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The relation between depression and its impact on dry eye syndrome among health related students in Umm Al-Qura University - A cross-sectional study

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ABSTRACT

Background: Dry eye disease encompasses a vital problem among medical students due to their daily computer use. This study aimed to explore the connection between DED and depression amongst medical students of Umm Al-Qura University. *Methods:* An online cross-sectional investigation was distributed among health-related colleges at Umm Al-Qura University. A PHQ-9 and DEQ-5 questionnaires were used to screen for depression and dry eye syndrome. The final data were subjected to an appropriate statistical analysis program. *Results:* 522 completed the survey. Male students were predominant. The total prevalence of depression was 44.06%, while about 30.08% suffered from dry eye syndrome. A significant difference was found among senior students, in which they correspond significantly with minimal depression (P-value, 0.000) and positive dry eye syndrome (P-value, 0.005). *Conclusion:* Among medical students, DED symptoms were seen relatively commonly. DES students should have an annual depression screening in primary care and ophthalmology clinics as a preventative step to enhance life quality and preserve psychological wellbeing.

Keywords: Depression, Dry eye syndrome, Impact, health students, Makkah city, Saudi Arabia

1. INTRODUCTION

Dry eye disease (DED) is a common chronic multifactorial condition of the eyes that causes alterations to normal ocular surface physiology, resulting in increased tear film osmolarity and inflammation. Symptoms of DED include

eye discomfort, irritation, burning, and visual disturbances (Lemp & Foulks, 2007; Alghamdi & Mandoura, 2022) which have a major negative impact on quality of life by interfering with daily activities such as reading, working, driving, and using a computer, making DED a significant public health concern (MBDRS & Schaumberg, 2007). The dry eye disease' prevalence has been estimated in numerous studies, ranging from 5% to 50% across different countries and around the world (Stapleton et al., 2017).

Many associated factors may links to DED (Khurana et al., 1991; Rouen & white, 2018), however, recently; there has been substantial evidence that psychological characteristics play a vital role in the perception of dry eye symptoms. A recent meta-analysis found that the frequency of depression and anxiety is roughly three times greater among DED patients (Wan et al., 2016). Medical students are affected by dry eyes because of their use of projectors and computers for academic purposes, and long periods of reading and exposure to screens. Several studies have been conducted to evaluate the prevalence of dry eye disease among medical students, and the results showed that the prevalence rates were ranging from 27.1% to 58% (Hyon et al., 2019; Laad et al., 2019).

Despite the fact that DED and depression are prevalent among medical students (Hyon et al., 2019; Laad et al., 2019; Siddiqui et al., 2020), the characteristics of DED and their relationship to depression have not been studied adequately. Thus, this study aims to explore the association between DED and depression among medical students of Umm Al-Qura University, Saudi Arabia.

2. METHODOLOGY

A PHQ-9 questionnaire was used to conduct a depression screening, and a DEQ-5 survey was used to diagnose DED in this observational and descriptive cross-sectional investigation. This study was driven by a previously published study (Martinez et al., 2019; Kroenke et al., 2001). Using Google Forms, a single uniform questionnaire was delivered to all health-related colleges in Umm Al-Qura University among September 2021, via multiple social media channels. Umm Al-Qura University's ethical committee approved this study with IRB number: (HAPO-02-K-012-2021-11-840). This survey followed the principles of the Declaration of Helsinki. All data were collected confidentially and anonymously, with the student's consent. The calculated sample size depends on Stat Calc of Open Epi software of Rollin School of Public Health, Emory University, USA (Sullivan et al., 2009). After the calculations, the smallest sample size to achieve an accuracy of ± 5% with a 95% confidence interval was 384. However, the concluding sample size was 522 during the collection of data. After the data was extracted, it was reviewed, coded, and fed into the IBM SPSS v.23 (SPSS, Inc. Chicago, IL).

A statistically significant P-value was less than 5%. Descriptive statistical analysis relying on frequencies and percentage distributions were applied to student factors, vision care, and depression degree. The overall score for the various items on the PHQ-9 was added together and classified as minimum, mild, moderate, moderately severe, and severe depression. A cross-tabulation was utilized with the DEQ-5 item's overall score to analyze the association between students' demography and depression.

3. RESULTS

We surveyed 522 health-related students at UQU. Their demography is listed in Table 1. Most students are between 22-25 years old with mean 21.8 (SD=1.77). Male students represent 51.3%, while female represents 48.7%. Most of the students were single 97.5% regarding students' social status. 5th year-students represents 21.1%, followed by 4thyear students 19.9%. Collage of medicine was predominant between all collages representing 97.1%.

Table 1 Demographic data

Variable	Category	Frequency (n.)	(%)
Age *(mean [SD])*	(21.8 [1.77])		
Age	19-21	254	48.7
	22-25	263	50.4
	26-30	5	1.0
Gender	Male	268	51.3
	Female	254	48.7
Academic year	2nd year	103	19.7
	3rd year	102	19.5

	4th year	104	19.9
	5th year	110	21.1
	6th year	102	19.5
	Intern	1	.2
College	College of medicine	507	97.1
	College of applied medical sciences	2	.4
	College of dentistry	7	1.3
	College of pharmacy	2	.4
	College of nursing	3	.6
	College of public health and health informatics	1	.2
Marital status	Single	509	97.5
	Married	13	2.5

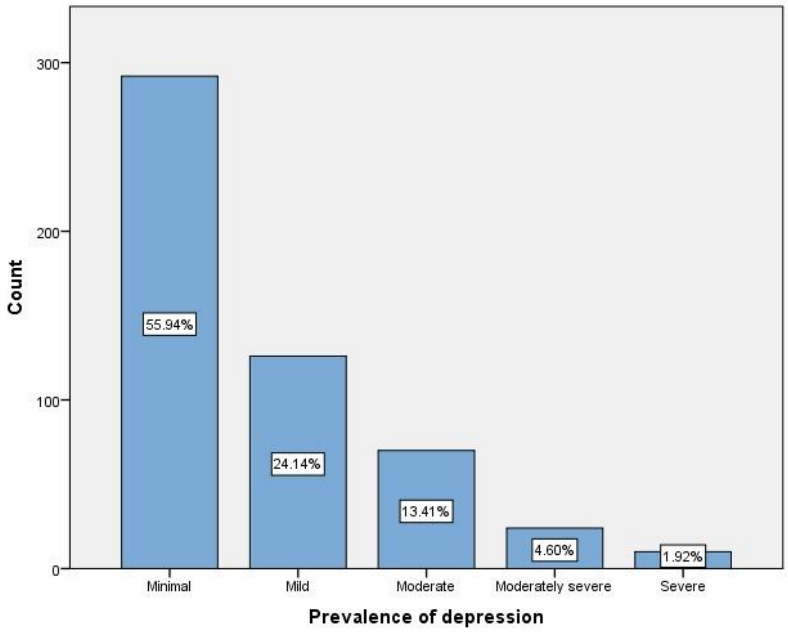

Figure 1 Frequency of depression according to PHQ-9

Table 2 The association between students' [collages and academic years] and [depression and dry eye syndrome]

Variables/Collages		Collage of medicine (n.)	Collage of dentistry (n.)	Collage of applied medical science (n.)	Collage of pharmacology (n.)	Collage of nursing (n.)	College of public health and health informatics (n.)	p-valve
Depression	Minimal	285	2	2	1	2	0	0.746
	Mild	118	0	5	1	1	1	
	Moderate	70	0	0	0	0	0	
	Moderately severe	24	0	0	0	0	0	
	Severe	10	0	0	0	0	0	

Dry eye syndrome	Yes	359	0	4	1	1	0	0.075
	No	148	2	3	1	2	1	
Variables/Academic year		2nd (n.)	3rd (n.)	4th (n.)	5th (n.)	6th (n.)	Interns (n.)	p-valve
Depression	Minimal	43	63	39	70	77	0	0.000*
	Mild	35	20	32	20	18	1	
	Moderate	16	11	24	13	6	0	
	Moderately severe	8	4	5	6	1	0	
	Severe	1	4	4	1	0	0	
Dry eye syndrome	Yes	71	74	68	67	85	71	0.005*
	No	32	28	36	43	17	32	

Around 4.60% of students suffered from moderately severe depression, while 1.92% suffered from severe depression (Figure 1). On the other hand, about 30.08% suffered from dry eye syndrome (Figure 2). Collage of medicine corresponds with minimal depression form with no significant association (P-value, 0.746) (Table 2). Furthermore, dry eye syndrome's increased prevalence corresponded with a collage of medicine with no significant variation (P-value, 0.075) (Table 2). The correlation between depression prevalence and dry eye syndrome with students' academic year was discussed in Table 2. Minimal depression forms were significantly correlated with senior students (P-value, 0.000). On the other hand, senior students were more significantly linked with positive dry eye syndrome (P-value, 0.005).

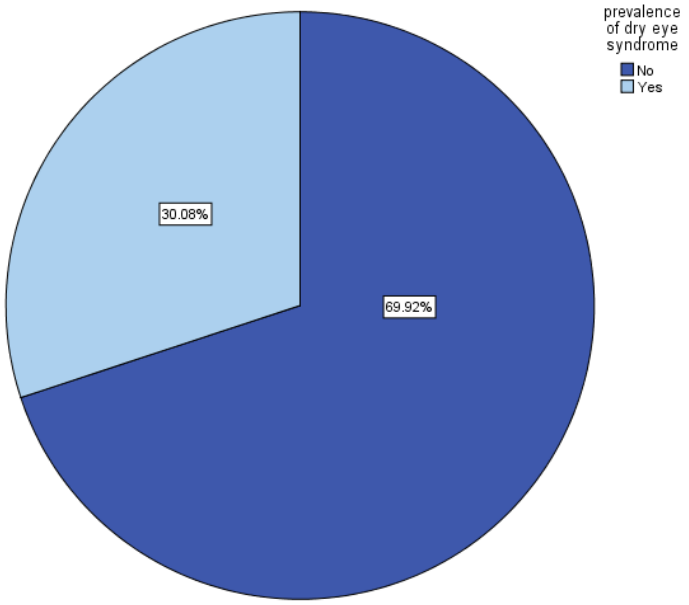

Figure 2 Prevalence of dry eye syndrome according to DEQ-5

A significant correlation was found between students who are suffered from dry eye syndrome with minimal depression (P-value, 0.000) (Table 3).

Table 3 The correlation between depression among students with or without dry eye syndrome

Category	Dry eye syndrome		p-value
	Yes (%)	No (%)	
Depression			
Minimal	231	61	
Mild	77	49	0.000*
Moderate	40	30	
Moderately severe	10	14	
Severe	7	3	

4. DISCUSSION

The current study was conducted to correlate depression and dry syndrome among health-related students of Umm Al-Qura University. Our results indicated that participants predominantly reported minimal depression (55.94%); Those students have no past history depression or any psychiatric disease nor were in a grief state; our finding agrees with previous studies done in India and Saudi Arabia, showing that most participants reported minimal depression (48.7%,42.0%) (Al-Dairi et al., 2020; Iqbal et al., 2015). In another study done in Malaysia, participants reported the prevalence of mild depression exceeds minimal depression by 36.4% (Fata et al., 2019). Furthermore, we reported a close similar prevalence of severe depression (1.92%) with Malaysians studies (Fata et al., 2019; Ashraful et al., 2018), in which only 2.2% and 6.6% reported severe depression, respectively.

The global prevalence of DED according to the TFOS DEWS II Epidemiology Report ranges from approximately 5% to 50%. It varies according to the various definitions of DED utilized and the population studied distinctions (Stapleton et al., 2017). Based on the results of the comprehensive cross-sectional study, the frequency of DED among UQU health-related students was estimated at 30%, according to Dry eye questionnaire 5 (DEQ-5). Similar studies have reported similar findings, including a study done in the general population of Saudi Arabia linking depression and DED where they found that approximately 50% of their participants had DED using DEQ-5, including a study done in Brazil which revealed that 34% of undergraduate students had variable severity of DES, which is slightly higher than our study (Yang et al., 2021). In contrast, our study reported a greater DED prevalence than another study done in Thailand that showed only 17% of its participants had DED (Tawonkasiwattanakun et al., 2021). These results could be affected by time spent on digital equipment, contact lens wearing, and other risk factors contributing to the increasing prevalence of DED in different populations (Wang et al., 2021).

Similar studies have reported the connotation between DED and depression (Wang et al., 2021; Wan et al., 2016; Weatherby et al., 2019; Van der vaart et al., 2015) and showed a significant association between them; one study showed that DED patients' symptoms might have a detrimental impact on everyday performance, emotional well-being, and working capability. In addition to the aggravating ocular symptoms, it may have a harmful effect on visual quality and perception of visual function. The disruption in visual perception and performance may worsen depressive and anxiety symptoms (Wan et al., 2016). Our study revealed that most students with DED suffered from various degrees of depression. As shown in a previous article, DED may play a role in depression (Weatherby et al., 2019). This underlines the value of designed to detect depression among DED students and trying to identify the portion of medical illnesses and their lifestyle that may be the underlying reason of dry eyes.

5. CONCLUSION

Our finding shows that DES is a probable factor for depression, as DES is associated with more minimal depression and recommends annual screening for depression among DES students in ophthalmology and primary healthcare center as a practical measure to improve life quality and maintain psychological well-being.

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Ethical approval

The study was approved by the Medical Ethics Committee of Umm Al-Qura University (ethical approval code: HAPO-02-K-012-2021-11-840).

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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