

A Survey of Dry Eye Symptoms in Contact Lens Wearers and Non-Contact Lens Wearers among University Students in the Kingdom of Saudi Arabia - Taif

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Abstract

Introduction: DES is caused by decreased production or increased evaporation of tears, or instability in the tear film. There are many risk factors associated with developing dry eyes.

Method: A population-based cross-sectional study was carried out between June and July 2018 in Taif-KSA. We conducted this study among University students in Taif- KSA aged between 18 and 28 years. The data was collected using the CLDEQ-8 questionnaire for contact lens wearers and DEQ-5 dry eye questionnaire for non-contact lens wearers.

Result: The study involved 227 contact lens wearers (221 females and six males) and 228 non-contact lens wearers (171 females and 57 males). Most of the contact lens wearers (96.5%) were females, whereas only about two third (75%) of the non-contact lens wearers females. We found that dry eye occurred in more than half of contact lens wearers (115, 50.4%) but only 28 (12.7%) of non-contact lens wearers. The ocular symptoms were relatively frequent in contact lens wearers, and the odds ratio of developing dry eyes in contact lens wearers was 8.58 compared to non-contact lens wearers.

Conclusion: The severity of symptoms differs from person to person according to the patient's lifestyle. Symptoms can occur in both contact and non-contact lens wearers. After comparing the result of this study, we found that DES occurs more commonly in contact lens wearers than non-contact lens wearers.

Keywords: Dry Eyes; Contact Lens; Non-Contact Lens; CLDEQ-8; DEQ-5

Abbreviations

DES: Dry Eye Syndrome; CLDEQ-8: Contact Lens Dry Eye Questionnaire-8; DEQ-5: Dry Eye Questionnaire-5

Introduction

The tear film that covers the ocular surface epithelium consists of three layers: the lipid, aqueous, and mucus layers [1]. Dry eye syndrome is caused by decreased production or increased evaporation of tears, or instability in the tear film. These factors cause inadequate lubrication of the cornea and conjunctiva, which might affect one or more tear film components or the position of the eyelids.

There are other risk factors of dry eyes, such as the aging process, environment, prolonged computer work or reading, medications, corneal surgery, and wearing contact lens. Dry eye symptoms are more common and intense in contact lens wearers than non-contact lens wearers. Also, dryness and discomfort of eyes are considered a principal reason for ceasing to wear lens. Students, especially those that wear contact lens, might have intensive dry eye symptoms due to extensive computer use, which is a predisposing factor for dry eyes [2]. Contact lens-related dry eye is a common but poorly understood clinical problem [3,4].

Symptoms of dry eye include dryness, discomfort, blurring of vision, soreness and irritation, foreign body sensation, burning and stinging [5]. These symptoms cause many patients to reduce their frequency of wearing contact lens or to stop using contact lens completely [6]. Unfortunately, current clinical tests are rarely correlated with symptoms of dry eyes. Therefore, diagnosis and treatment of dry eyes are mostly based on the reported symptoms.

Dryness of eyes is widespread among contact lens wearers. According to a survey done in the United States (US), 18 to 30% of soft contact lens patients are symptomatic, 12 to 21% are symptomatic enough to reduce contact lens wearing time, and 6 to 9% cannot wear contact lenses due to dryness symptoms. The Canadian Dry Eye epidemiological study found that 50.1% of contact lens wearers present to the optometrists with symptoms associated with dry eyes [4,7]. DESs are highly prevalent in Al-Ahsa (Kingdom of Saudi Arabia, KSA), as 32.1% of the population is symptomatic [8].

The Contact Lens Dry Eye Questionnaire (CLDEQ-8) was developed to assess the severity and intensity of dry eye symptoms in people wearing contact lenses, while the dry eye questionnaire (DEQ-5) was developed to assess the symptoms of dry eye in people not wearing contact lenses [2].

Purpose of the Research

We conducted this study among university students to determine the prevalence of dry eye symptoms among contact lens wearers and non-contact lens wearers and to determine whether there is an association between dry eye symptoms and wearing contact lens.

Materials and Methods

This population-based cross-sectional study was carried out between June and July 2018 in Taif governorate western region of Saudi Arabia, about 700 km from the capital Riyadh and with a population by about 1 million.

The study included 227 contact lens wearers and 228 non-contact lens wearers between 18- and 28-years-old. Among patients being treated for ocular infection within 4 weeks, those who used artificial tear preparations within 1 week had a history of refractive and other corneal surgeries or presented with eyelid anomalies, those who have disease affect their eyes, those who take medication (e.g. antihistamines, nasal decongestants, tranquilizers, certain blood pressure medications, anti-depressant was excluded).

This study was conducted among University students in Taif (KSA) aged between 18 and 28 years. The purpose of the research project was explained to the students and consent was collected for their participation. Then, the questionnaires were given depending on the use of contact lenses. The Contact Lens Dry Eye Questionnaire-8 (CLDEQ-8) for contact lens wearers and Dry Eye Questionnaire-5 (DEQ-5) for non-contact lens wearers were used. Students using contact lenses for the past 4 weeks or more were considered as contact lens wearers. Both questionnaires were similar, except the contact lens wearers were asked to report the symptoms they experienced while wearing contact lenses. Both questionnaires included categorical scales to measure the frequency, severity, and occurrence of common ocular surface symptoms. Ocular symptoms that were assessed included discomfort, dryness, changeable, blurring of vision, soreness and irritation, foreign body sensation, burning, and sensitivity to light. We determined whether the subjects thought that they had a dry eye and whether subjects have been previously diagnosed to have a dry eye by self-assessment. Age and gender were provided in the questionnaire by the respondents.

Research proposal and a request letter are submitted for vice dean female section and vice dean scientific research for approval before conduction of the study.

Statistical analysis

The categorical variables were presented as frequencies and percentage, and continuous variables were presented as mean \pm standard deviation (SD). Association between gender and dry eye symptoms in contact lens wearers and gender and dry eye symptoms in contact lens non-wearers were calculated using the Chi-squared test. The odds of developing dry eyes in contact lens wearers and non-wearers were presented.

The analysis was performed using a 95% confidence interval and the Statistical Package for Social Science (SPSS), version 23 (IBM, Armonk, NY, USA).

Results and Discussion

The current study involved 227 contact lens users and 228 non-contact lens wearers. The mean age of contact lens users and non-contact lens wearers were 22.69 ± 2.67 and 23.38 ± 3.35 years respectively. Most contact lens wearers (96.5%) were female whereas only about two-thirds (75%) of the contact lens non-wearers were female. Only 2.6% of contact lens wearers were males, which is not a surprising result, especially in the Saudi culture (Table 1).

	Characteristics	Mean \pm SD/ N (%)
Contact lens wearers	Age	22.69 ± 2.67
	Gender	
	Male	6 (2.6)
	Female	221 (96.5)
Contact lens non-wearers	Age	23.38 ± 3.35
	Gender	
	Female	171 (74.7)
	Male	57 (24.9)

Table 1: Age and gender of contact lens wearers (n = 227) and contact lens non-wearers (n = 228).

Contact lens wearers

Most of the contact lens wearers (57.2%) cited cosmetic reasons as their motivation, whereas the remaining participants (41.9%) reported wearing contact lenses for vision correction. The mean discomfort level due to wearing contact lens was 1.62 ± 0.91 in a 5-point Likert scale. Three (1.3%) of the respondents felt ‘intense discomfort’. Five (2.2%) contact lens wearers had a ‘very intense’ feeling of dry eye, and the mean level of dry eye feeling was 1.32 ± 1.18 in a 5-point Likert scale. Nineteen (8.3%) participants had vision change between clear and blurry or foggy while wearing the contact lens in the past 2 weeks while 54 (23.6%) participants never experienced such symptoms. The mean level of feeling of blurriness or fogginess was 1.34 ± 1.19 in a 5-point Likert scale. Ten (4.4%) of the respondents felt so bothered (in last 2 weeks) that they wanted to take the contact lenses out of their eyes several times in a day. All other responses by the contact lens wearers are given in table 2.

Questions	Responses	Mean \pm SD/N (%)
Q1. Do you wear contacts?	Constantly	51 (22.3)
	Frequently	46 (20.1)
	Sometimes	75 (32.8)
	Rarely	46 (20.1)
	Never	9 (3.9)
Q2. If yes, for what purpose?	Cosmetic	131 (57.2)
	Vision correction	96 (41.9)
Q3a. During a typical day in the past of 2 weeks, did your eyes feel discomfort while wearing your contact lenses?	Constantly	26 (11.4)
	Frequently	41 (17.9)
	Sometimes	94 (41.0)
	Rarely	37 (16.2)
	Never	29 (12.7)

Q3b. How intense was the discomfort feeling with your contact lenses?		1.62 ± 0.91
Q4a. During a typical day in the past of 2 weeks, how often did your eyes feel dry?	Constantly	19 (8.3)
	Frequently	1 (0.4)
	Sometimes	86 (37.6)
	Rarely	51 (22.3)
	Never	70 (30.6)
Q4b. How intense was this feeling of dryness?		1.32 ± 1.18
Q5a. During a typical day in the past 2 weeks, how often did your vision change between clear and blurry or foggy while wearing your contact lenses?	Constantly	19 (8.3)
	Frequently	26 (11.4)
	Sometimes	91 (39.7)
	Rarely	37 (16.2)
	Never	54 (23.6)
Q5b. When your vision was blurry, how noticeable was the change-able, blurry, or foggy vision?		1.34 ± 1.19
Q6. During a typical day in the past 2 weeks, how often did your eyes bother you so much that you wanted to close them?	Constantly	18 (7.9)
	Frequently	36 (15.7)
	Sometimes	80 (34.9)
	Rarely	40 (17.5)
	Never	53 (23.1)
Q7. How often during the past of 2 weeks, did your eyes bother you so much while wearing your contact lenses that you felt as you needed to stop whatever you were doing and take them out?	Several times a day	10 (4.4)
	Daily	14 (6.1)
	Several times a week	27 (11.8)
	Weekly	10 (4.4)
	Less than once a week	87 (38.0)
	Never	79 (34.5)

Table 2: Responses to the dry eye-related questions by the contact lens wearers (n = 227).

Contact lens non-wearers

Thirteen (5.7) respondents always felt discomfort and 52 (22.7%) respondents frequently felt discomfort in their eyes in the last month. The mean levels of feeling discomfort, feeling eye dryness, and feeling blurry or foggy in the past month were 1.62 ± 0.96, 1.42 ± 1.08, and 1.28 ± 1.12 in 5-point Likert scales. Fifteen patients (6.6%) always felt dry eyes, and nine (3.9%) patients always had vision change in the last month. While asked about the frequency of feeling excessively watery eyes in the past month, five (2.2%) responded 'always', 10 (4.4%) responded 'frequently', 29 (12.7%) responded 'sometimes', 26 (11.4%) responded 'rarely' and 158 (69.0%) responded 'never'. About a quarter (25.3%) of contact lens non-wearers were previously diagnosed as having dry eye disease. Overall, the feeling of eye dryness affected activities like reading, driving, and watching TV for 141 (61.6%) patients. All other responses by contact lens non-wearers are presented in table 3.

Questions	Responses	Mean ± SD/N (%)
Q1a. During a typical day in the past month, how often did your eyes feel discomfort?	Always	13 (5.7)
	Frequently	52 (22.7)
	Sometimes	98 (42.8)
	Rarely	37 (16.2)
	Never	28 (12.2)
Q1b. When your eyes felt discomfort, how intense was this feeling of discomfort at the end of the day		1.62 ± 0.96
Q2a. During a typical day in the past month, how often did your eyes feel dry?	Always	15 (6.6)
	Frequently	30 (13.1)
	Sometimes	81 (35.4)
	Rarely	39 (17.0)
	Never	63 (27.5)
Q2b. How intense was this feeling of dryness?		1.42 ± 1.08
Q3a. During a typical day in the past month, how often did your vision change between clear and blurry or foggy while wearing your contact lenses?	Always	9 (3.9)
	Frequently	37 (16.2)
	Sometimes	78 (34.1)
	Rarely	49 (21.4)
	Never	55 (24.0)
Q3b. When your vision was blurry, how noticeable was the changeable, blurry, or foggy vision?		1.28 ± 1.12
Q4. During a typical day in the past month, how often did your eyes look or feel excessively watery?	Always	5 (2.2)
	Frequently	10 (4.4)
	Sometimes	29 (12.7)
	Rarely	26 (11.4)
	Never	158 (69.0)
Q5. During a typical day in the past month, how often did your eyes bother you so much that you wanted to close them?	Always	16 (7.0)
	Frequently	34 (14.8)
	Sometimes	86 (37.6)
	Rarely	40 (17.5)
	Never	52 (22.7)
Q6. have you been ever diagnosed with dry eyes disease	No	169 (73.8)
	Yes	58 (25.3)
Q7. Does this eye dryness affect one of these activities (reading driving -watching TV)	No	87 (38.0)
	Yes	141 (61.6)

Table 3: Responses to the dry eye related questions by the contact lens non-wearers (n = 228).

Contact lens wearers vs. non-wearers

Among the contact lens wearers, 115 (50.4%) respondents had dry eyes; whereas among the non-wearers, only 28 (12.7%) respondents had dry eyes. The odds of developing dry eyes in contact lens wearers is 1.03, while the odds of developing dry eyes in non-contact lens users is 0.12. The odds ratio of developing dry eyes in contact lens wearers is 8.58 compared to contact lens non-wearers. The association

between gender and dry eye symptoms in contact lens wearers ($p = 0.494$) and gender and dry eye symptoms in contact lens non-wearers ($p = 0.302$) were not statistically significant, which means dry eye can develop in both genders equally at the 95% CI (Table 4).

Association between		p-value
Gender and	Dry eye in contact lens wearers	.494
Gender and	Dry eye in contact lens non-wearers	.302

Table 4

Discussion

Among our participants, dry eye was reported by 115 (50.4%) contact lens wearers but only 28 (12.7%) non-contact lens wearers. The ocular symptoms were relatively frequent in contact lens wearers, and the odds ratio of developing dry eyes in contact lens wearers was 8.58 compared to non-contact lens wearers. Dry eye can develop in both genders equally. We found that most contact lens wearers were female. This might be because of a trend in which females seek to look good without glasses.

DES assessment tests (slit lamp examination, Schirmer test, tear film break-up time and rose Bengal staining) were not performed in this study. The data mentioned within the results analysis regarding the dry eye symptoms were from the responses of the questionnaire survey solely.

A cross-sectional study of dry eye symptom done in Malaysia for contact and non-contact lens wearers reported that for the majority of contact lens wearing students, symptoms of dry eyes occurred sometimes, while few of them had symptoms constantly. The most common symptom these authors reported for contact lens wearers was dry eyes (73.5%), followed by discomfort (62.6%), blurring of vision (58.4%), grittiness/scratchiness (53%), foreign body sensation (51.2%), soreness and irritation (50.6%), and burning sensation/stinging (34.9%), with sensitivity to light as the least frequent symptom. The frequency of dry eye symptoms was nearly the same among soft contact lens wearing students. On the other hand, the majority of non-contact lens wearers reported that sometimes they had symptoms, while few of them had these symptoms constantly. The commonest symptom was tired eye (77%), while a burning sensation/stinging (21.5%) was the least frequently reported. The other symptoms were discomfort (45.1%), grittiness/scratchiness (38.4%), dry eyes (33.2%), and blurring of vision (25.5%). Some of the participants experienced more than one symptom. Compared to this result, we found that the highest percentage of the contact lens wearers feel discomfort (41%), while dryness was reported by 37.6%, 39.7% of participants felt vision change between clear and blurry or foggy, and 34.9% complained of a bothered eye; while the percentage of discomfort in non-contact lens wearers was 42.8%, dryness was 35.4%, change between clear and blurry or foggy was 34.1%, and 37.6% had a bothered eye.

Chalmers and Begley (2006) found that 76.8% dry eye symptoms with 26.8% of participant had frequent, constant symptoms in contact lens wearers. A significantly higher intensity of symptoms was reported late in the evening compared to earlier in the day, with a 12.7% increase in the first 2 h of wear to 28.5% late in the day. These authors also reported that contact lens-related dryness is not associated with gender and occurs at a higher frequency and intensity in both male and female contact lens wearers. In this study, we did not compare dry eye symptoms at different times of the day. Nevertheless, we also found that the dry eye symptoms occur in both genders equally, regardless of whether they use contact lenses.

Conclusion

Dry eye syndrome can occur in multiple ways, and multiple risk factors might aggravate the symptoms. The diagnosis and treatment of dry eyes are usually based on patient symptoms. The severity of symptoms differs from person to person according to the patient's lifestyle. Dry eye syndrome occurs in both contact lens wearers and non-contact lens wearers. After comparing the result of this study, we found that dry eye syndrome is more common in contact lens wearers than non-contact lens wearers. Therefore, contact lens wearing is considered a risk factor for developing DES.

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Conflict of Interest

No conflict of interest is reported for any of the co-authors.

Bibliography

1. Tear Film. American Academy of Ophthalmology (2018).
2. Reddy S and Hui Ying K. "A Survey of Dry Eye Symptoms in Contact Lens Wearers and Non-Contact Lens Wearers among University Students in Malaysia". *Journal of Clinical and Experimental Ophthalmology* 7.1 (2016).
3. Lemp A., et al. "Report of the National Eye Institute/Industry Workshop on clinical trials in dry eyes". *Eye and Contact Lens* 21.4 (1995): 221-232¹
4. Orsborn GN and Zantos SG. "Practitioner survey: management of dry-eye symptoms in soft lens wearers". *Contact Lens Spectrum* 4.9 (1989): 23-26¹
5. Dry eyes - Symptoms and causes. Mayo Clinic (2018).
6. Brennan N and Efron N. "Symptomatology of HEMA Contact Lens Wear". *Optometry and Vision Science* 66.12 (1989): 834-838.
7. Doughty M., et al. "A Patient Questionnaire Approach to Estimating the Prevalence of Dry Eye Symptoms in Patients Presenting to Optometric Practices across Canada". *Optometry and Vision Science* 74.8 (1997): 624-631¹
8. Alshamrani A., et al. "Prevalence and risk factors of dry eye symptoms in a Saudi Arabian population". *Middle East African Journal of Ophthalmology* 24.2 (2017): 67-73.

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