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Dry Eye Disease and Contact Lens Use: Assessing Awareness, Knowledge, and Self-Care Behaviors in the Saudi Population

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Abstract **Background**: Dry eye disease (DED), also known as keratoconjunctivitis sicca, is a multifactorial ocular surface disorder marked by tear film instability, hyperosmolarity, and ocular surface inflammation. It leads to symptoms such as discomfort, dryness, and blurred vision, significantly impairing vision-related quality of life. Contact lens wear is a well-established risk factor, contributing to increased tear evaporation, reduced tear production, and ocular surface irritation. Environmental and behavioral factors further exacerbate the risk, especially in regions with hot, arid climates like Saudi Arabia. Despite the rising popularity of contact lenses particularly among young adults there is a notable lack of research evaluating awareness and self-care practices related to DED in this population. **Aim**: To assess awareness, knowledge, and self-care behaviors regarding DED among contact lens users in Saudi Arabia and examine the relationship between lens-wearing habits and symptom severity. **Methods**: A cross-sectional study was conducted from July 2025 to May 2026 among Saudi residents. Participants (n = 518), recruited via social media, were adults aged 18–65 years who currently wear contact lenses and report DED symptoms. Exclusion criteria included recent ocular surgery, active ocular surface disease, and incomplete responses. Data were collected through a structured, bilingual (Arabic/English) self-administered questionnaire adapted from validated sources, covering demographics, symptoms, and lens-use practices. The minimum sample size of 384 was determined using prevalence-based estimation at a 95% confidence level. Data were analyzed using SPSS version 20. **Results**: The mean age of participants was 35.17±14.5 years, with females representing 59.5% of the sample. More than half (51.1%) reported experiencing dry eye symptoms. The most commonly reported aggravating factor was prolonged screen use (73.6%), followed by exposure to wind or dry weather (52.1%). Cosmetic contact lens use was reported by 29.5% of participants, with most users wearing lenses for less than 4 hours (44.6%) or 4–8 hours (44.1%). Discomfort during use was common (66%), and 47.7% discontinued cosmetic lenses due to symptoms. Only 37.6% had consulted an eye specialist, while 65.2% expressed willingness to participate in future studies. 25.9% had minimal DED, 35.8% mild, 26.3% moderate, and 12% severe level. Moderate-to-severe cases accounted for 38.3%. DESS severity was significantly associated with gender (χ^2=17.832, p<0.001), education level (χ^2 = 42.901, p = 0.010), residential area (χ^2 = 29.518, p = 0.003), and contact lens use (χ^2 =14.314, p = 0.003). **Conclusion**: Dry eye symptoms are highly prevalent among the Saudi population, particularly among females and contact lens users. Although awareness of symptoms and triggers is moderate, professional consultation remains low. These findings highlight the need for targeted educational and preventive eye health programs, especially among contact lens users.

Key Words Dry Eye Disease, Contact Lenses, Awareness, Self-Care, Saudi Arabia

INTRODUCTION

A frequent multifactorial condition of the ocular surface, dry eye disease (DED) can have a substantial impact on comfort and vision. DED is described as a "multifactorial disease of the ocular surface characterized by a loss of homeostasis of the tear film and accompanied by ocular symptoms, in which tear film instability and hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities

play etiological roles" by the Tear Film and Ocular Surface Dry Eye Workshop II (TFOS DEWS II) [1].

The prevalence of DED varies across different regions, ranging from 4.6% in North America to 47.9% in Africa [2]. In Asian countries, approximately 20.1% of individuals develop DED. Moreover, in some industrialized Asian countries, such as Taiwan, Korea, and Japan, over a quarter of the population is affected [3]. The population of Saudi Arabia, particularly in the eastern province, is very susceptible to acquiring DED because of the region's epidemiological and environmental risk factors. The eastern province, like the majority of Saudi Arabia, is noted for having one of the warmest desert climates, with summertime highs over 50 degrees, which is a significant risk factor for DED [4].

The development of DED is also greatly influenced by environmental factors, such as air pollution, climate, and the usage of digital devices. Temperature, humidity, and air pollutants have a major impact on tear film stability and ocular surface health worldwide, according to a thorough review [5]. In controlled trials, low relative humidity has been repeatedly linked to increased tear evaporation, decreased tear stability, and worsening symptoms of DED [6]. A recent systematic review and dose-response meta-analysis by Ha *et al.* found that every additional hour of daily digital screen time was linked to 21% higher odds of myopia. This relationship followed a sigmoidal pattern, suggesting potential harm beyond one hour of daily exposure. The widespread use of digital devices has also emerged as a significant risk factor [7].

Tear film instability, hyperosmolarity, and ocular surface inflammation brought on by a lack of homeostasis are the hallmarks of DED. Neuropathic ocular pain (NOP) can arise from peripheral and central sensitization, neuronal plasticity, and corneal nerve damage [8]. Early on, subclinical inflammation that may go unreported is frequently present along with symptoms that are temporary and reversible. However, more serious illness, characterized by permanent epithelial alterations, chronic inflammation, and visual impairment, may arise if the ocular surface is unable to re-equilibrate [9].

Therefore, decreased tear flow, increased evaporation, and repetitive nerve stimulation can cause DED to develop into an irreversible chronic condition if treatment is not received. Treatment-resistant illness and irreversible damage to the ocular surface result from this self-sustaining cycle of inflammation [10]. Significant clinical problems are presented by the variety in disease development and the complexity of DED presentations. To end the disease's vicious cycle, treatment plans must concentrate on preserving and restoring ocular surface homeostasis [11].

Wearing contact lenses has been identified as a modifiable risk factor for DED, and dryness from the lenses is frequently mentioned as the main reason for pain, shorter wearing times, and lens cessation. Dry eye symptoms are thought to affect between 15% and 55% of contact lens wearers, which is higher than the percentage seen in non-contact lens wearers [1]. Increased tear film instability brought on by contact lens friction with the ocular surface, accelerated pre-corneal tear film evaporation and subsequent tear film thinning, decreased contact lens wettability, ocular surface inflammation, and meibomian gland dysfunction are some of the hypothesized mechanisms of contact lens-related dry eye [12].

The current study aimed To assess awareness, knowledge, and self-care behaviors regarding DED among contact lens users in Saudi Arabia, and examine the relationship between lens-wearing habits and symptom severity.. In addition, potential risk factors, including age, sex, contact lens type, duration of contact lens wear, and contact lens care practices) were examined to evaluate their statistical association with DED symptoms. The results of this study are intended to increase knowledge of symptomatic DED in contact lens wearers and to aid in the creation of methods to lessen discomfort and lower the region's contact lens dropout rates.

METHODS

Study Design and Setting

This was a cross-sectional study conducted between July 2025 to May 2026 in Saudi Arabia. The study used a structured questionnaire developed by the authors based on previous literature to assess the relationship between dry eye disease and awareness and self-care practices among contact lens users. The study targeted the Saudi population of both males and females across different age groups that wear contact lenses.

Sample Size

To make sure there were enough responses for the sample to be representative of the entire population, the sample size was calculated. The Raosoft sample size calculator was used to calculate the sample size. The computed sample size was 384 with an indicator percentage of 0.50, a 5% margin of error, and a 95% confidence interval (CI).

Inclusion Criteria

Included adults aged 18–65 years who were healthy, currently residing in Saudi Arabia, and actively using contact lenses (daily, weekly, or monthly disposable lenses). Eligible participants were required to provide informed consent and report symptoms suggestive of dry eye disease (DED) or related ocular discomfort.

Exclusion Criteria

included individuals who had undergone ocular surgery within the previous six months, had an active ocular surface disease, were not contact lens users, or provided incomplete responses to key survey items. Participants with coexisting ocular conditions, complicated or severe dry eye disease, or autoimmune disorders known to affect tear production or ocular surface health—such as Sjögren's syndrome, rheumatoid arthritis, systemic lupus erythematosus, ocular graft-versus-host disease, or Stevens–Johnson syndrome—were also excluded from the study.

Method for Data Collection, Instrument

A structured questionnaire was used as the study tool. The instrument was developed in both Arabic and English after reviewing relevant literature and adapting items from validated surveys related to dry eye symptoms and contact lens use within the Saudi population. The final version of the questionnaire consisted of 16 questions divided into three main sections.

- **The First Section:** included sociodemographic characteristics such as gender, age group, and educational level
- **The Second Section:** assessed participants' knowledge and experiences regarding dry eye symptoms. This included questions about the presence and frequency of symptoms, use of eye drops or other treatments, perceived causes and risk factors, and types of treatments used
- **The Third Section:** contained perception and practice-related questions, including the effect of dry eye symptoms on daily activities, frequency and duration of contact lens use, discomfort while wearing lenses, experience with therapeutic lenses, and reasons for discontinuing their use

The questionnaire was self-administered and distributed online through a secure survey platform. It required approximately 5–10 minutes to complete. Participation was voluntary, and informed consent was obtained electronically before proceeding. Data collection was conducted among residents of Saudi Arabia to ensure the target population was appropriately represented.

Scoring System

Dry Eye Symptom Score (DESS):

The Dry Eye Symptom Score is calculated based on responses to questions 4 through 9 and questions 10 through 15, with each item scored on a scale from 0 to 3. The maximum possible score is 30. The total score is interpreted as follows: a score between 0 and 6 indicates no or minimal symptoms; 7 to 14 reflects mild symptoms; 15 to 22 represents moderate symptoms; and 23 to 30 indicates severe symptoms. This score provides a quantitative measure of the severity of dry eye symptoms experienced by the individual.

Contact Lens Discomfort Score (CLDS)

The Contact Lens Discomfort Score is derived from questions 17, 18, 19, and 21. Question 17 evaluates the number of hours contact lenses are worn daily, with scores assigned as follows: less than 4 hours = 0, 4 to 8 hours = 1, and more than 8 hours = 2. Question 18 assesses the level of discomfort experienced while wearing contact lenses on a scale of 0 to 3. Question 19 asks whether the participant has stopped using lenses due to discomfort, scored as 0 for "No" and 2 for "Yes." Question 21 measures comfort with therapeutic lenses, with responses scored as follows: very comfortable = 0, comfortable = 1, uncomfortable = 2, and very uncomfortable = 3. The total CLDS ranges from 0 to 9. Interpretation of the final score is as follows: a score between 0 and 2 indicates comfort with contact lenses; a score of 3 to 5 suggests moderate discomfort; and a score of 6 to 9 signifies severe discomfort.

Pilot Test

This Questionnaire was Distributed on 20 Individuals and asked to Fill it. This was done to Test the Simplicity of the Questionnaire and the Feasibility of the Study. Data of the Pilot Study Will Excluded from Fhe Final Data of the Study.

Analyzes and Entry Method

The data had been entered into the device using the "Microsoft Office Excel Software" Windows (2021). The collected data were subsequently transmitted to the Statistical Package of Social Science Software (SPSS) application, version 26 (IBM SPSS Statistics for Microsoft Windows, Version 21.0) for statistical analysis. Descriptive statistics were used to summarize the numerical variables for baseline characteristics. For categorical variables, frequencies and percentages were calculated. The Chi-square test was used to identify associations between categorical variables.

RESULTS

Table 1 shows the sociodemographic characteristics of the studied participants, this study included 518 participants. The mean age was 35.17±14.504 (18-65). The majority of

Table 1: Sociodemographic Characteristics of the Studied Participants (n = 518)

Variable	Mean±SD (Range)	Median
Age	35.17±14.504 (18-65)	32
Variable	Frequency	Percentage
Age Groups		
From 18 to 29 years	221	46.6
From 30 to 44 years	93	19.6
From 45 to 59 years	131	27.6
60 years and above	29	6.1
Sex		
Male	192	40.5
Female	282	59.5
Marital Status		
Divorced	5	1.1
Married	241	50.8
Single	223	47
Widowed	5	1.1
Region of Residence		
Central	26	5.5
Eastern	44	9.3
Northern	10	2.1
Southern	33	7
Western	361	76.2
Education Level		
University	22	4.6
Secondary	5	1.1
Postgraduate	47	9.9
High school	90	19
Bachelor's degree	256	54
Diploma	37	7.8
Middle school	15	3.2
Primary school	1	0.2
I don't have an educational qualification	1	0.2

Table 2: Distribution of Knowledge of Dry Eye Symptoms (N = 474)

Question	Response Category	Frequency (n)	Percentage
1. Do you experience symptoms of Dry Eye Disease such as burning, itching, or feeling of a foreign body in the eye?	Yes	242	51.1
	No	232	48.9
2. Do you experience dryness or stickiness in your eyes?	Sometimes	188	39.7
	Never	114	24.1
	Rarely	105	22.2
	Often	67	14.1
3. Do you feel worsening of symptoms during reading or screen use?	Sometimes	173	36.7
	Often	146	31.0
	Rarely	78	16.6
	Never	74	15.7
4. Upon waking up, do you experience redness or stickiness?	Never	209	44.1
	Sometimes	116	24.5
	Rarely	108	22.8
	Often	41	8.6
5. How often do you experience dry eye symptoms during the week?	Once or twice	215	45.4
	Never	129	27.2
	3–5 times	70	14.8
	Almost daily	60	12.7
6. Do you use eye drops or other treatments for dry eye?	No	241	50.8
	Yes	233	49.2
7. If yes, what type of eye drops or treatments do you use?	Lubricating drops	240	87.6
	Allergy drops	16	5.8
	Lubricating + allergy drops	16	5.8
	Gel	1	0.4
	Refreshing tears	1	0.4
8. What factors do you believe cause or increase your dry eye symptoms? (Select all that apply)	Contact lens use	165	34.8
	Long screen exposure	349	73.6
	Exposure to wind or dry weather	247	52.1
	Other diseases (e.g., diabetes, allergies)	119	25.1
	Poor nutrition	50	10.5

Table 3: Perception and Practice of Participants Regarding Dry Eye Disease and Contact Lens Use

Question	Response Category	Frequency (n)	Percentage
1. How do symptoms of Dry Eye Disease affect your daily activities (such as reading, working, sleeping)?	Slightly affects	236	49.8
	No effect	121	25.5
	Moderately affects	86	18.1
	Severely affects	31	6.5
2. Do you wear cosmetic contact lenses?	No	334	70.5
	Yes	140	29.5
3. If yes, how many hours a day do you usually wear them? (n = 186)	Less than 4 hours	83	44.6
	4–8 hours	82	44.1
	More than 8 hours	21	11.3
4. Do you feel discomfort or dry eyes while wearing cosmetic contact lenses? (n = 300)	Sometimes	123	41.0
	Never	102	34.0
	Often	48	16.0
	Always	27	9.0
5. Have you tried therapeutic contact lenses for dry eye?	No	428	90.3
	Yes	46	9.7
6. If yes, how do you rate your comfort while using therapeutic lenses? (n = 102)	Comfortable to some extent	52	51.0
	Uncomfortable	23	22.5
	Very comfortable	19	18.6
	Very uncomfortable	8	7.8
7. Have you stopped using therapeutic contact lenses due to discomfort? (n = 218)	No	158	72.5
	Yes	60	27.5
8. Have you stopped using cosmetic contact lenses due to discomfort? (n = 279)	No	146	52.3
	Yes	133	47.7
9. If yes, how many hours per day do you wear them until you feel uncomfortable? (n = 164)	Less than 4 hours	90	54.9
	4–8 hours	58	35.4
	More than 8 hours	16	9.8
10. Have you consulted an eye specialist about dry eye?	No	296	62.4
	Yes	178	37.6
12. Would you like to participate in future studies about dry eye or contact lenses?	Yes	309	65.2
	No	165	34.8

patients were females (282, 59.5%), married (241, 50.8%), living in Western region (361, 76.2%) and Bachelor degree (256, 54%).

In Table 2 The results in table 2 showed a high prevalence of dry eye symptoms among participants, with

Table 4: Distribution of Dry Eye Symptom Score (DESS) Levels (n = 316)

Severity level	Frequency (n)	Percentage
Minimal	82	25.9
Mild	113	35.8
Moderate	83	26.3
Severe	38	12

Table 5: Association between Dry Eye Symptom Score (DESS) Severity and Demographic Factors of the Studied Participants

Variable	Category	Minimal n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	p-value
Age group	18–29	45 (40.2)	87 (45.8)	70 (50.0)	18 (58.1)	0.353
	30–44	23 (20.5)	37 (19.5)	29 (20.7)	4 (12.9)	
	45–59	39 (34.8)	49 (25.8)	35 (25.0)	8 (25.8)	
	≥60	5 (4.5)	17 (8.9)	6 (4.3)	1 (3.2)	
Gender	Female	50 (44.6)	113 (59.5)	96 (68.6)	23 (74.2)	<0.001
	Male	62 (55.4)	77 (40.5)	44 (31.4)	8 (25.8)	
Marital status	Single	47 (42.0)	88 (46.3)	67 (47.9)	20 (64.5)	0.519
	Married	62 (55.4)	99 (52.1)	69 (49.3)	11 (35.5)	
	Divorced	1 (0.9)	1 (0.5)	3 (2.1)	0 (0.0)	
	Widowed	2 (1.8)	2 (1.1)	1 (0.7)	0 (0.0)	
Education level	University	1 (0.9)	6 (3.2)	11 (7.9)	4 (12.9)	0.010
	Secondary	1 (0.9)	3 (1.6)	1 (0.7)	0 (0.0)	
	Postgraduate	11 (9.8)	20 (10.5)	11 (7.9)	5 (16.1)	
	High school	25 (22.3)	45 (23.7)	16 (11.4)	4 (12.9)	
	Bachelor's degree	52 (46.4)	95 (50.0)	92 (65.7)	16 (51.6)	
	Diploma	14 (12.5)	14 (7.4)	7 (5.0)	2 (6.5)	
	Middle school	7 (6.3)	6 (3.2)	2 (1.4)	0 (0.0)	
	Primary school	0 (0.0)	1 (0.5)	0 (0.0)	0 (0.0)	
	No qualification	1 (0.9)	0 (0.0)	0 (0.0)	0 (0.0)	
Residential area	Central	5 (4.5)	12 (6.3)	6 (4.3)	3 (9.7)	0.003
	Western	93 (83.0)	146 (76.8)	105 (75.0)	17 (54.8)	
	Southern	5 (4.5)	11 (5.8)	10 (7.1)	6 (19.4)	
	Eastern	5 (4.5)	20 (10.5)	17 (12.1)	2 (6.5)	
	Northern	4 (3.6)	1 (0.5)	2 (1.4)	3 (9.7)	

Table 6: Association between DESS Severity and Contact Lens use among Participants

Variable	Category	Minimal n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	p-value
Do you wear cosmetic contact lenses?	No	88 (78.6%)	142 (74.7%)	86 (61.4%)	17 (54.8%)	0.003
	Yes	24 (21.4%)	48 (25.3%)	54 (38.6%)	14 (45.2%)	
Hours of wearing contact lenses	4–8 hours	12 (35.3%)	29 (43.3%)	31 (46.3%)	10 (55.6%)	0.428
	<4 hours	18 (52.9%)	33 (49.3%)	25 (37.3%)	7 (38.9%)	
	>8 hours	4 (11.8%)	5 (7.5%)	11 (16.4%)	1 (5.6%)	

over half (51.1%) reporting experiencing symptoms such as burning or itching. most participants reported experiencing dryness, discomfort during screen use, once or twice a day. screen exposure was as the most common aggravating factor (73.6%), followed by exposure to wind or dry environments (52.1%), revealing the role of environmental and lifestyle influences. only about half of participants reported using eye drops (49.2%), lubricating drops were the most commonly used treatment among users (87.6%).

The participants in Table 3 showed that Dry Eye Disease slightly affects their daily activities (49.8%), while only 6.5% reported severe effect. Cosmetic contact lens use showed (29.5%) predominately using from less than 4 hours (44.6%, and from 4 -8 hours with 44.1%), discomfort was noticed, with 41% showed sometimes feel discomfort. Majority of the participants had not tried therapeutic lenses (90.3%), and among those who did, about half reporting comfort to some extent (51%). 27.5% of participants stopped using therapeutic lenses due to discomfort, and 47.7% of users discontinued cosmetic lenses due to discomfort, and most could tolerate lenses for less than 4 hours. Participants who consulted eye specialist represented 37.6%, and the majority of participants 65.2% liked to participating in future studies, indicating a positive opportunity for awareness and intervention programs.

Moderate to severe represented about 38.3%, while mild and minimal were 61.7% (Table 4, Figure 1).

The chi-square analysis showed that DESS severity was significantly associated with education level ($\chi^2 = 42.901$, df = 24, p = 0.010), with the majority of participants holding a bachelor's degree. No statistically significant associations were observed between DESS severity and age groups (p = 0.353), marital status (p = 0.519), residential area showed significant association with higher proportions in Western (p = 0.003). Gender showed a significant association with DESS severity ($\chi^2 = 17.832$, df = 3, p<0.001), females showed higher proportion than males, revealing a higher symptom severity among females in Table 5.

In Table 6 There was a statistically significant association between DESS severity level and wearing cosmetic contact lens use ($\chi^2 = 14.314$, p = 0.003), indicating

Table 7: Association between Total CLDS Score and Sociodemographic Characteristics Using Chi-Square and Monte Carlo Test

Variable	Category	Comfort n (%)	Moderate n (%)	Severe n (%)	Total n (%)	p-value (Monte Carlo)
Age groups	18–29 years	10 (50.0)	21 (44.7)	4 (44.4)	35 (46.1)	0.281
	30–44 years	8 (40.0)	13 (27.7)	1 (11.1)	22 (28.9)	
	45–59 years	2 (10.0)	13 (27.7)	4 (44.4)	19 (25.0)	
Gender	Female	12 (60.0)	32 (68.1)	6 (66.7)	50 (65.8)	0.876
	Male	8 (40.0)	15 (31.9)	3 (33.3)	26 (34.2)	
Marital status	Single	13 (65.0)	22 (46.8)	4 (44.4)	39 (51.3)	0.759
	Married	7 (35.0)	22 (46.8)	5 (55.6)	34 (44.7)	
	Divorced	0 (0.0)	2 (4.3)	0 (0.0)	2 (2.6)	
	Widowed	0 (0.0)	1 (2.1)	0 (0.0)	1 (1.3)	
Education level	University	1 (5.0)	6 (12.8)	0 (0.0)	7 (9.2)	0.004*
	Postgraduate	2 (10.0)	5 (10.6)	2 (22.2)	9 (11.8)	
	High school	4 (20.0)	6 (12.8)	2 (22.2)	12 (15.8)	
	Bachelor's degree	8 (40.0)	30 (63.8)	2 (22.2)	40 (52.6)	
	Diploma	4 (20.0)	0 (0.0)	1 (11.1)	5 (6.6)	
	Middle school	1 (5.0)	0 (0.0)	2 (22.2)	3 (3.9)	
Residential area	Central	2 (10.0)	0 (0.0)	0 (0.0)	2 (2.6)	0.213
	Western	15 (75.0)	39 (83.0)	7 (77.8)	61 (80.3)	
	Southern	1 (5.0)	4 (8.5)	0 (0.0)	5 (6.6)	
	Eastern	2 (10.0)	4 (8.5)	2 (22.2)	8 (10.5)	

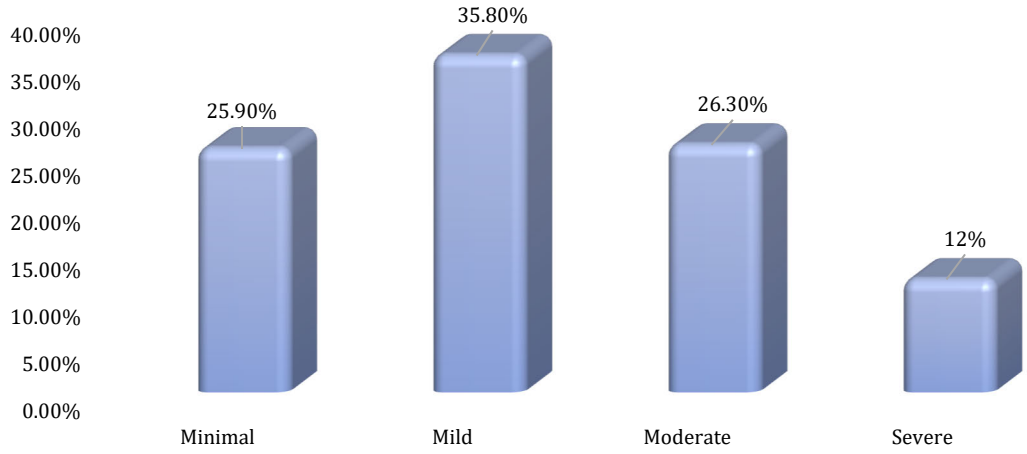


Figure 1: Distribution of DESS levels

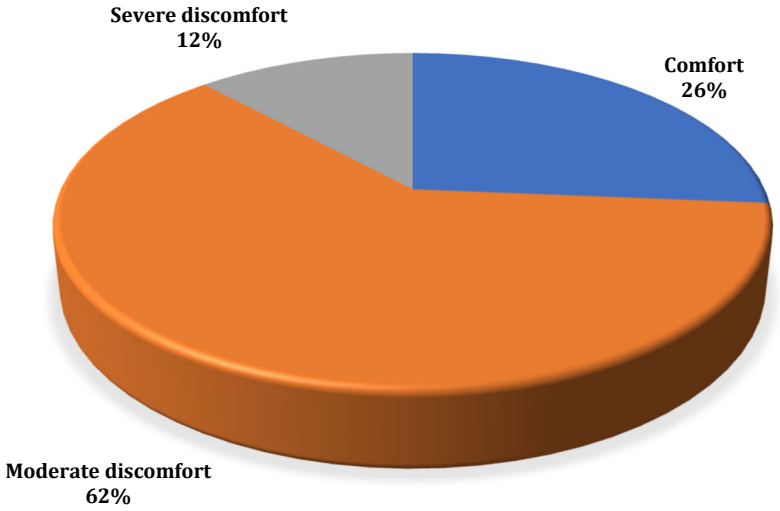


Figure 2: Distribution of Contact Lens Discomfort Score (CLDS) (n = 76)
Moderate to severe discomfort represent 73.6%

that higher severity of dry eye symptoms was more common among contact lens users. No significant association was found between DESS severity and daily duration of contact lens wear (χ^2=5.960, p = 0.428), but wearing contact lenses for 4-8 hours showed higher percentage in in severe and moderate DESS levels, and for more than 8 hours showed higher in moderate level.

In Table 7 The results indicate that education level is the only variable significantly associated with CLDS score (χ^2 = 25.207, df = 10, p = 0.004). Participants with a bachelor's degree constituted the largest proportion of those reporting moderate discomfort (63.8%), and severe discomfort in 22.2%. no statistically significant associations were observed between CLDS score and age groups (p = 0.281), gender (p = 0.876), marital status (p = 0.759), or residential area (p = 0.213). Although younger participants (18–29 years) represented the largest proportion across all CLDS categories, and females showed slightly higher proportions of discomfort compared to males.

DISCUSSION

Inflammatory diseases of the ocular surface and ocular pain or visual symptoms are linked to a set of tear film disorders known as "dry eye disease,"(DED) which are caused by decreased tear film production or instability. Dry eye illness is a developing public health issue that impairs quality of life, including aspects of everyday activities, employment productivity, and social, psychological, and physical functioning. It causes ocular discomfort, weariness, and visual disruption [13]. The current study aimed to assess awareness, knowledge, and self-care behaviors regarding DED among contact lens users in Saudi Arabia, and examine the relationship between lens-wearing habits and symptom severity.

Regarding sociodemographic characteristics of the studied participants, this study included 518 participants. The mean age was 35.17±14.504 (18-65). The majority of patients were females (282, 59.5%), married (241, 50.8%), living in Western region (361, 76.2%) and Bachelor degree (256, 54%). The chi-square analysis showed that DESS severity was significantly associated with education level (χ^2 = 42.901, df = 24, p = 0.010) and gender (χ^2 = 17.832, df = 3, p<0.001), while there was no significant association with age (p = 0.353) and marital status (p = 0.519).

Previous research has identified gender and age as significant factors in DED prevalence [14,15]. In our study, gender showed a significant association with DESS severity (χ^2 = 17.832, df = 3, p<0.001), females showed higher proportion than males, revealing a higher symptom severity among females but there were no statistically significant associations observed between DESS severity and age groups. Alharbi *et al* found that females were more likely to develop DED, with 73% of females reporting DED compared to 57.4% of males (p = 0.003). Additionally, older participants were more likely to experience DED; specifically, 76.9% of participants over 55 years had DED compared to 69.4% of those aged 19-25 [16]. Different studies found increased DED incidence among females and older individuals [17,18]. While some studies have reported no significant gender differences or a higher prevalence in younger populations [19, 20].

In our study we discovered that 140 (29.5%) of participants wear cosmotic contact lenses and 46 (9.7%) wear therapeutic lenses. There was a statistically significant association between DESS severity level and wearing cosmetic contact lens use (χ^2 = 14.314, p = 0.003), indicating that higher severity of dry eye symptoms was more common among contact lens users. Adversely contact lenses were not determined to be a significant risk factor for dry eye syndrome by Helayel *et al.*, possibly due to other reasons like hot and dry weather, which makes the statistics for CL inconsequential [20]. Moreover, 41 % feel dry eye symptoms while wearing contact lenses, compared to the 4.5% reported severe dry eyes in a study conducted in the Asir Region [21].

A high prevalence of dry eye symptoms was found among participants, with over half (51.1%) experienced symptoms such as burning or itching and dryness. According to Dry Eye Symptom Score (DESS) 61.7 % of patients experienced minimal to mild symptoms while 38.3 % experienced moderate to severe symptoms. This prevalence is higher than that reported in some previous studies in Saudi Arabia, such as a prevalence of 38.4% [20] , 32.1% in Al-Ahsa [15], and 49.5% among 4,066 healthy adults from five regions [18]. However, our findings were lower than that of two studies, the first one of an urban population in high-altitude areas of Southwest Saudi Arabia, where the prevalence was 66.8% [22], and a broader study that reported a DED prevalence of 74.9% across various regions of Saudi Arabia [23].

Most participants reported experiencing dryness, discomfort during screen use, once or twice a day. screen exposure was as the most common aggravating factor (73.6). This is comparable to the findings of Kalakattawi *et al*, who discovered that the majority of her sample (86.5%) spent a significant amount of time each day watching TV and using computers or mobile phones [24]. The majority of research indicates that people with DES frequently complain of eye strain, eye tiredness, burning, redness, dry eye, and blurred vision when they watch TV or other electronic devices without taking breaks [25]. The study's findings regarding the practice of prolonged electronic device viewing are unrelated to general knowledge, although most participants were aware that this behavior could lead to DES and that quitting or taking a break could help. But they had it. As a result, we discovered that different populations have different attitudes and levels of knowledge.

CONCLUSION

This study indicates a considerable prevalence of Dry Eye Disease (DED) symptoms in the Saudi population, with over half of the participants reporting at least one symptom and a notable number experiencing moderate to severe cases. The use of cosmetic contact lenses was widespread and showed a strong

correlation with increased severity of dry eye symptoms, indicating that wearing these lenses may worsen or lead to dry eye issues. Females exhibited notably higher DESS severity than males. Additionally, there were significant association with education level and residential area, suggesting that sociodemographic factors may impact the burden of the disease and awareness of it. While most participants indicated that their symptoms had a mild effect on their daily activities, a significant number faced functional limitations, stopped using contact lenses because of discomfort, and made limited use of therapeutic treatments. The low use of therapeutic contact lenses and the average frequency of consultations with eye care professionals suggest a lack of awareness and effective management practices. The results highlight the importance of specific public health approaches to enhance awareness, early detection, and suitable self-care methods for dry eye disease, especially for those who use contact lenses.

Limitations of the Study

- The cross-sectional design limits the ability to establish causal relationships between contact lens use and dry eye severity
- Using self-reported questionnaire data may lead to inaccuracies in remembering and reporting, especially when evaluating how often symptoms occur and habits related to wearing contact lenses
- The sample mainly includes younger adults and those with higher levels of education, which could restrict the ability to apply the findings to the overall Saudi population, especially older individuals or those with lower educational attainment
- Dry eye disease was not clinically confirmed, and the classification of its severity was based on questionnaire scores instead of objective eye examinations. This approach may result in misclassification bias

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Ethical Approval
The study was fully explained to all participants, and it was emphasized that participation was voluntary. Written informed consent was obtained from each participant prior to enrollment. All collected information was securely stored and used exclusively for research purposes.

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Conflict of Interest
The authors declare that there are no conflicts of interest.

Informed Consent
Written informed consent was obtained from all study participants.

Data and Materials Availability
All data generated or analyzed during this study are included in this published article.

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