

Influence of the COVID-19 Pandemic on Contact Lens Use and Practices in Saudi Arabia –  
A Cross Sectional Study



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**Abstract**— One of the most significant medical events in current times is the emergence of the novel corona virus, Health authorities in many countries, including Saudi Arabia, imposed lockdowns and restricted free movement to contain the pandemic, which in turn, has affected the daily life of people, markedly limiting travel and social interactions. This cross-sectional study was performed to assess the influence of the COVID 19 pandemic on contact lens wear and usage in Saudi Arabia, and factors responsible for the same. This cross-sectional study was conducted using online questionnaire to study the pattern of contact lens compliance, practices and possible apprehensions among contact lens wearers during the pandemic and the factors responsible for them. 465 responses to the online questionnaire, 344 responses of contact lens users were included in the present study. Almost 78% of the respondents belonged to the 18-30-year age group. Of the 344 participants, 322 were female and 22 were male, majority of the participants used monthly replacement lenses (74.7%). Most of them were using lenses for more than 2 years (74.1%). this study showed that the COVID 19 pandemic has managed to affect every aspect of an individual's life, contact lens wear being one of them. However, what is worrying is that there were no significant precautionary measures adopted in those who continued use. Increased patient education to minimize the risk of infections and proper contact lens handling practices are the need of the hour.

**Key words:** COVID19, contact lens, replacement lenses, infection, precautionary measures

### **Introduction**

One of the most significant medical events in current times is the emergence of the novel corona virus, severe acute respiratory syndrome corona virus 2 ( SARS CoV2) causing Coronavirus disease 2019 (COVID-19).<sup>1</sup> The condition, which presented as pneumonia of unknown origin, was first identified in Wuhan, the capital city of Hubei province in China.<sup>2</sup> It was subsequently recognized as a pandemic, and, there have been 340,543,962 confirmed cases of COVID-19, including 5,570,163 deaths, reported to WHO.<sup>3</sup> The clinical features of COVID-19 are manifold, ranging from being completely asymptomatic to acute respiratory distress and multiorgan dysfunction. The presenting symptoms range from fever, cough, dyspnea, to headaches, fatigue, myalgia and even conjunctivitis.<sup>4</sup> Health authorities in many countries, including Saudi Arabia, imposed lockdowns and restricted free movement to contain the pandemic, which in turn , has affected the daily life of people, markedly limiting

travel and social interactions.<sup>5-10</sup> Physical distancing practices adopted during the COVID 19 pandemic has been noted to be accompanied by both advantages and disadvantages, which are expected to persist for many years.<sup>7</sup> In the world over, movement restrictions and social distancing has impacted all aspects of an individual's life and even affected individual preferences such as contact lens wear.<sup>6</sup> Many personal habits including contact lens wear and usage has been affected by the public perception of risk of infection. In different studies from Saudi Arabia, the level of knowledge of the participants about the virus was moderate, and accurate information about its symptoms and transmission were found to be less than desired.<sup>10,11</sup> The social media was found to have a significant impact in affecting the public perception during the COVID 19 pandemic and one study found a significant correlation between social media and spreading panic about COVID 19.<sup>12</sup> There have also been some researches published which advocate cessation of contact lens use during the pandemic, especially when patient has any respiratory symptoms.<sup>13,14</sup> On the other hand, there are studies which affirm that contact lens wear in asymptomatic persons does not present any risk provided proper hygienic measures are followed.<sup>15</sup> Nevertheless, different studies have noted that there has been a reduction in contact lens wear.<sup>16,17</sup> This could be due to a combination of factors including effect of published literatures, influence of social media and infection related anxiety. Until date, there is no published research about the influence of the COVID 19 pandemic on contact lens wear in Saudi Arabia. This study was conducted with the aim of assessing the influence of the COVID 19 pandemic on contact lens wear and usage in Saudi Arabia, and factors responsible for the same.

### **Patients and Methods**

This cross-sectional study was conducted to study the alteration, if any, in the pattern of contact lens compliance, practices and possible apprehensions among contact lens wearers during the pandemic and the factors responsible for them. Also, an attempt was made to correlate this change in contact lens behavior to age, duration and frequency of lens wear, type of lens and the extent of change in life style due to the pandemic.

This online, questionnaire-based study was conducted in Al Ahsa region of Saudi Arabia. Saudi adult, contact lens users were included in this research. The online Google form questionnaire was distributed through social media including What's App, Facebook and e-mail. Participation was voluntary and informed and participants were assured about confidentiality. The participants were provided with a brief information about the research at the beginning of the questionnaire and asked to proceed only if they wanted to. Individual consent was taken by clicking on the 'agree' button on a question asking about their willingness to participate in the study. The study commenced after obtaining appropriate permission from the College of Medicine IRB.

The online questionnaire had a total of 13 questions divided into 3 sections. Section A had 3 general questions assessing demographic information. Section B had 5 questions assessing contact lens history. Change in contact lens usage during the pandemic was assessed through 5 questions in section C. The questionnaire was designed by an ophthalmologist and validated by another faculty member. This was followed by pilot testing, after which, it was disseminated to the medical students.

The sample size of the study was calculated using the online sample size calculator ([www.raosoft.com](http://www.raosoft.com)) and was estimated to be 384 using confidence level of 95%. The data was entered through a designed Google sheet linked to the questionnaire, then reviewed and converted into a Microsoft office Excel file. The data was analyzed using percentages and means and chi square test for comparison between groups. A P-value of less than 0.05 was considered significant.

## **Results**

There were 465 responses to the online questionnaire and after applying the inclusion and exclusion criteria, 344 responses of contact lens users were included in the present study. Almost 78% of the respondents belonged to the 18-30-year age group. Of the 344 participants, 322 were female and 22 were male. (Table 1) 20% of the respondents had school level education and 80% had college level education.

Regarding the pattern of contact lens use, majority of the participants used monthly replacement lenses(74.7%). (Table 2) Most of them were using lenses for more than 2 years (74.1%). However, only 19.2% of them were using the lenses daily and of them, about 56% were using the lenses for 4 to 6 hours. The most common source of purchasing contact lenses was an optical shop, followed by a pharmacy outlet.

When enquired about the change in life style and contact lens usage during the pandemic, 51.7% of the respondents strongly agreed/ agreed that there had been a restriction in activities due to the pandemic. 63% of the contact lens wearers in this study stated that they had used contact lenses less often than usual during the pandemic. (Table 3)

When enquired about the reason for reduced contact lens wear, the most common reason was reduced need to go out and less events and functions( $n=194$ ), followed by fear of introducing an infection into the eye( $n=64$ ). (Table 4)

52.3% of the respondents denied taking any special precautions when using contact lens during the pandemic time. Among those who took special precautions, the most common was increased and more meticulous hand hygiene prior to lens handling.

When asked about resuming contact lens use similar to pre COVID times, only 40% strongly agreed/agreed that they would be able to use contact lens as they used earlier.

When analyzed, there was no significant relationship noticed between age of the respondent and type of contact lens used, reduction in contact lens use during the pandemic and using precautionary measures while handling lenses during the pandemic. Similarly, no significant relationship was found between level of education and type of lens, reduction in lens use and precautionary measures. Duration of lens wear also had no influence on the type of lens used or changes in contact lens practices during the pandemic. However, a statistically significant relationship was noted between participants who felt/ strongly felt that there was a restriction in activities during the pandemic and had reduced contact lens wear during the pandemic with a p value less than 0.00001.(Table 5)

## Discussion

Most of the contact lens wearers in this study were in the 18-30-year age group and were females. This is thought to be the predominant age and sex group using contact lens, especially those using for cosmetic purposes. Our age and sex parameters were similar to that of other studies in this region.<sup>18,19</sup> About 75% of the participants used a monthly replacement type of contact lens, and most of the participants used the lenses for 4 to 6 hours a day, which was the trend noted in another study as well.<sup>20</sup> Approximately 74% had been using lenses for more than 2 years, but majority (80.8%), however, were not daily wearers. A large number of participants (n= 264) obtained the lenses from optical shops which resembled the findings in other Saudi Arabian studies to a large extent.<sup>18-20</sup>

51.7% of the respondents in the present study strongly agreed/ agreed that there had been a restriction in activities due to the pandemic. In the Kingdom of Saudi Arabia, the Government imposed a lockdown even before the first case of SARS CoV2 was detected, with precautionary measures ranging from suspension of flights, religious, entertainment and sporting mass gatherings, temporary closure of educational establishments and mosques to even imposing a curfew as per the local requirements.<sup>8-10</sup> In a study from Spain, only 15% of the participants felt that they were leading a normal life during the pandemic and 75% of the participants in a UK study felt that they were self-isolating/rigorously following self-isolation advices.<sup>16,17</sup>

As anticipated, 63% of the contact lens wearers in this study stated that they had used contact lenses less often than usual during the pandemic. This pattern is similar to reductions in contact lens wear to the tune of 67% and 56% in other studies, with one study reporting that 46% of their participants completely stopped contact lens wear during the pandemic.<sup>6,16,17</sup> The commonest reason for reduced contact lens use in the present study was reduced need to wear contact lenses as there was less need to go out and less gatherings/events (n= 194). This reason was noted to be the foremost in other studies as well.<sup>16,17</sup> Fear of infection was the cause in only 64 (29.5%) respondents who gave a reason for reduced contact lens. 52.3% of the respondents denied taking any special precautions prior to or while using contact lenses, which was comparable to 56.8% in a Spanish study and more than 50% respondents not taking appropriate handwashing precautions in another research.<sup>6,17</sup> Of those who adopted precautionary measures, only 16 subjects (5%) sought contact lens related medical advice. This shows that a large percentage of the contact lens wearers were unable to seek medical advice, probably due to reduced accessibility to health care providers. Online consultations could provide a solution and help disseminate information about proper handling of contact lenses and other infection control measures as well. With the progress of the pandemic, it has been noted that both the Saudi Government and private agencies have launched many platforms and applications to provide health care and online health/telehealth delivery channels have played a vital role in controlling the spread of COVID 19 in Saudi Arabia.<sup>21,22</sup> Enhanced reach of this health care modality could go a long way in improving patient care in these times and it presumably represents an important future mode of health care delivery. It was also anticipated that fear of infection

would drive more contact lens wearers to the daily disposable type, which in many studies has been postulated to be associated with a reduced infection risk and better long-term ocular health, if used appropriately.<sup>23</sup> However, no such trend was observed in this study. The lack of information about the benefits of daily disposable lens, the cost factor and the reduced accessibility during the pandemic were thought to be reasons for the same. Interestingly, among the participants who had adopted special precautions, the most common one was improved hand hygiene prior to lens handling. The increased hand hygiene compliance was noted in other studies as well, in terms of frequency and thoroughness, and it probably reflects the greater awareness of hand hygiene as part of the worldwide infection control public health drive.<sup>16</sup>

With the control of the pandemic, contact lens use was assumed to show a turnaround as lives return to normal and the advantages of contact lens wear become apparent to the wearer again.<sup>6, 15</sup> Interestingly, only 40% of the participants of this study reported that they would begin resumption of lens wear at the prepandemic level. This could be explained by the increased reliance on glasses as has been shown in one study that 90.4% of the study population were more used to wearing glasses.<sup>6</sup> Furthermore, it could also be the result of the increased fear of infections created by the pandemic, apprehensions of infections by newer strains of the virus and even the predictions of more pandemics in the future.<sup>24,25</sup>

Garcia- Ayuso et al noted that among those who kept wearing lenses during the pandemic, the majority were daily wearers before the pandemic.<sup>6</sup> No such relationship was noted in our study. This study, however, noted a significant relationship between those who agreed/strongly agreed that there was a restriction in activities during the pandemic and had reduced contact lens wear during the pandemic ( $p < 0.00001$ ). This could be anticipated due to the reduced need to go out due to the initial lockdown and the social distancing measures adopted for the past ten months as a precautionary measure against the SARS-CoV2 virus.

### **Limitations of the study**

This study was conducted to assess the extent to which the COVID 19 pandemic has affected contact lens wear in Saudi Arabia and is probably one of the first of its kind in this region. The sample size in this study was slightly less than the optimum and the study also was expected to have the inherent bias associated with an online questionnaire format. However, this study does bring to light the changes in the practice and attitude of contact lens wearers in this region. Further studies with larger sample sizes and across more areas are planned.

### **Conclusion**

In conclusion, this study showed that the COVID 19 pandemic has managed to affect every aspect of an individual's life, contact lens wear being one of them. In the present study, there was a reduction in contact lens wear, mainly caused by a restriction of daily activities. However, what is worrying is that there were no significant precautionary measures adopted in those who continued use. Increased patient education to minimize the risk of infections and proper contact lens handling practices are the need of the hour. Online medical consultations could prove to be the solution and although there has been an increase in the same, increased accessibility to online consultations to all sections of the population could

help improve individual health and enhance the general health of the community as well. With the vaccine at arm's reach, the end to the pandemic seems on the horizon. But until then, it is best to stay safe, adopt all precautionary measures and follow health guidelines as far as possible.

**Table legends:**

Table 1. Demographic characteristics of contact lens wearers

Table 2. Contact lens usage characteristics

Table 3. Effect of pandemic on general activities and contact lens wear

Table 4. Causes of change in contact lens usage characteristics during pandemic

Table 5. Chi square table

**Table 1.**

Demographic characteristic		Number of respondents
Age group	18-30 years	268 (77.9%)
	31-50 years	71 (20.6%)
	51 years and above	5(1.5%)
Sex	Females	322 (93.6%)
	Males	22 (6.4%)
Level of education	School level education	69 (20%)
	Bachelor's degree and above	275 (80%)

**Table 2.**

Contact lens usage characteristics		Number
Type of lens used	Daily, disposable soft lenses	55 (16%)
	Monthly replacement lenses	257 (74.7%)
	Others	32(9.3%)
Duration of contact lens wear	Less than 12 months	41 (11.9%)
	12 months to 2 years	48 (14%)
	More than 2 years	255(74.1%)
Pattern of lens usage	Daily	66(19.2%)
	Occasional	278 (80.8%)

**Table 3.**

Effect of pandemic on general activities and contact lens wear		Frequency and percentage
Was there a restriction in activities during the pandemic?	Strongly agree	71 (20.7%)
	Agree	105 (30.5%)
	Neutral	86 (25%)

	Disagree	50 (14.5%)
	Strongly disagree	32 (9.3%)
<b>Was there any change in contact lens usage during the pandemic?</b>	Used lenses less than before	217 (63.1%)
	Same as before	116 (33.7%)
	More than before	11 (3.2%)
<b>Have you been taking extra precautions while using contact lenses during the coronavirus pandemic?</b>	Yes	164 (47.7%)
	No	180 (52.3%)
<b>When the COVID-19 pandemic ends, will you re-use contact lenses as frequently as before?</b>	Strongly agree	49 (14.3%)
	Agree	88 (25.6%)
	Neutral	125 (36.3%)
	Disagree	61(17.7%)
	Strongly disagree	21(6.1%)

**Table 4.**

Contact lens usage characteristics during pandemic		Number
<b>Causes of reduction in contact lens wear during the pandemic</b>	Reduction in going out/ events	194
	Difficulty in purchasing lens	24
	Fear of introducing an infection	64
	Medical advice	16
	Advice from family and friends	9
	To reduce expenses	12
<b>Precautionary measures adopted during the pandemic</b>	Increased and more meticulous handwashing prior to handling lenses	146
	Changing the contact lens solution more frequently	114
	Switching to daily disposable lenses	31
	Increased use of artificial tears	1

**Table 5.**

	Reduced contact lens wear	No change or increased wear	Marginal row totals
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Agreed/ strongly agreed to restriction of activities during pandemic	138(111.02) [6.55]	38 (64.98) [11.2]	176
Neutral/ disagreed to restriction of activities during pandemic	79 (105.98) [6.87]	89 (62.02) [11.73]	168
Marginal column totals	217	127	344 (Grand total)

The chi-square statistic is 36.3554. P value is <0.00001.(significance at  $p < 0.05$ )

### **Declarations:**

#### **Ethics approval and consent to participate**

Research was conducted after obtaining the institutional researchers' board (IRB) of King Faisal University.

#### **Consent for publication**

We authorize the journal for publication of identifying images or other personal or clinical details of participants that compromise anonymity. (Not applicable)

#### **Availability of data and material**

All data and material are available upon request

#### **Competing interests**

The author declares that there is no compete or conflict of interests regarding the publication of this article.

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'Not applicable'

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