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## ASSESSMENT OF KNOWLEDGE AND COMPLIANCE REGARDING CONTACT LENS WEAR AND CARE AMONG FEMALE COLLEGE STUDENTS IN SAUDI ARABIA

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### ABSTRACT

**Background:** The regular use of contact lens for improving vision has seen an increasing trend worldwide and this can be attributed to increase in awareness through better advertisement, easy availability and handling, better products through advanced manufacturing strict guidelines. Our Objectives was to assess knowledge and compliance regarding contact lens wear and care among female college students in Saudi Arabia. **Methods:** A cross-sectional descriptive study was conducted from March to May, 2010, among randomly selected 50 female students of King Saud University, Riyadh, who were aged between 18 – 25 years. Data were collected through pre-designed, pre-tested self-explained questionnaire with the help of optometrist. Results: It was found that significant number of the study population (88%) was regularly cleaning the lens case. However, only 58 percent of them cleaned their hands before putting the contact lens in the lens case while the remaining either did not clean at all (18%) or cleaned irregularly (24%). There were findings related to the habit of immersing the lens, only half the lens in the cleaning solution (34%). Regular visit to eye practitioners (38%) and use of contact lens beyond the expiry date (10%). **Conclusion:** It appears that primarily it is poor hand hygiene, inadequate care of the lens and the lens case, improper use of the cleaning solution and irregular follow up visits to the eye practitioners for eye check among the young female population.

**Keywords:** Contact lens, Saudi Arabia, eye infections, lens care.

### INTRODUCTION

Contact lens use for the correction of refractive error is gaining momentum world-wide. This could be attributed to the advancement in contact lens manufacturing technology; improved lens materials, production techniques as well as storage and care products. There have also been improvements on awareness and/or education on the proper use of contact lenses and contact lens care products. In Saudi Arabia, contact lens use has also been on the increase.[1] Apart from its use for the correction of refractive error and management of problem of ocular adnexa such as in exophthalmos to prevent exposure keratopathy or cornea problems such as keratoconus,[2, 3]

contact lens has also been used for prosthetic and cosmetic reasons for example to enhance eye colour. There are lots of different designs available in terms of lens type and materials and at an affordable cost. These have made contact lens wear popular among the young people particularly females in Saudi Arabia.

Contact lens can act as a vector for microorganisms to adhere to and transfer to the ocular surface if not used and cared properly. In the presence of reduced tissue resistance, microorganisms or transient pathogens can invade and colonize the cornea or conjunctiva to produce inflammation or infection.[4] Noncompliance has been implicated as one of the causes of

complications in contact lens wear; the inadequate adherence to the practitioner's instructions on the use of contact lenses and care products.[5] These complications which range from mild eye irritations to keratitis have in most cases posed a threat to the oculo-visual function. Studies,[6, 7] have identified several risk factors associated with lens wear complications in an attempt to encourage successful lens wear and to minimize disease burden. Amongst the identified risk factors, some are non-modifiable such as gender or age,[8] of which we cannot influence whereas others are modifiable such as poor hand cleaning and lens case hygiene[9] hence can be targeted in minimizing vision loss and maximizing successful lens wear.

Ocular health education or knowledge in the correct and careful practice regarding contact lens wear can prevent complications resulting from the wearer's inappropriate behavior. One of the ways of investigating this is from the person's perception regarding his own knowledge of contact lens wear.[10] There are three primary areas of concern namely: contact lens wear schedule, lens care, and contact lens replacement schedule. Consequently the study of knowledge of compliance can contribute to the planning of educational and health campaigns aimed at reducing some of the ocular complications associated with contact lens wear.

Whilst many eye care practitioners are familiar with the notion that many contact lens wearers are non-compliant, there is very little up-to-date objective data available to support this belief in Saudi Arabia. In this report we present independent research which describes the lens wear and care habits of female contact lens wearers in Riyadh, Saudi Arabia. Educational status of patients is one of the factors thought to influence compliance.[11] The current study was conducted among the female college students with a primary objective to assess the knowledge and compliance of contact lens care and their practice

related to contact lens use, cleaning and maintenance.

## **MATERIALS AND METHODS**

A cross sectional descriptive study was conducted using a structured questionnaire among the female students at King Saud University in Riyadh aged 18-25. The study got clearance from the University Ethics Committee and was implemented among the female students. Any female who has ever worn contact lens for any period of time and for whatever reason was enrolled in this study. To get a better understanding of some questions and to capture appropriate information, a pilot study (pre- test) was conducted on 10 students a week prior of starting research work and after review few modifications were done in the questionnaire for the final research work. A total of 50 contact lens wearers were identified and a structured questionnaire was introduced to collect the information from March to May 2010 after getting the informed consent for the participation in this study. The questionnaire was in Arabic language and had 35 questions. The tool was validated by three Optometry experts working in the Department of Optometry before using in this present study. For analysis purpose the questionnaire was also back translated in English to ensure the same meaning is conveyed.

The questionnaire was based on the knowledge and practices of contact lens wear, care and its possible complications. All the questions were prepared in Arabic language and the answers were also given in Arabic language by the participants who participated in the study. The questionnaire was designed in a very comprehensive manner which consisted of 35 questions related to general demographic data, socio economic status, contact lens hygiene and hand cleaning, compliance to eye care provider's instructions and behavioral aspects. The tool was objective type which was not time consuming as the participant has to tick her answer on the appropriate box (answers being 'Yes',

'NO' & 'Sometimes'). The data that was collected in the questionnaires was coded and it was analyzed using Epi\_info software version 3.5.1 2008, (CDC Atlanta).

## RESULTS

**Demographic characteristics:** Fifty females participated in the study and their age distribution was as follows; 54% were under age group of 18-21 years and the remaining 46% were between 22-25 years (Table-1). 74% (37) students were single while the rest 26% (13) were married (Graph -1). Out of the fifty contact lens users, 92% (46 females) were using soft lens and 8% (4 females) were RGP lens users. Majority of the participants 66% (33) were using contact lens for cosmetic purposes while the remaining 34% (17) were using for refractive purpose. It was observed that 52% (26) of them got their contact lenses from cosmetic center while 38% (19) got theirs from optical shop and only 10% (5) got their lenses prescribed from hospital (Table 2)

**Lens supply:** It was also found that 82% (41) of the lens users were cleaning the lens case regularly. Out of fifty participants, 46 (92%) of them clean their hands before using contact lens and 4 (8%) of them doesn't clean their hands before inserting contact lens in the eye. Only 58% (29) of them clean the hands before putting the contact lens in the lens case and remaining either do not clean at all 6 (12%) or clean sometimes 15 (30%) (Table 3)

**Lens care:** Other significant finding of the study is that 74% (37) immerse the lens in cleaning solution completely while 26% (13) of them place the lens half immersed in the cleaning solution. It was also established that only 62% (31) of them visit the eye practitioner regularly. There was also usage of expired contact lens by 10% (5) participants regularly, and 16% (8) of them use the expired contact lens sometimes (Table-4).

The distribution of subjects according to the usage of cleaning solution was shown in Graph 2. It showed 72% (36) subjects don't have any ocular

problem while on changing the cleaning solution, 24% (12) were using the same brand and the remaining 2 (4%) uses water temporarily.

**Compliance associated with Contact lens wear:** Regarding history of lens related complications, 10% (5) reported having experienced a contact lens related complication. Patients were also queried on their knowledge of complications associated with contact lens wear. More than half of the patient surveyed (65%) reported that they had not experienced a contact lens-related complication.

Pearson Chi square test was used to find out the association between the age, level of education and compliance of contact lens care based on the subject's responses. There was a statistically significant association between age and Cleaning the lens cases ( $p=0.002$ ), washing hands before inserting contact lenses ( $p=0.054$ ), cleaning hands before keeping the lens in the lens cases ( $p=0.000$ ), Immersing lens in cleaning solution ( $p=0.000$ ), whereas no statistically significant association noted between age and follow up with the eye care practitioner among our subjects ( $p=0.109$ ). The level of education showed statistically significant association with cleaning of lens case ( $p=0.005$ ), cleaning hands before keeping lens in the lens case ( $p=0.000$ ), Immersing lens in cleaning solution ( $p=0.002$ ) and Follow up visits with the eye care practitioner ( $p=0.004$ ), whereas washing hands before inserting contact lenses in the eye does not showed any significant association with level of education ( $p=0.295$ ). (Table 5)

## DISCUSSION

Contact lenses are a convenient alternative to eyeglasses and it is considered as a better option for certain eye conditions, such as keratoconus and irregular astigmatism. Contact lenses usually provide better vision and freedom of movement for some users, but improper care and cleaning of these products can cause discomfort, blurred vision and pain. Contact lenses are not only worn

to correct vision and it can be worn for cosmetic or therapeutic purposes. In this study, 34% of females were found to be wearing CLs to correct refractive error and 66% were using CLs for the cosmetic purposes.

In this study patient's compliance on the use and care of contact lenses were weighed against lens supply, lens care regimen and contact lens replacement schedule. The place of contact lens supply; cosmetic centers, Optical showrooms and hospitals, has been found to be associated with contact related complications,[9] as there are limited instructions given to patients on the use of contact lenses. In this study, 52% of the participants agreed to have purchased their contact lens from the cosmetic centers while only 10% had obtained their lenses from an optometrist from hospitals. This is contrary to the recent study in Australia by Wu and Stapleton,[12] where majority (66%) of the participants was said to have obtained their lenses from the optometrist. This disparity between these studies reflects the difference in years of contact lens practices and laws on who can and cannot fit contact lenses as well as level of education given to patients in the two countries. In Saudi Arabia for instance, contact lens practice is more recent compared to Australia. Another reason for the differences in the two studies could have stemmed from the sample size and the demography of this study as the study had considered only female contact wearers.

According to Claydon et al,[13] the major areas of non-compliance in contact lens wear have been highlighted as the lack of hand and lens-case hygiene, the over wearing of contact lenses, the poor attendance of patients at aftercare appointments and the inadequate use of care and maintenance systems. In our study, majority of the participants cared for their lens cases regularly and 92% of lens wearers reported cleaning their hands before putting on the lenses in the eye, and this was also seen in the study by Wu and Stapleton.[12] However, over half of the subjects (58%) actually cleaned their hands before

replacing the lenses in the case. In the present study also, 74% of the participants immerse their lenses completely in the solution while cleaning the lenses. In a similar study conducted by Mayers et al,[14] 71% of contact lens wearers put their lenses directly into the lens case without rinsing and rubbing the lenses to clean them; 11 percent rinsed only, and only 7 percent performed "rinse-and-rub" cleaning technique. The lack of hands' cleaning before touching the lens could introduce dirt on the lens surface which can be transferred to the eye, resulting in irritation and/or infection especially where the lenses are not properly cleaned. This study also found that 31% of contact lens wearers wait up to 12 months to replace their lens case and most the lens wearers reported to visit the optometrist regularly. A study done by Hickson-Curran et al,[15] among 787 contact lens wearers revealed that 48 percent replaced their case annually.

Compliance with contact lens care and maintenance instructions is considered to be the most important aspect of the safe and comfortable use of lenses. The use of contact lenses is known to increase the microbial load in the eye which can adversely affect corneal health (16), ranging from a mild ocular redness and irritation to a very severe sight threatening situation like *Acanthamoeba* keratitis. Poor contact lens hygiene and microbial contamination of the lens storage case have been observed to be related to microbial keratitis(17,18,19) .A proper hand wash and hygiene plays an important role in controlling the risk of infection while handling contact lenses. In this study, 30% of subjects' clean their hands before inserting CLs in the eye and remaining 12% doesn't wash their hands at all. This may cause risk of ocular infections secondary to CL wear. Appropriate counseling regarding contact lens care, maintenance instructions and personal hygiene should be given to the subjects in the clear manner by eye care practitioners. Proper lens care is essential for safety and success, but so is adherence to prescribed replacement schedules

and recommended wearing schedules, as well as regular return visits to the eye-care practitioner.

In our study, 92% of subjects were using soft CLs and 8% were using RGP CLs. Soft contact lenses deteriorate over time as they become worn, dirty and accumulate protein deposits that cannot be removed even by elaborate cleaning. This can affect visual acuity and increase discomfort. There are chances of infection of the lens leading to corneal ulcer. Regular visit to the optometry clinic is believed to encourage prompt replacement of lenses as faults or abnormalities would be identified on time and appropriate management initiated. Also, each patient encounter is an opportunity to review and reinforce proper wearing and replacement time and contact lens care. Continually educating patients that contact lenses are medical devices and reviewing proper lens wearing and replacement schedules is the best way to avoid noncompliance.

### RECOMMENDATIONS

Many patients see contact lens solely as a cosmetic item and not as a medical device. This attitude leads to the purchase of contact lens and care products from the cosmetic shops and over the internet. Therefore, there is need to enact laws that will regulate dispensing of contact lenses by unqualified persons as well as purchase or sale of contact lenses and care products over the internet. Education, improving communication, behavioral modifications are the main factors that helps to improve the compliance level in any population. When eye care practitioners dispense contact lenses, there is need to educate patients on the proper wearing schedule; for example not to sleep in lenses that are not approved for overnight wear. This gives patients the opportunity to ask to be fitted in a higher-Dk lens if overnight wear is an option. Patients should also be given helpful tips or written instruction on the steps to follow while cleaning the lenses as well as while fitting and replacing the lens in the case.

Eye care practitioners should equally educate patients on the replacement schedule of their lenses. It is relatively easy to blame patients for poor compliance but experience has shown that poor compliance can be avoided or at least reduced by proper training at the initial fitting of contact lenses and reinforcement at the follow up visits. While some contact lens patients are noncompliant on purpose, most patients would be more compliant with their replacement schedule if they had reminders or a way of remembering when to replace their lenses. There should be a place on an eye care practitioners written contact lens prescription for the recommended wearing time, replacement schedule.

### CONCLUSION

Contact lenses are the safest forms of vision correction when patients follow the proper care and wearing instructions. Contact lens wearers could be damaging their eyes by not using proper hygiene in caring for their lenses. Poor hand hygiene, inadequate lens care and not remembering when to come back for aftercare visits are the common non-compliant behaviors in lens wearers. Higher educational status does not always mean higher compliance amongst contact lens wearers. Proper contact lens care and regular follow-up visits to their eye care practitioner are essential for a patient's safety and wearing success. Appropriate counseling regarding contact lens wear and care should be given to the subjects by contact lens dispensers or Optometrists or Ophthalmologists. Clean and safe handling of contact lenses is one of the most important measures where contact lens wearers should follow to protect their ocular health and sight. However, due to the limitation of the study to only females, this may not be generalized to the general population in Saudi Arabia. Therefore, there is need for more studies that will involve both, male and females.

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**Table 1 – Distribution of the study participants according to the age-group**

Age group	No. of students	Percentage %
18-21	27	54%
22-25	23	46%
Total	50	100%

**Table 2 - Distribution of the study group by characteristic of the lens**

S. No.	Characteristics of the study group	Categories	Total (%)
1.	Contact lens purchased from	Hospital	05 (10%)
		Cosmetic Centre	26 (52%)
		Optical Shop	19 (38%)
2.	Type of Contact lens	Soft lens	46 (93%)
		Hybrid lens	4 (8%)
3.	Lens used for	Cosmetic purpose	33 (66%)
		Refractive purpose	17 (34%)

**Table 3- Distribution of the cleaning characteristics of lens users**

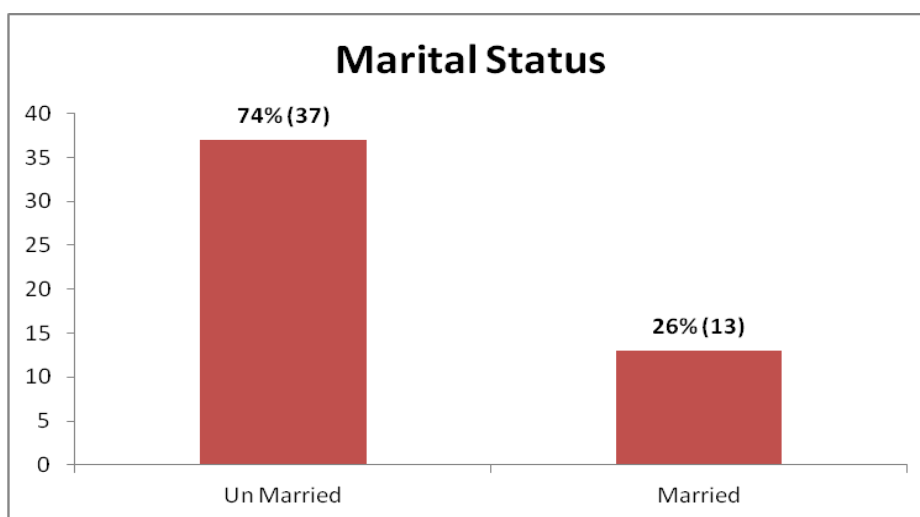
S. No.	Lens Users	Cleaning Characteristics	Total (%)
1.	Cleaning the lens case	Regularly	41 (82%)
		Irregularly	9 (18%)
2.	Washing hands before using contact lens	Wash hands	46 (92%)
		Do not wash hands	4 (8%)
3.	Clean hands before putting lens in the lens case	Regularly	29 (58%)
		Sometimes	15 (30%)
		Not at all	6 (12%)

**Table 4 - Distribution of the study population according to lens care**

S. No.	Lens Care	Characteristics	Total (%)
1.	Immersing lens in cleaning solution	Completely immersed	37 (74%)
		Partially immersed	13 (26%)
2.	Follow up visit to the eye practitioner	Regular	31 (62%)
		Irregular	19 (38%)

**Table 5 - Age and Level of Education vs Compliance**

Parameters	Age p-value	Level of Education p-value
Cleaning the lens case	0.002*	0.005*
Washing hands before using contact lens	0.054*	0.295
Clean hands before putting lens in the lens case	0.000*	0.000*
Immersing lens in cleaning solution	0.000*	0.002*
Follow up visit to the eye practitioner	0.109	0.004*

**Graph 1- Marital Status of The Study Participants****Graph 2 – Distribution of The Study Population According To Use of Cleaning Solution**