia and Temporal Trends from 2000 through 2050," *Ophthalmology,* vol. 123, pp. 1036-1042, 2016.
[6] D. Wang, B. Hu, C. Hu, F. Zhu, X. Liu, J. Zhang, B. Wang, H. Xiang, Z. Cheng, Y. Xiong, Y. Zhao, Y. Li, X. Wang, and Z. Peng, "Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China," *Jama,* vol. 323, pp. 1061-1069, 2020.
[7] W. A.-O. X. Guan, Z. Y. Ni, Y. Hu, W. H. Liang, C. Q. Ou, J. X. He, L. Liu, H. Shan, C. L. Lei, D. S. C. Hui, B. Du, L. J. Li, G. Zeng, K. Y. Yuen, R. C. Chen, C. L. Tang, T. Wang, P. Y. Chen, J. Xiang, S. Y. Li, J. L. Wang, Z. J. Liang, Y. X. Peng, L. Wei, Y. Liu, Y. H. Hu, P. Peng, J. M. Wang, J. Y. Liu, Z. Chen, G. Li, Z. J. Zheng, S. Q. Qiu, J. Luo, C. J. Ye, S. Y. Zhu, and N. S. Zhong, "Clinical Characteristics of Coronavirus Disease 2019 in China," *The New England Journal of Medicine,* vol. 382, pp. 1708–1720, 2020.
[8] S. Sadhu, R. Agrawal, R. Pyare, C. Pavesio, M. Zierhut, A. Khatri, J. R. Smith, M. D. de Smet, and J. Biswas, "COVID-19: Limiting the Risks for Eye Care Professionals," *Ocul Immunol Inflamm,* vol. 28, pp. 714-720, 2020.
[9] A. R. Sahin, A. Erdogan, P. M. Agaoglu, Y. Dineri, A. Y. Cakirci, M. E. Senel, R. A. Okyay, and A. M. Tasdogan, "2019 Novel Coronavirus (COVID-19) Outbreak: A Review of the Current Literature," *EJMO,* vol. 4, 2020.
[10] R. Gulias-Cañizo, E. D. Ruíz-Leyja, V. Sánchez-Huerta, and L. Ochoa-de la Paz, "SARS-CoV-2 and the Eye: A Relationship for a Possible Prognostic Tool in COVID-19 Patients," *Clin Ophthalmol,* vol. 15, pp. 707-712, 2021.
[11] D. Ma, C. B. Chen, V. Jhanji, C. Xu, X. L. Yuan, J. J. Liang, Y. Huang, L. P. Cen, and T. K. Ng, "Expression of SARS-CoV-2 receptor ACE2 and TMPRSS2 in human primary conjunctival and pterygium cell lines and in mouse cornea," *Eye,* vol. 34, pp. 1212-1219, 2020.
[12] C. Lange, J. Wolf, C. Auw-Haedrich, A. Schlecht, S. Boneva, T. Lapp, H. Agostini, G. Martin, T. Reinhard, and G. Schlunck, "What is the importance of the conjunctiva as a potential transmission pathway for SARS-CoV-2 infections?," *Ophthalmologe,* vol. 117, pp. 626-630, 2020.
[13] D. García-Ayuso, M. Escámez-Torrecilla, C. Galindo-Romero, F. J. Valiente-Soriano, E. Moya-Rodríguez, P. Sobrado-Calvo, and J. Di Pierdomenico, "Influence of the COVID-19 pandemic on contact lens wear in Spain," *Cont Lens Anterior Eye,* vol. 44, p. 17, 2021.
[14] P. B. Morgan, "Contact lens wear during the COVID-19 pandemic," *Contact Lens and Anterior Eye,* vol. 43, p. 213, 2020.
[15] L. Jones, K. Walsh, M. Willcox, P. Morgan, and J. Nichols, "The COVID-19 pandemic: Important considerations for contact lens practitioners," *Cont Lens Anterior Eye,* vol. 43, pp. 196-203, 2020.
[16] G. Kampf, D. Todt, S. Pfaender, and E. Steinmann, "Persistence of coronaviruses on inanimate surfaces

and their inactivation with biocidal agents," *J Hosp Infect,* vol. 104, pp. 246-251, 2020.
[17] G. Orsborn, "The importance of credible information about contact lens wear during pandemic," *Cont Lens Anterior Eye,* vol. 43, pp. 214-215, 2020.
[18] P. Wu, F. Duan, C. Luo, Q. Liu, X. Qu, L. Liang, and K. Wu, "Characteristics of Ocular Findings of Patients With Coronavirus Disease 2019 (COVID-19) in Hubei Province, China," *JAMA Ophthalmology,* vol. 138, pp. 575-578, 2020.
[19] L. Liang and P. Wu, "There may be virus in conjunctival secretion of patients with COVID-19," *Acta Ophthalmologica,* vol. 98, pp. 223-223, 2020.
[20] C.-w. Lu, X.-f. Liu, and Z.-f. Jia, "2019-nCoV transmission through the ocular surface must not be ignored," *The Lancet,* vol. 395, p. e39, 2020.
[21] N. Hong, W. Yu, J. Xia, Y. Shen, M. Yap, and W. Han, "Evaluation of ocular symptoms and tropism of SARS-CoV-2 in patients confirmed with COVID-19," *Acta Ophthalmologica,* vol. 98, pp. e649-e655, 2020.
[22] P. E. Napoli, M. Nioi, E. d'Aloja, and M. Fossarello, "The Ocular Surface and the Coronavirus Disease 2019: Does a Dual 'Ocular Route' Exist?," *Journal of Clinical Medicine,* vol. 28, p. 1269, 2020
[23] L. Chen, M. Liu, Z. Zhang, K. Qiao, T. Huang, M. Chen, N. Xin, Z. Huang, L. Liu, G. Zhang, and J. Wang, "Ocular manifestations of a hospitalised patient with confirmed 2019 novel coronavirus disease," *Br J Ophthalmol,* vol. 104, pp. 748-751, 2020.
[24] L. van der Hoek, K. Pyrc, M. F. Jebbink, W. Vermeulen-Oost, R. J. Berkhout, K. C. Wolthers, P. M. Wertheim-van Dillen, J. Kaandorp, J. Spaargaren, and B. Berkhout, "Identification of a new human coronavirus," *Nat Med,* vol. 10, pp. 368-73, 2004.
[25] C. Aristeidis and D. Tzamouranis, "Effect of the COVID-19 Pandemic on Contact Lens Wear in Greece," *Ophthalmology Research An International Journal,* vol. 14, pp. 22-29, 2021.
[26] D. D. Tzamouranis and A. Chandrinos, "Dataset on the questionnaire-based survey of the perceived risk of COVID-19 infection and Contact lens (CL) wearers," *Data in Brief,* vol. 36, p. 107101, 2021.
[27] M. Vianya-Estopa, N. Garcia-Porta, D. P. Piñero, L. Simo Mannion, E. W. Beukes, J. S. Wolffsohn, and P. M. Allen, "Contact lens wear and care in Spain during the COVID-19 pandemic," *Contact Lens and Anterior Eye,* vol. 44, p. 101381, 2021.
[28] M. Nagra, N. Retallic, and S. A. Naroo, "The impact of COVID-19 on soft contact lens wear in established European and US markets," *Cont Lens Anterior Eye,* vol. 45, p. 23, 2022.
[29] M. M. Bakkar and E. A. Alzghoul, "Assessment of contact lens wearers' attitude toward contact lens wear and care during Coronavirus Disease 2019 (COVID-19) pandemic: A cross-sectional online survey," *Contact Lens and Anterior Eye,* vol. 44, p. 101410, 2021.
[30] M. M. Bakkar and E. A. Alzghoul, "Assessment of compliance with contact lens wear and care among university-based population in Jordan," *Contact Lens and Anterior Eye,* vol. 43, pp. 395-401, 2020.
[31] B. S. A. Abdullah Fahad AlWadani, Kaberi B Feroze, Muhannad Mohammed Alwadany, Abdullah khalid AlWadani, Faisal Mohsen AlWadani, "Influence of the COVID-19 Pandemic on Contact Lens Use and Practices in Saudi Arabia –A Cross Sectional Study," *Sapporo Medical Journal,* vol. 56, 2022.
[32] D. Rey-Rodriguez, D. Arcos, and L. Tovar-Oviedo, "¡Profesionales y pacientes están usando lentes de contacto durante la pandemia de COVID-19?," *Revista Mexicana de Oftalmología,* vol. 95, pp. 188-192, 2021.
[33] M. Vianya-Estopa, J. S. Wolffsohn, E. Beukes, M. Trott, L. Smith, and P. M. Allen, "Soft contact lens wearers' compliance during the COVID-19 pandemic," *Contact Lens and Anterior Eye,* vol. 44, p. 101359, 2021.
[34] E. M. Rueff, E. Y. Chen, and A. L. Nguyen, "Vision Correction Habits After COVID-19 Onset in Spectacle and Contact Lens Wearers," *Eye Contact Lens,* vol. 50, pp. 65-69, 2024.
[35] A. Sulley, B. Terrell, A. Bogers, A. Pursey, and D. Lipkin, "Global contact lens wear and purchase behaviour during COVID-19 times," *Contact Lens and Anterior Eye,* vol. 44, p. 13, 2021.

Author Profile

Dr. Sinem SİPAHİOĞLU KARA obtained her B.Sc. degree from Kocaeli University, Physics in 2009. After she graduated from the university, she completed to master of Science program at Marmara University, Physics, and at İstanbul University-Cerrahpaşa, Biophysics. She received a Ph.D. degree in the bioengineering program at Yıldız Technical University in 2019. She works on the Opticianry Programme at Bilecik Şeyh Edebali University.

Dr. Şükriye Ceren Öcal Dirican is an Assistant Professor in the Department of Medical Laboratory Techniques at Istanbul Beykent University. She completed her undergraduate and master's degrees in the Department of Biology at Gazi University, and received her PhD degree from the Institute of Natural Sciences at Ankara University in 2024. Her areas of expertise include cell biology, microbiology, and laboratory researcher.