

Compliance with contact lens care and factors driving noncompliance in health-care students in Jeddah, Saudi Arabia

Nada K. Naaman^{1,2}, Suzan Y. Alharbi^{2,3}, Muhammad A. Khan^{1,2}, Saeed A. Alghamdi^{2,4}

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Abstract:

PURPOSE: This study aimed to assess compliance to contact lens care behaviors and determine common factors influencing noncompliance among a population of university students in Jeddah, Saudi Arabia.

METHODS: This is an observational, cross-sectional study in which a previously validated self-administered questionnaire consisting of 12 questions addressing compliance to contact lens wear and care was E-mailed through the university message center.

RESULTS: A total of 388 participants completed the questionnaire. Of those who completed the survey, 150 were contact lens users with an experience of 1 month or more. The average compliance rate to contact lens care was around 66%. High levels of compliance were reported in sharing contact lenses, sleeping with contact lenses, showering/swimming with contact lenses, and using water to clean contact lenses. Moderate levels of compliance were shown in overuse of contact lenses, adherence to instructions of lens cleaning, cleaning the lens case, and adherence to aftercare visits. The lowest levels of compliance were noted in washing hands before lens use and lens case replacement. Gender, smoking, contact lens experience, type and modality of contact lens usage, and contact lens purchase site were found to have a significant association with behaviors showing poor compliance. Believing there is no harm in wearing lenses for longer than the recommended replacement schedule was the primary reason given for overusing contact lenses.

CONCLUSION: Moderate levels of compliance were generally reported by respondents, necessitating the need for better strategies to reinforce the importance of compliance to contact lens care in the Saudi population.

Keywords:

Compliance, contact lens, keratitis, Saudi Arabia, university

INTRODUCTION

Contact lenses have become increasingly popular among adolescents in Saudi Arabia for both refractive correction and cosmetic purposes.^[1,2] Thus, contact lens-related complications continue to rise with the increased usage.^[3] Contact lens-related problems range from minor discomfort to severe sight-threatening eye infections.^[4,5] For instance, contact lens misuse was found to be the most significant risk factor for microbial keratitis, a serious corneal infectious disease that results in approximately 1 million clinic and emergency department visits annually, with an estimated cost of \$175 million in the United States.^[6-9] The etiology of

microbial keratitis follows a global distribution pattern reflecting variations in population demographic and environmental factors, as well as contact lens wear. Regions with the highest prevalence of contact lens use reported a predominance of bacterial keratitis.^[10] Among isolated bacterial organisms, *Pseudomonas aeruginosa* has always been associated with contact lens wear. Keratitis induced by such virulent organisms is rapidly developing and may cause blindness in the absence of timely management.^[6,11] In a study conducted in Southern Saudi Arabia, *P. aeruginosa* accounted for 19.5% of contact lens-induced keratitis cases with patients requiring a mean follow-up period of 3–4 months.^[12] Patient noncompliance to instructions given by eye care practitioners

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¹College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, ²King Abdullah International Medical Research Center, ³Jeddah Eye Hospital, Ophthalmology Western Region Program, Jeddah, Saudi Arabia, ⁴Department of Ophthalmology, Ministry of National Guard – Health Affairs, Jeddah, Saudi Arabia

Address for correspondence:
Dr. Nada K. Naaman,
College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia.
E-mail: naaman204@ksau-hs.edu.sa

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proves to be strongly associated with contact lens-related adverse events.^[13,14] Unhealthy habits for contact lens care include failure to wash hands, overnight wear, water exposure, solution misuse, and infrequent lens case replacement, as provided by the American Academy of Ophthalmology and the Centers for Disease Control and Prevention.^[15,16] Calculating the true rate of compliance to recommendations remains a challenge as long as there exists no established testing method with predefined scoring criteria. A few studies, however, attempted to assess compliance using self-reported questionnaires. A review by Claydon and Efron reported 40%–91% of contact lens users as noncompliant.^[17] A more recent study across Europe found compliance rates of 0.3% and 2.7% in daily and extended lens wearers, respectively.^[18] Factors likely contributing to the patient level of compliance include those related to the regimen cost, complexity, and convenience. Furthermore, the method of instruction and patient–clinician relation may play a role in compliance. Locally, a few studies in Saudi Arabia have been conducted to identify the habits of using contact lenses. Among them was a cross-sectional study performed in King Abdulaziz University (KAU), Jeddah, which reported that 30.4% of 536 medical students had at least one contact lens-related complication.^[21] Similarly, a study that recruited patients attending ophthalmology clinics at KAU Hospital, Jeddah, as well as visitors of a large shopping mall in Jeddah reported a high percentage of noncompliance with contact lens-related hygiene rules (89%) and a higher prevalence of associated eye complaints (93%).^[19] Another study was conducted in a mall in Riyadh on 510 contact lens wearers which demonstrated that two-thirds of participants suffered from complications requiring the assistance of eye care professionals, which suggests poor compliance to hygienic contact lens care.^[20]

To our knowledge, a very limited number of studies assessing patient compliance were conducted in Saudi Arabia and no studies reported factors influencing noncompliance. Awareness of modifiable parameters could aid in reducing contact lens-related adverse events. Furthermore, adjustments to the current practitioner instructions method are integral for improved patient compliance and, eventually, satisfaction. This study aimed to assess compliance to contact lens wear instructions among a population of university students in Saudi Arabia. The study also evaluated the factors driving noncompliant behaviors.

METHODS

Study design

The study had a descriptive cross-sectional design. It was conducted among health-care students of King Saud bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia, between September and December 2020. Study subjects were invited to voluntarily participate in the study by completing a questionnaire sent via E-mail through the university message center. Contact lens wearers who have

worn lenses for at least 1 month were included in the study. Participants who did not wear contact lenses or have worn lenses for <1 month were excluded.

The questionnaire

Permission was obtained for the use of a previously validated questionnaire by Bakkar and Alzghoul addressing compliance to contact lens wear and care.^[21] Participants were invited to fill a structured, self-administered survey inquiring about demographics and characteristics of contact lens use. The next 12 questions assessed compliant behaviors encompassing contact lens usage habits, lens case and solution replacement, general hygiene measures, and adherence to aftercare visits [Table 1]. In these particular questions, compliance level was evaluated by scores given for each response on a scale ranging from 1 to 4, with lower scores indicating better compliance levels. In accordance with previous studies,^[21-23] scores of 1 and 2 were considered as compliant while 3 and 4 were considered noncompliant. The questionnaire included an additional question for respondents who seldom replace lenses asking them to rank a set of common reasons for wearing lenses longer than the recommended replacement schedule from most likely to least likely.

Sample size

Using data reported from previous studies, the rate of noncompliance with hygienic rules among contact lens wearers in Saudi Arabia was 89%.^[24] Assuming a type I error of 5% and a precision/absolute error of 5%, the estimated sample size was 151. Sample size calculation for cross-sectional studies formula was used to calculate the sample size. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3775042/>.

Ethical considerations

Approval from the Institutional Review Board Ethical Committee at King Abdullah International Medical Research Center was obtained before the commencement of data collection. Study subjects were required to sign informed consent forms prior to completing the survey. The study was carried out in accordance with the codes of ethics outlined by the Declaration of Helsinki.

Statistical analysis

All parameters gathered were coded into Microsoft Office Excel and then transferred to the Statistical Package for the Social Sciences software version 20 (International Business Machines Corp. IBM, Armonk, NY, USA) for statistical analysis. Quantitative variables such as age were presented in means and standard deviations. Qualitative variables were summarized using appropriate descriptive statistics such as frequencies and percentages. To compare categorical variables, the Chi-square test was used to evaluate the significance. A statistical significance cutoff of $P < 0.05$ was used.

RESULTS

A total of 388 participants completed the questionnaire sent via E-mail through the message center of King Saud Bin Abdulaziz University for Health Sciences in Jeddah. Only 173 (44.6%)

Table 1: Compliant behaviors included in the questionnaire according to their frequency (1–4 score)

	Score 1	Score 2	Score 3	Score 4
Sharing contact lenses between users	Rarely	Occasionally	Frequently	Always
Sleeping/napping with lenses	Rarely	Occasionally	Frequently	Always
Showering/swimming with lenses	Rarely	Occasionally	Frequently	Always
Overuse of lenses	Rarely	Occasionally	Frequently	Always
Keeping the old solution in lens case (topping up)	Rarely	Occasionally	Frequently	Always
Using lens solution after its expiry date	Rarely	Occasionally	Frequently	Always
Washing hands before lens use	Always	Frequently	Occasionally	Rarely
Using water/saliva to clean lenses	Rarely	Occasionally	Frequently	Always
Adherence to/following instructions of lens cleaning	Always	Frequently	Occasionally	Rarely
Cleaning and rinsing the lens case	Always	Frequently	Occasionally	Rarely
Adherence to aftercare visits	Always	Frequently	Occasionally	Rarely
Lens case replacement	Monthly	Every 3 months	Every 6 months	>6 months

participants had worn contact lenses, of whom 150 (86.7%) had a contact lens experience of 1 month or more. The mean age of those fulfilling the inclusion criteria was 22 years, with almost all of them being females (95.3%). The demographic characteristics are presented in Table 2.

With respect to the contact lens users' profile, 87 (58%) participants did not know the type of lenses used whereas 53 (35.3%) individuals have used lenses for cosmetic purposes. The modality of contact lenses worn was extended (3–6 months) in 55 (36.7%) participants, daily disposable in 37 (24.7%), monthly in 35 (23.3%), and yearly replaceable in 23 (15.3%). Moreover, contact lens solutions used were multiple in 71 (47.3%) participants and not known in 64 (42.7%). With regard to the purchase site, 78 (52%) participants purchased their lenses at optic stores, comprising more than half of the sample. Furthermore, contact lens wearing time per day was 5–7 h in 75 (50%) responders. Table 3 shows the study population contact lens wear profile.

Behaviors related to lens care and the level of compliance toward each behavior are shown in Table 4. Compliance to contact lens care varied greatly with different practices. For instance, 135 (90%) participants reported rarely sharing contact lenses with others; however, 95 (63.3%) participants reported rarely washing their hands before lens use. The frequencies of compliant behaviors versus noncompliant behaviors are shown in Table 5 by combining frequencies of scores 1 and 2 for compliance and frequencies of scores 3 and 4 for noncompliance. The compliance rate ranged from 16% to 98% with an estimated average of 66%. Based on a previously published study by Morgan (2007), the level of compliance was further categorized into high level if the compliance rate was more than 80% in a certain behavior, moderate level if the compliance rate was 40%–80%, and low level if it was <40%.^[18] Accordingly, high levels of compliance were reported in aspects including sharing contact lenses with others (98%), sleeping/napping with contact lenses (95.3%), using lens solution after its expiry date (86.7%), using water/saliva to clean contact lenses (85.3%), and showering/swimming with contact lenses (82.7%). Moderate levels of compliance were shown

Table 2: Demographic characteristics of the study sample (n=150)

	n (%)
Age (years), mean (SD)	22.33 (2.28)
Gender	
Male	7 (4.7)
Female	143 (95.3)
Education	
Undergraduate	108 (72.0)
Postgraduate	42 (28.0)
Smoking	
No	138 (92.0)
Yes	12 (8.0)
Contact lens experience (months)	
1-12	44 (29.3)
13-24	23 (15.3)
25-36	16 (10.7)
≥37	67 (44.7)

SD: Standard deviation

in behaviors such as adherence to aftercare visits (79.3%), keeping the old solution in lens case (topping up) (70.7%), overuse of contact lenses (64%), adherence to instructions of lens cleaning (48%), and cleaning the lens case (48%). The lowest levels of compliance were shown in washing hands before lens use (16%) and lens case replacement (16%).

Certain characteristics, which include male gender, smoking, longer contact lens experience, cosmetic type of contact lenses, yearly replacement contact lenses, and pharmacy/beauty store-purchased lenses, were significantly associated with poorer levels of compliance to contact lens care behaviors, as demonstrated in Table 6.

Participants who “frequently” or “always” use their lenses for longer than the recommended replacement schedule were asked to rank a set of reasons from most likely to least likely, as shown in Figure 1. The highest-ranked reason given for wearing lenses for longer than recommended was “I don't think there is any harm in wearing them longer,” which was picked by 19 (35.2%) students. Twelve (22.2%) subjects chose “I forget to order new lenses” making it the second most common reason.

DISCUSSION

This study aimed to assess compliance to contact lens wear instructions and evaluate the factors driving noncompliant behaviors among a population of university students in Saudi Arabia. The findings demonstrated compliance rates with an all-inclusive range varying copiously depending on different habits of contact lens care. Washing hands before lens use and lens case replacement were the behaviors that showed the lowest levels of compliance.

Male gender, smoking, longer contact lens experience, cosmetic and yearly replacement types of contact lenses, and lenses purchased at pharmacies/beauty stores were

significantly associated with poorer levels of compliance. Believing there is no harm in wearing lenses for longer than the recommended replacement schedule was the primary reason given for overusing contact lenses.

In general, this study’s participants showed moderate levels of compliance with an average compliance rate of 66%. This finding is similar to that of a review published by Claydon and Efron,^[17] and a study assessing compliance among university students in Jordan^[21] and another in Malaysia.^[25] In contrast, noncompliance tipped the balance in other parts of the world.^[23,26]

Behaviors with high levels of compliance

The high level of compliance observed in this study in sharing contacts with others and sleeping/napping with lenses agrees with what was reported in the literature with regard to lens sharing^[1,2,21] and using lenses during naps or overnight sleep.^[1,2,21,22,24,27] In this study, most students only rarely or occasionally used an expired lens solution. This result is consistent with that of a study of Italian teenagers conducted by Abbouda *et al.*^[28] On the other hand, Yung *et al.* stated that more than half of the study subjects did not regularly check the expiry dates of their lens care solutions.^[23] Comparable rates of compliance in cleaning contact lenses with water or saliva have been reported in previous works that inquired about this practice.^[21,22,27,29] A number of studies

Table 3: Contact lens users’ profile (n=150)

	n (%)
Type of contact lenses worn	
Soft spherical	6 (4.0)
Soft toric	3 (2.0)
Gas permeable	1 (0.7)
Cosmetic	53 (35.3)
I do not know	87 (58.0)
Modality of contact lenses wear	
Daily disposable wear	37 (24.7)
Monthly replacement	35 (23.3)
Extended wear (3-6 months)	55 (36.7)
Yearly replacement	23 (15.3)
Contact lens care system used	
Multiple contact lens solution	71 (47.3)
Hydrogen peroxide	5 (3.3)
Saline	10 (6.7)
I do not know	64 (42.7)
Contact lens purchased at/from	
Optic store	78 (52.0)
Internet	10 (6.7)
Pharmacy/beauty store	48 (32.0)
Others	2 (1.3)
Contact lens wearing time per day	
<5 h	33 (22.0)
5-7 h	75 (50.0)
8-12 h	25 (16.7)
>12 h	17 (11.3)

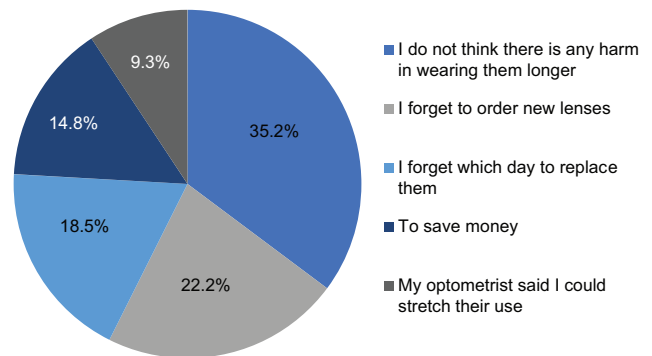


Figure 1: Reasons for using lenses longer than the recommended replacement schedule

Table 4: Frequency of compliance to contact lens care behaviors

	Score 1, n (%)	Score 2, n (%)	Score 3, n (%)	Score 4, n (%)
Sharing contact lenses between users	135 (90.0)	12 (8.0)	3 (2.0)	0
Sleeping/napping with lenses	124 (82.7)	19 (12.7)	4 (2.7)	3 (2.0)
Showering/swimming with lenses	114 (76.0)	10 (6.7)	13 (8.7)	13 (8.7)
Overuse of contact lenses	44 (29.3)	52 (34.7)	40 (26.7)	14 (9.3)
Keeping the old solution in lens case (topping up)	56 (37.3)	50 (33.3)	32 (21.3)	12 (8.0)
Using lens solution after its expiry date	101 (67.3)	29 (19.3)	17 (11.3)	3 (2.0)
Washing hands before lens use	8 (5.3)	16 (10.7)	31 (20.7)	95 (63.3)
Using water/saliva to clean lenses	121 (80.7)	7 (4.7)	10 (6.7)	12 (8.0)
Adherence to/following the instructions of lens cleaning	37 (24.7)	35 (23.3)	32 (21.3)	46 (30.7)
Cleaning and rinsing the lens case	19 (12.7)	53 (35.3)	45 (30.0)	33 (22.0)
Adherence to aftercare visits	76 (50.7)	43 (28.7)	23 (15.3)	8 (5.3)
Lens case replacement	8 (5.3)	16 (10.7)	24 (16.0)	37 (24.7)

Score 1 is total compliance; score 4 is total noncompliance

looked into the rates of lens exposure to water by swimming or showering while wearing contact lenses. Many studies agreed that contact lens wearers are highly compliant to avoiding swimming/showering with lenses;^[2,28-31] several others, however, reported moderate-to-poor levels of compliance.^[21,27,32,33] The high levels of compliance reported in this study may be because most participants purchased their contact lenses from optic stores which have most likely given them instructions on the wear and care of their lenses.

Behaviors with moderate levels of compliance

Contrary to the low levels of compliance reported in the literature,^[1,21,22,27,33] adherence to aftercare visits showed moderate-to-high levels of compliance in this study. An exception to most of the previous works was that of Philips and Prevade which reported a soaring compliance rate in yearly aftercare follow-ups for patients using soft contact lenses.^[34] In accordance with the literature where not replacing

lens solution and only topping up has always been there as a behavior with moderate levels of compliance,^[18,21,22,27] this study also revealed this practice to be one with moderate levels of compliance. Interestingly, however, very high levels of compliance were observed in a study conducted in Spain during the lockdown due to the coronavirus disease 2019 (COVID-19), highlighting the pandemic's impact on contact lens wearers' older habits.^[30] The literature showed inconsistencies with regard to reports of contact lens overuse with some studies showing poor levels of compliance,^[2,13,27,35] others, in line with this study's results, reporting moderate levels of compliance,^[18,21,23] and a number of them even describing high levels of compliance.^[30,34,36] The variable levels of compliance reported could be chiefly attributed to differences in the type of contact lenses a study may be limited to, as well as the sample's demographic and background differences. In line with several recent works,^[21,27,30] adherence to lens cleaning instructions was found to be within the moderate range of compliance in the current study. Locally, Alhumaidi and Yousef^[24] and Ibrahim *et al.*^[2] reported rates of adherence to instructions of lens cleaning similar to those demonstrated by this study as well. The frequency of cleaning and rinsing the lens case was shown to be in the lower range of moderate compliance in this study, which is a common concern in previous works with some studies even evaluating aspects pertaining to correct lens case cleaning techniques. A study conducted among health-care workers in Pakistan showed similar results in which only a minority of the participants rinsed their contact lens case.^[37] A study by Morgan *et al.* reported that correct case care was practiced among only 4% of wearers.^[35] In Spain, wearers of soft reusable contact lenses demonstrated a poor compliance rate to lens case cleaning in addition to practicing a set of nonoptimal cleaning behaviors including rinsing with tap water, wiping with a tissue only, and replacing the solution without wiping/rinsing.^[30] Only 7% followed the optimal technique which encompassed rinsing the case with lens solution and wiping it with a clean tissue afterward.

Table 5: Compliant behaviors associated with contact lens use

	Compliance rate, n (%)	Noncompliance rate, n (%)
Sharing contact lenses between users	147 (98.0)	3 (2.0)
Sleeping/napping with lenses	143 (95.3)	7 (4.7)
Showering/swimming with lenses	124 (82.7)	26 (17.3)
Overuse of contact lenses	96 (64.0)	54 (36.0)
Keeping the old solution in lens case (topping up)	106 (70.7)	44 (29.3)
Using lens solution after its expiry date	130 (86.7)	20 (13.3)
Washing hands before lens use	24 (16.0)	126 (84.0)
Using water/saliva to clean lenses	128 (85.3)	22 (14.7)
Adherence to/following the instructions of lens cleaning	72 (48.0)	78 (52.0)
Cleaning and rinsing the lens case	72 (48.0)	78 (52.0)
Adherence to aftercare visits	119 (79.3)	31 (20.7)
Lens case replacement	24 (16.0)	61 (40.7)

Compliance rate is estimated by the combination of frequencies of scores 1 and 2 from Table 4; noncompliance rate is the combination of frequencies of scores 3 and 4

Table 6: Participants' characteristics associated with poor levels of compliance to contact lens care behaviors

Characteristics	Noncompliance behavior
Male gender	Sleeping/napping with contact lenses ($P=0.002$)* Showering/sleeping with contact lenses ($P=0.018$)* Infrequent replacement of contact lens case ($P=0.021$)*
Smoking	Poor adherence to instructions of lens cleaning (rub, rinse, and soak) ($P=0.011$)†
Contact lens experience of <3 years (<37 months)	Using water/saliva to clean lenses ($P=0.001$)*
Longer experience of contact lens wear (3 years and more, i.e., >36 months)	Sleeping/napping with lenses ($P=0.045$)* Showering/swimming with lenses ($P=0.005$)*
Type of contact lens: Cosmetic (colored lenses)	Using contact lenses longer than recommended ($P=0.031$)* Using lens solution after expiration ($P=0.017$)*
Modality of contact lens worn: Yearly replacement lens	Topping up old lens solution in lens case ($P<0.001$)† Use of lens solution after expiration ($P<0.001$)* Infrequent replacement of lens case ($P=0.003$)*
Contact lens purchased at pharmacies/beauty stores	Topping up old lens solution in lens case ($P=0.001$)* Infrequent handwash before lens use ($P=0.012$)* Using water/saliva to clean lenses ($P=0.001$)*

*Fisher's exact test, †Chi-square test

Behaviors with low levels of compliance

Behaviors associated with the lowest levels of compliance were handwashing before lens use and lens case replacement. The literature split up regarding reports of hand hygiene before handling contact lenses, with the majority of studies reporting reasonable to high levels of compliance,^[18,20-24,27,28,30,37] while others described poor compliance rates.^[26,35] Perhaps, the constant reinforcement of the importance of hand hygiene during the COVID-19 pandemic has had an effect and has yet to play a role in the population’s compliance to any hygienic practice in the future. Nonadherence to lens case replacement proved to be one of the least followed behaviors in the literature.^[18,23,24,28] Sapkota even found that both medical doctors and subjects with no medical background demonstrated very poor levels of compliance with regard to lens case replacement.^[22] This raises the need for practitioners to place more emphasis on the significance of regular replacement of lens cases to contact lens wearers. A summary of the findings presented by previous works is presented in Table 7.

Factors driving noncompliance

Noncompliant behaviors were significantly associated with the male gender rather than the female gender. This finding is expected and consistent with that of previous reports showing evidence of a significant difference between sexes.^[24,35] This result may reflect women’s tendency to follow different self-care practices. Smoking was also associated with poor adherence to instructions of lens cleaning, which agrees with the report of Bakkar and Alzghoul showing a relation between smoking and other noncompliant behaviors.^[21]

A positive association was found between noncompliance and longer contact lens experience (more than 3 years). This finding agrees with several previous works in the literature with Chun and Weissman^[38] and Radford *et al.*^[39] being two of the earliest studies investigating noncompliance in relation to years of contact lens wear. Other reports, however, reported no significant differences in compliance with respect to lens wear experience.^[22,26,32,36] Limited contact lens experience (<3 years), on the other hand, was associated with only one form of noncompliance namely using water/saliva to clean lenses.

Participants wearing contact lenses for cosmetic reasons and those purchasing lenses at a pharmacy/beauty store were more likely to carry out different noncompliant behaviors. This may be attributed to the lack of instructions provided to those wearing lenses for cosmetic reasons and the absence of eye care practitioners at pharmacies/beauty stores. This pattern was also observed by Sokol *et al.* when lenses used for therapeutic purposes were compared to those used for cosmetic reasons.^[33]

Modality of contact lenses worn has also shown to have an impact on compliance rate in the current study as yearly replacement lenses were shown to be linked with noncompliant behaviors. However, unfortunately, this has not been investigated closely in the literature.

Table 7: Compliance with contact lens wear in different studies

	Yung <i>et al.</i> ^[23] (%)	Bui <i>et al.</i> ^[22] (%)	Morgan <i>et al.</i> ^[35] (%)	Abbouda <i>et al.</i> ^[28] (%)	Alhumaidi and Yousef ^[24] (%)	Ibrahim <i>et al.</i> ^[21] (%)	Bakkar and Alzghoul ^[21] (%)	Vianya-Estopa <i>et al.</i> ^[30] (%)	Garcia-Ayuso <i>et al.</i> ^[27] (%)	Current study (%)
Average compliance	40	44	-	-	-	-	75	-	-	66
Sharing contact lenses	-	-	-	-	-	17	8	-	-	2
Sleeping with lenses	-	29	18	-	3	30	4	3	10	5
Swimming with lenses	-	57	-	38	13	25	44	-	42	17
Overuse of lenses	22	43	60	-	-	46	24	12	61	36
Topping up solution	53	13	35	-	-	-	32	18	38	29
Using expired solution	58	-	-	10	-	-	32	-	-	13
Washing hands before lens use	65	93	40	85	81	72	96	97	67	16
Cleaning lenses correctly	65	-	20	40	37	-	56	46	72	48
Cleaning lens case	35	-	4	-	-	87	37	14	14	48
Adherence to aftercare visits	-	-	-	-	-	-	34	-	20	79
Lens case replacement	37	63	-	31	16	-	75	85	42	16

Reasons for using lenses longer than recommended were explored. Most wearers who overused contact lenses were unaware of the harm inflicted by such practice. This reason was similarly picked by about one-third and one-fifth of participants in studies by Dumbleton *et al.*^[36] and Vianya-Estopa *et al.*,^[30] respectively. This is in a way promising as raising awareness and reinforcing the importance of compliance with lens replacement schedules should be able to resolve a substantial part of this issue. In contrast, a significant number of contact lens wearers in other parts of the world overused their lenses to save money,^[13,30,36] which was not an issue for most of our study population.

Several limitations should be noted when interpreting this study's findings. This is a single-centered study including only health-care students, which may not necessarily represent the practices of less-educated contact lens wearers or health-care students living elsewhere in Saudi Arabia. Furthermore, using an online route for dissemination can be a problem in that it cannot be confirmed that all respondents understood all the survey's questions before submission. Despite these limitations, the findings are of paramount importance and a great addition to the literature as this is considered the first study to assess compliance to contact lens care in addition to exploring factors driving noncompliance in Saudi Arabia. The analysis provided of factors impacting compliance should be able to bridge past works of noncompliance reportage to future researchers, directing them to focus their attention to answer the question of the utmost importance "how to improve compliance?"

CONCLUSION

The study concluded that a relatively high percentage of contact lens wearers in a Saudi university of health-care students displayed some degree of noncompliance to contact lens care behaviors. Lack of compliance in handwashing before handling contact lenses and replacement of lens case showed to be a matter of highest concern. Male gender, smoking, longer contact lens experience, cosmetic and yearly replacement types of lenses, and site of purchase being a pharmacy or a beauty store were associated with poor compliance behaviors. The findings should, therefore, prompt eye care practitioners to provide ample instructions regarding contact lens care and mention the importance of compliance to lens care practices. The conduction of further studies is advocated to clarify whether the implementation of such recommendations would improve compliance to contact lens care guidelines in Saudi Arabia.

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Conflicts of interest

There are no conflicts of interest.

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