The attitude and awareness of contact lens use among medical students of King Faisal University, Al Ahsa, Saudi Arabia

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ABSTRACT

Background: Not many studies have investigated the knowledge outcomes among medical students with regards to contact lenses (CL). Thus, in this study, we aim to assess the attitude and awareness of CL use and the associated factors among medical students of King Faisal University (KFU), Al Ahsa, Saudi Arabia. Methods: This a cross-sectional study that based developed based on a designed questionnaire that was composed of 31 questions with a maximum score of 57 points. We have also conducted a linear regression model to explore the possible important factors that may affect the level of knowledge and awareness about contact lenses care. Results: A total of 208 participants were included in this study, with a mean age of 21.0 ± 1.9, and 56.3% (n = 117) of them being females. The total mean knowledge score in our study was 30.1 ± 7.74, which was higher in females (31.5 ± 7.09) than in male participants (28.7 ± 7.69). The results of the linear regression model showed that being female (E = -0.37; 95%CI = -0.65— -0.10; P = 0.007), using contact lenses (E = 0.56; 95%CI = 0.29 — 0.82; P < 0.001), and in the third year (E = 0.66; 95%CI = 0.19— 1.13; P = 0.007) is significantly correlated with having higher knowledge scores about using CLs. Conclusion: Female participants had higher total mean knowledge scores than males. We recommend that further educational campaigns should be inaugurated to raise awareness about taking care of CLs and enhancing the related practices of wearing them.

Keywords: Contact lenses, knowledge, medical, prevalence

Introduction

Studies show that refractive errors are increasingly becoming a burden on the affected patients and the corresponding healthcare systems. Contact lenses (CLs) have been widely approved for the correction of refractive errors. The purpose of CLs use is usually medical, to correct an underlying error of refraction and corneal pathologies, or cosmetic. Wearing CLs has been prescribed for decades, and the rate for using them has been increasing since then. Many benefits have been reported for CLs use in the literature. Studies indicated that the quality of life (QoL) for patients using CLs has increased, especially for younger patients. This is probably attributable to the increased flexibility of CLs and enhanced appearance than wearing glasses.

Studies have shown that as a result of the increasing frequency of wearing CLs, many associated problems have been reported. Many complications can develop following the frequent and improper wear of CLs. Endophthalmitis and keratitis are common serious complications that many CL users are not aware of. The development of such complications might lead to the development of serious adverse events which may impact the affected users’ vision as a result of the poor compliance to the prescribed guidelines by the attending physicians."
et al.\(^\text{16}\) reported that 99% of the US citizens that wear CLs are at risk of developing ocular infections as a result of at least one mispractice related to CLs care. Jones et al.\(^\text{10}\) also reported that the continuous use of CLs has resulted in increasing the frequency of itching, burning, or tearing eyes. Besides, other complications as conjunctival hyperemia might develop which may cause discomfort and affect the care provided by wearing CLs.\(^\text{11,12}\) Therefore, it is essential to raise awareness and knowledge about CLs' use and care to avoid such complications and attain the potential best benefits from wearing them.

To collect enough evidence about the awareness and knowledge of individuals towards CLs use and care, many epidemiological studies should be conducted in different regions. In Pakistan, the desired degree of awareness about the good care of CLs was not present in more than half of the healthcare practitioners using CLs.\(^\text{13}\) In Saudi Arabia, Abahussin et al.\(^\text{14}\) reported that the prevalence of CLs use was 70.2%, and around two-thirds of these used them for cosmetic purposes. The same study also showed that around 39% of the female students’ population reported that they used CLs without the prior consultation of a healthcare practitioner. However, not many studies have investigated these outcomes among medical students. Thus, in this study, we aim to assess the attitude and awareness of CLs use and the associated factors among medical students of King Faisal University (KFU), Al Ahsa, Saudi Arabia.

**Methods**

**Study design and population**

This is a cross-sectional study that based developed based on a designed questionnaire to estimate the level of knowledge and awareness towards contact lenses use among medical students in KFU, Al Ahsa, Saudi Arabia. We also aimed to assess the variation in the level of knowledge and awareness between males and females, and explore the possible important factors that may affect the level of knowledge and awareness about contact lenses care. All of the study participants were medical students only and have agreed to take part in this study, and the institutional review board approval was obtained from the KFU. Our questionnaire was composed of two main parts and an introductory part to explain to the participants the background of the study and the aimed outcomes. The first main part included 13 questions that were mainly about the use of CLs including the duration of use, the reasons, types, and mode of wear, in addition to the baseline characteristics and demographics. The second main part consisted of 18 questions that would help evaluate the knowledge about CLs use and wear, like hand washing before using CLs, cleaning CLs, cleaning materials, knowledge about renewal, wearing practices, knowledge about overwear syndrome and associated symptoms and complications, and how to behave when noticing a CL-related symptom. The maximum score was 57 points for all the investigated questions. Regarding the coding of the obtained answers of the study participants, any question that was answered by a yes or no, the answer was coded as 1 or 0, respectively. Any question that was composed of three sections (yes, no, sometimes), the answer was coded as 2, 0, 1, respectively. Moreover, scaled questions were coded based on the number of each factor, as each one represented one score and never or no represented 0 scores.

The study was approved by the Eastern region Family Medicine ethical committee at the Ministry of Health, Saudi Arabia.

**Statistical analysis**

We have conducted the statistical analysis using SPSS v26 (IBM Statistics, Armonk, New York), and whenever a comparison was made, A value of \(P < 0.05\) was considered significant on the different occasions. We have represented the continuous variables as means and standard deviation, while ordinal variables were represented as events and percentages. Besides, we have conducted a linear regression model to explore the possible important factors that may affect the level of knowledge and awareness about contact lenses care. The results were finally represented as estimates and their 95% confidence intervals (CI).

**Results**

A total of 208 participants were included in this study, with a mean age of 21.0 ± 1.9, and 56.3% (\(n = 117\)) of them being females. The prevalence of CL use was 47.1% (\(n = 98\)), which was significantly higher in females than males (59.0% Vs. 31.9%, \(P < 0.001\), respectively). Other baseline demographics and baseline characteristics are represented in Table 1. Current users accounted for 69.7% (\(n = 69\)), with no significant difference between male (71.4%) and female participants (69.0%) (\(P = 0.814\)). Most male participants tend to daily use CLs (79.3%) which is significantly more than half of the females (43.7%) (\(P = 0.004\)). Moreover, most male participants used CLs daily (82.1%) while most females used them occasionally (65.7%) (\(P < 0.001\)). Other characteristics of CLs use among males and females can be seen in Table 2. Among the reported problems with wearing CLs, eye redness was the commonest (Total = 76%, female = 79.5%, male = 71.4%), followed by eye itching (Total = 62.0%, female = 64.1%, male = 59.3%), and dryness (Total = 57.7%, female = 62.4%, male = 51.6%) [Figure 1]. Wearing CLs during sleep (Total = 76.0%, female = 82.1%, male = 68.1%), swimming (Total = 52.9%, female = 58.1%, male = 46.2%), and without handwashing (Total = 48.1%, female = 56.4%, male = 37.4%), or sharing them with others (Total = 61.1%, female = 70.1%, male = 49.5%) were the most common reasons for developing these problems [Figure 2].

The total mean knowledge score in our study was 30.1 ± 7.74, which was higher in females (31.5 ± 7.09) than in male participants (28.7 ± 7.69) [Figure 3]. Furthermore, participants in the third year had a higher total mean knowledge score than other participants [Figure 4]. Most of the study population washed their hand before using CLs (Total = 86.1%, female = 90.6%, male = 80.2%, \(P = 0.032\)). Knowledge about CLs renewal every 3 months was significantly more frequently seen in females than males (Total = 54.3%, female = 60.7%, male = 46.2%, \(P = 0.037\)). Besides, most participants do not rub their CLs (Total = 68.8%, female = 62.4%, male = 76.9%, \(P = 0.025\)). Other assessed
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Table 1: Sociodemographic characteristics of the participants

| Variables                  | Are you a contact lens user? | P       |
|----------------------------|-----------------------------|---------|
|                            | No                          | %       | Yes                          | %       | Total                       | %       |
|                            | Count                       | %       | Count                       | %       | Count                       | %       |
| Age (years); mean±SD       | 21.1±1.8                    | 43.6    | 20.9±2.0                    | 70.4    | 21.0±1.9                    | 56.3    | 0.228                       |
| Gender                     | Female                      | 48      | 69                          | 70.4    | 117                         | 56.3    | <0.001*                     |
|                            | Male                        | 62      | 29                          | 29.6    | 91                          | 43.8    |                             |
| Nationality                | Saudi                       | 110     | 98                          | -       | 208                         | -       |                             |
| City                       | Al Ahsa                     | 93      | 85                          | 86.7    | 178                         | 85.6    | 0.802                       |
|                            | Dammam                      | 8       | 6                           | 6.1     | 14                          | 6.7     |                             |
|                            | Jubail                      | 2       | 3                           | 3.1     | 5                           | 2.4     |                             |
|                            | Jubail & Al Ahsa            | 2       | 0                           | 0.0     | 2                           | 1.0     |                             |
|                            | Khobar                      | 5       | 4                           | 4.1     | 9                           | 4.3     |                             |
| Year of Medical College    | Fifth year                  | 18      | 9                           | 9.2     | 27                          | 13.0    | 0.190                       |
|                            | First year                  | 15      | 20                          | 20.4    | 35                          | 16.8    |                             |
|                            | Fourth year                 | 23      | 22                          | 22.4    | 45                          | 21.6    |                             |
|                            | Second year                 | 30      | 20                          | 20.4    | 50                          | 24.0    |                             |
|                            | Sixth year                  | 11      | 7                           | 7.1     | 18                          | 8.7     |                             |
|                            | Third year                  | 13      | 20                          | 20.4    | 33                          | 15.9    |                             |

SD: standard deviation; *Statistically significant

Discussion

In this study, we hoped to shed more light on the attitude and awareness among medical students of King Faisal University, Al Ahsa, Saudi Arabia. We hope that our findings would be used to imply beneficial approaches that would enhance the practice of CLs among medical students. The prevalence of CLs use in our medical population was 47.1%. This knowledge parameters can be seen in Table 3. The results of the linear regression model showed that only being female (E = -0.37; 95%CI = -0.65— -0.10; P = 0.007), using contact lenses (E = 0.56; 95%CI = 0.29— 0.82; P < 0.001), and in the third year (E = 0.66; 95%CI = 0.19— 1.13; P = 0.007) is significantly correlated with having higher knowledge scores about using CLs [Table 4].

Figure 1: Problems related to wearing contact lenses

Figure 2: The reasons related to problems of contact lenses wearings

rate is similar to the 40.5% reported by Ibrahim et al.[9] for medical students in Jeddah. On the other hand, Bamahfouz et al.[18] reported that the rate is 50.1%. On a global level, the prevalence of CLs among medical students is variable, and studies showed that it ranges between 17.1-27.4%.[16,17] Our findings also showed that the mean total knowledge score was 30.1 ± 7.74. We also found that the prevalence of CL use was significantly more common among female medical students. This is consistent with the previous results by Ibrahim et al.[9] and Bamahfouz et al.[18] that was conducted on medical students from Jeddah, and Mekkah, respectively. Female students had also significant high total mean knowledge scores. This is probably attributable to the high prevalence
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Previous studies have demonstrated that many factors are associated with developing complications related to CLs use. Bamahfouz et al.\textsuperscript{[15]} reported that prolonged and daily use, in addition to sleeping, taking showers, or swimming with CLs was significantly associated with the development of complications. In our study, we found that the daily use of CLs and the daily mode of CLs were more significantly higher in male than female participants. However, we did not find any significant differences between males and females regarding hours per day wearing of CLs, and most of them used CLs for a maximum of hours less than 12 per day. Moreover, washing hands before wearing CLs, poor cleaning of CLs, and poor rubbing techniques applications are significant factors that might increase the risk of developing complications.\textsuperscript{[18]} In this study, most of the participants washed hands before wearing CLs, while around two-thirds of them did not use rubbing techniques, and both factors were significantly in favor of our female participants. This indicates the low knowledge practices among the Saudi population and necessitates the need for implying further preventive plans to increase the level of awareness. A previous study by Thakur et al.\textsuperscript{[19]} reported that around half of the study participants that used CLs had detectable bacterial contaminations in their lens care solutions and/or CLs, however, none of these participants developed symptoms.

![Figure 3: Gender differences in the assessed knowledge scores](image)

**Table 2: Characteristics of contact lens usage among males and females**

| Variables                                      | Gender                  |          |          |          |          |          |
|------------------------------------------------|-------------------------|----------|----------|----------|----------|----------|
|                                                 | Female                  | Male     | Total    |          |          |          |
|                                                 | **Count**               | **%**    | **Count**| **%**    | **Count**| **%**    |
| Are you a contact lens user?                    | No                      | 48       | 41.0     | 62       | 68.1     | 110      | 52.9     |<0.001* |
|                                                | Yes                     | 69       | 59.0     | 29       | 31.9     | 98       | 47.1     |          |
| Contact lens user                               | Current user            | 49       | 69.0     | 20       | 71.4     | 69       | 69.7     | 0.814   |
|                                                | Past user               | 22       | 31.0     | 8        | 28.6     | 30       | 30.3     |          |
| Duration of contact lens wear of current user   | <6 months               | 23       | 32.4     | 12       | 41.4     | 35       | 35.0     | 0.116   |
|                                                | >5 years                | 4        | 5.6      | 2        | 6.9      | 6        | 6.0      |          |
|                                                | 1 to 5 years            | 29       | 40.8     | 5        | 17.2     | 34       | 34.0     |          |
|                                                | 6 months to 1 year      | 15       | 21.1     | 10       | 34.5     | 25       | 25.0     |          |
| Type of contact lenses use                      | Rigid gas permeable     | 2        | 2.9      | 1        | 3.4      | 3        | 3.0      | 1.000   |
|                                                | Soft contact lenses     | 68       | 97.1     | 28       | 96.6     | 96       | 97.0     |          |
| Mode of wear                                    | Daily wear              | 31       | 43.7     | 23       | 79.3     | 54       | 54.0     | 0.004*  |
|                                                | Disposable              | 15       | 21.1     | 1        | 3.4      | 16       | 16.0     |          |
|                                                | Extended wear           | 25       | 35.2     | 5        | 17.2     | 30       | 30.0     |          |
| Use contact lenses                              | Daily                   | 24       | 34.3     | 23       | 82.1     | 47       | 48.0     |<0.001*  |
|                                                | Occasionally            | 46       | 65.7     | 5        | 17.9     | 51       | 52.0     |          |
| Hours per day wearing contact lenses            | <8 hours                | 33       | 45.8     | 14       | 48.3     | 47       | 46.5     | 0.472   |
|                                                | >12 hours               | 7        | 9.7      | 5        | 17.2     | 12       | 11.9     |          |
|                                                | 8-12 hours              | 32       | 44.4     | 10       | 34.5     | 42       | 41.6     |          |
| Reasons of using contact lenses                 | Convenience             | 6        | 8.3      | 3        | 10.3     | 9        | 8.9      | 0.245   |
|                                                | Cosmetic                | 31       | 43.1     | 7        | 24.1     | 38       | 37.6     |          |
|                                                | Others                  | 1        | 1.4      | 0        | 0.0      | 1        | 1.0      |          |
|                                                | Refractive              | 34       | 47.2     | 19       | 65.5     | 53       | 52.5     |          |

\*Statistically significant
We have also conducted a linear regression model to identify the factors that can predict having high knowledge scores of CLs use. Our results showed that being a female using CLs significantly correlates with having high knowledge scores.
Table 4: Linear regression for predictors of knowledge score among the participants

| Predictor             | Standardized Estimate | 95% confidence Interval | P     |
|-----------------------|-----------------------|-------------------------|-------|
|                       | Lower | Upper |       |       |
| Age                   | -0.01 | -0.14 | 0.13  | 0.941 |
| Gender                |       |       |       |       |
| Female                | Reference |       |       |       |
| Male                  | -0.37 | -0.65 | -0.10 | 0.007*|
| City                  |       |       |       |       |
| Khobar                | Reference |       |       |       |
| Al Ahsa               | -0.63 | -1.29 | 0.04  | 0.064 |
| Dammam                | -0.16 | -0.99 | 0.67  | 0.705 |
| Jubail                | -0.29 | -1.37 | 0.80  | 0.604 |
| Jubail& Ahsa          | 0.89  | -0.63 | 2.41  | 0.248 |
| Year of Medical College|   |       |       |       |
| First year            | Reference |       |       |       |
| Fifth year            | 0.05  | -0.45 | 0.55  | 0.85  |
| Fourth year           | 0.20  | -0.24 | 0.64  | 0.377 |
| Second year           | 0.28  | -0.15 | 0.71  | 0.203 |
| Sixth year            | 0.23  | -0.34 | 0.80  | 0.427 |
| Third year            | 0.66  | 0.19  | 1.13  | 0.007*|
| Are you a contact lens user |   |       |       |       |
| No                    | Reference |       |       |       |
| Yes                   | 0.56  | 0.29  | 0.82  | <0.001*|

*Statistically significant

This is logical as individuals that frequently seek to wear CLs acquire more knowledge about CLs to achieve better cosmetic or medical outcomes. Moreover, we found that being a third-year medical student also significantly correlates with having high knowledge scores other than older and younger participants. Although we do not have a proper explanation for this correlation, except for the possible differences in demographics among these participants, previous studies have demonstrated the importance of education on obtaining better knowledge scores.[20,21] On the other hand, Alobaidan et al.[22] reported that neither gender nor the level of education significantly correlates with having high knowledge scores of CLs use in their Saudi general population, however, younger ages less than 25 years old did. Moreover, a previous registry-based study reported that male participants were better users of CLs than females in terms of fewer symptoms. However, the authors justified this by reporting that female participants tend to promptly report the symptoms and frequently report to their healthcare professionals. Moreover, the same study showed that higher CL-related hygienic practices were seen more frequently among females.[22] This indicates that female individuals have more knowledge about CLs care and use than males. Contact lenses have been a part of some individual's daily lives. The use of CLs in a hygienic way is essential to prevent unwanted infections. This is the first study to assess the knowledge and practice of CLs in Al Ahsa, Saudi Arabia. More studies are necessary to study a larger group of residents.

Some factors might have limited the findings of this study. These include the survey-based design of the study, and the limited sample size, which necessitates the need to conduct further investigations with proper sampling and study design.

Conclusion

Our findings demonstrate the high prevalence of CLs use among our medical students’ population and the low knowledge scores among them. Female participants had higher total mean knowledge scores than males, and they significantly used more disposable and extended-wear CLs than males. We also found that the female gender, using CLs, and being in the third year significantly correlate with having higher knowledge scores. We recommend that further educational campaigns should be inaugurated to raise awareness about taking care of CLs and warn against the possible associated complications.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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