Awareness of Common Eye Diseases Among College Students at A Saudi University

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Abstract **Introduction:** Many eye conditions, including cataract, glaucoma, and diabetic retinopathy, are among the major causes of blindness in the world. There were many studies on the subject worldwide but fewer in the Middle East; hence, the subject needs more investigation. This research is significant as it fills the gap in the literature on the awareness of common eye diseases in Saudi Arabia. This study was carried out to assess the awareness of common eye diseases among college students at a Saudi University. **Methodology:** This was a cross-sectional study, including college students at Prince Sattam bin Abdulaziz University (PSAU), Saudi Arabia. Data was collected using a self-administered questionnaire and was analyzed using the SPSS program. **Results:** Our study included 579 participants. 62.7% of participants reported no family history of eye diseases, and among those who did, dry eye was the most frequently mentioned condition, with 27.8%. Cataract, glaucoma, and diabetic retinopathy had lower reported family histories at 12.3%, 5.9%, and 3.5%, respectively. Concerning awareness, 60.3% of participants were aware of dry eye, followed by cataract (38.7%) and glaucoma (33.3%). However, 26.9% reported no awareness of any eye disease. The internet emerged as the most significant source of information (46.7%), while family, friends, and relatives were also prominent sources (35.4%). Regarding knowledge of specific eye diseases, there were varying awareness levels. For example, 58.4% recognized cataract as treatable, and 42.5% knew glaucoma could cause blindness. **Conclusion:** A significant proportion of participants exhibited awareness of conditions like dry eye, cataract, and glaucoma; there is room for improvement. Study findings underscore the importance of educational interventions aimed at enhancing awareness, especially for students in non-medical disciplines.

Key Words Eye Diseases, college students, Cataract, Glaucoma, Diabetic Retinopathy, Dry Eye, Saudi Arabia

1. Introduction

Many eye conditions, including cataract, glaucoma, and diabetic retinopathy, are among the major causes of blindness in the world. Low health knowledge of these illnesses and their sequelae reduces opportunities for early intervention and prevention by delaying seeking medical care. Because of this, increasing public knowledge of ocular disorders is crucial for their early diagnosis and treatment, which lessens the burden of visual impairment [1].

There have been many studies on the subject worldwide but fewer in the Middle East; hence, the subject needs more investigation. The results of these studies and research were significant. In a study of participants 711, the majority had a basic understanding of prevalent eye disease and its causes. Hence, our findings indicate the necessity for eye healthcare

interventions concentrating on knowledge gaps, particularly on glaucoma [2].

In a different survey, the most frequently given accurate response was that getting enough sleep is essential for general eye health (92.1%), followed by routine eye exams even in the absence of eye disease (89.1%). The study's results showed that the population under investigation in the study region knew only a moderate amount about eye conditions and eye care. The highest levels of awareness were for general eye care, while the lowest was for glaucoma and cataracts [3]. Another study found that 31%, 38%, 37%, and 52% of the study group, respectively, were aware of cataract, glaucoma, DR (Diabetic Retinopathy), and DED (Dry Eye Disease) [4]. According to the findings of further study, the participants' acceptable knowledge (score $\geq 50\%$) was low

regarding refractive errors (63%), paediatric eye disorders (51.5%), and glaucoma (14.8%), and high regarding ocular trauma (81.2%), diabetes (88.6%), and other general eye diseases (91.3%) [5].

The Kingdom of Saudi Arabia introduced the 2030 Vision in April 2016. Its goals included maximizing and better utilizing the capacity of hospitals and healthcare facilities, improving the caliber of those facilities' therapeutic and preventive healthcare services, and providing healthcare through public corporations to both improve that sector's quality and get ready for the long-term advantages of privatization [6]. Regarding the degree of awareness of prevalent eye disorders globally, varying results have been observed [5], [7]–[9]. To date, more studies are needed to assess the awareness of common eye diseases in Saudi Arabia. This study was carried out to assess the awareness of common eye diseases among college students at a Saudi University.

2. Methods

This study employed a cross-sectional survey design to investigate the awareness of common eye diseases among college students at Prince Sattam bin Abdulaziz University (PSAU). The research design involved surveying 500 participants, selected through stratified random sampling. The sample consisted of college students aged 18-25 years who were currently enrolled at PSAU, with participants stratified based on gender, academic year, and college. Data was collected using a self-administered questionnaire divided into two sections. The first section gathered demographic information, such as age, gender, academic year, and college. The second section focused on assessing awareness of common eye diseases through multiple-choice questions.

The questionnaire, adapted with modifications from a validated survey [4]. Questions aimed to evaluate awareness regarding specific eye conditions like glaucoma, cataracts, diabetic retinopathy, and dry eye disease. Additionally, participants were asked about their familiarity with the diseases, their knowledge of associated risk factors, and the source of their information. The investigators meticulously reviewed responses to ensure participants' comprehension of the questionnaire. The survey also delved into participants' awareness of the diseases' impact on vision, addressing whether these conditions are blinding, preventable, treatable, and if vision returns to normal following treatment.

A. Statistical Analysis

A statistical analysis using both descriptive and inferential methods was performed on the data. Frequencies and percentages were computed and summarised as basic descriptive statistics of the sociodemographic traits and other categorical variables. The central tendency and dispersion metrics for continuous variables were presented as means (M) and standard deviations (SD), respectively.

One score was assigned to each of the four questions that tested the respondent's knowledge about eye illnesses. Each participant's score was added together, along with their level

		N	%	M	SD
Sex	Female	203	35.1%		
	Male	376	64.9%		
Age				20.9	2.3
Academic year	Graduate	93	16.1%		
	5th Year	34	5.9%		
	4th Year	54	9.3%		
	6th Year	32	5.5%		
	1st Year	144	24.9%		
	2nd Year	104	18.0%		
	3rd Year	118	20.4%		
College	Medical	290	50.1%		
	Non-medical	289	49.9%		

Table 1: Sociodemographic characteristics of the participants

of knowledge about each eye condition. As a result, each eye illness might have a maximum score of 0-4. The participants' knowledge scores about various eye diseases were compared based on their family history and sociodemographic variables. The Kruskal-Wallis test and the non-parametric Mann-Whitney U test was the two inferential statistical analyses used in the comparison. A 95% confidence interval was indicated by a p-value of 0.05, which was considered significant. For all statistical computations, IBM SPSS version 27.0.1 was used.

3. Results

A. Sociodemographic Characteristics

Among the 579 participants, a majority of 376 were male, constituting 64.9% of the sample, while Two hundred three participants were female, making up 35.1% of the total. The average age of the participants was 20.9 years, with a standard deviation of 2.3, indicating a relatively homogeneous age distribution. In terms of academic year, the largest proportion of students were in their first year (24.9%), followed by the third year (20.4%), and medical students represented 50.1% of the total, with non-medical students comprising the remaining 49.9%. This demographic snapshot provides a clear overview of the composition of our study's participant pool, which encompasses a diverse range of students in terms of gender, age, academic progression, and college affiliation (Table 1).

B. Family History, Awareness, Sources of Information of Eye Diseases

Notably, a majority of participants (62.7%) reported no family history of these diseases. Among those who did report a family history, dry eye was the most frequently mentioned condition, with 27.8% of participants noting its presence in their families. Cataract, glaucoma, and diabetic retinopathy had lower reported family histories, at 12.3%, 5.9%, and 3.5%, respectively. For participants with family members affected by these conditions, parents were often the closest relatives with these diseases.

Regarding awareness, the majority of participants were aware of dry eye (60.3%), followed by cataract (38.7%) and glaucoma (33.3%). Notably, 26.9% reported no awareness of any eye disease, highlighting the need for improved
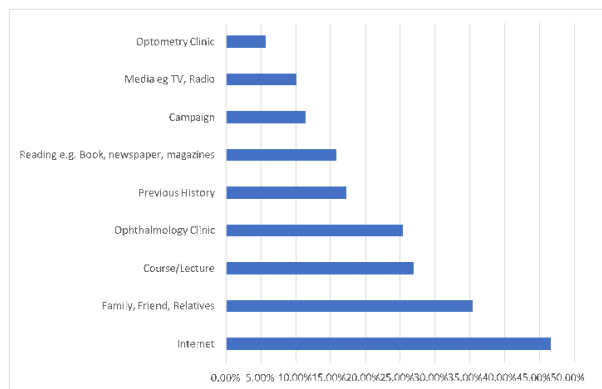
Figure 1: Sources of information about eye disease

knowledge dissemination. In terms of sources of information, the internet emerged as the most significant source, with 46.7% of participants citing it as their informational channel. Family, friends, and relatives were also prominent sources (35.4%). Educational sources, such as courses and lectures, played a role for 27% of participants, and ophthalmology clinics (25.5%) and previous personal history (17.3%) were other notable sources (Table 2, Figure 1).

C. Risk Factors of Eye Diseases

For diabetic retinopathy, a substantial proportion of participants (45.0%) recognized physical diseases like high blood pressure and diabetes as risk factors. Family history (36.5%) and age (29.7%) were also acknowledged as contributors to the development of this condition.

Concerning dry eye, a significant number of participants (44.3%) mentioned 'other' risk factors, indicating a certain level of uncertainty or less commonly known factors. Age (35.0%) and family history (31.0%) were also acknowledged as potential risk factors, along with the influence of medications (30.8%) and physical diseases like high blood pressure and diabetes (19.6%). For cataract, age was widely recognized as a risk factor by the majority of participants (52.3%). Family history (33.4%) and the influence of physical diseases (26.0%) were also identified as contributing factors. The 'other' category was mentioned by 25.1% of participants, while medications (21.0%) were also acknowledged as a potential risk factor.

Regarding glaucoma, the acknowledgment of age (42.6%) and family history (39.1%) as risk factors was quite prominent. Participants also recognized physical diseases like high blood pressure and diabetes (33.0%) and mentioned 'other' factors (27.6%) as contributors. Medications (23.3%) were noted to a slightly lesser extent (Table 3).

D. Knowledge of Eye Diseases

Table 4 provides an overview of the participants' knowledge regarding four common eye diseases: cataract, glaucoma, diabetic retinopathy, and dry eye. The data highlights varying levels of awareness. For cataract, while 58.4% recognized

it as a treatable condition, 50.9% were unsure if it causes blindness. Regarding glaucoma, 42.5% knew that it can cause blindness, and 45.1% were aware that it can be treated. For diabetic retinopathy, 37.8% knew it can be avoided, and 32.0% recognized that it can be treated. The majority (65.6%) believed that vision could return to normal after treatment. For dry eye, 67.0% recognized it can be avoided, and 68.7% acknowledged its treatability. While 50.9% knew dry eye does not cause blindness, a significant proportion (39.9%) remained unsure.

E. Factors Associated with Knowledge of Eye Diseases

Tables 5 and 6 display associations between participants' knowledge of specific eye diseases (cataract, glaucoma, diabetic retinopathy, and dry eye) and various sociodemographic characteristics and family history of the respective diseases. Statistically significant associations were observed for certain factors.

In Table 5, knowledge of cataract and glaucoma was significantly associated with academic year and college, where medical students displayed higher awareness (p < 0.001). Family history of cataract was also linked to better knowledge (p < 0.001). However, family history of glaucoma did not have a significant impact on knowledge levels (p = 0.132).

In Table 6, for knowledge of diabetic retinopathy and dry eye, significant associations were observed with academic year, college, and family history. Graduates and medical students demonstrated higher knowledge levels (p < 0.001). Family history positively influenced knowledge, with p-values less than 0.001.

4. Discussion

Our study aimed to assess the level of awareness of common eye diseases among college students, both medical and non-medical, and to evaluate their knowledge while exploring existing misconceptions regarding eye diseases. Study findings demonstrated a need for improved awareness and education regarding common eye diseases among college students. The relatively low levels of knowledge, particularly among non-medical students, suggest that many students may need help comprehending the potential consequences of these eye conditions. This lack of awareness could have severe implications for their future eye health.

Only 58.4% of participants recognized cataract as a treatable condition is a cause for concern. Cataract is one of the most common eye disorders, and timely treatment can prevent severe visual impairment [10]. The uncertainty regarding whether cataract causes blindness underscores the need for more apparent education on this matter [11]. Age was widely recognized as a risk factor for Cataracts by the majority of participants. Family history and the influence of physical diseases were also identified. These findings align with the well-established risk factors for cataracts, demonstrating a basic understanding among the participants [12].

		N	%
Is there any of these diseases in your family?	None	363	62.7%
	Dry Eye	161	27.8%
	Cataract	71	12.3%
	Glaucoma	34	5.9%
	Diabetic Retinopathy	20	3.5%
Relationship to family member with glaucoma	Parents	25	92.6%
	Sister	1	3.7%
	Brother	1	3.7%
Relationship to the family member with cataract?	Parents	61	92.4%
	Brother	4	6.1%
	Sister	3	4.5%
Relation to family member with diabetic retinopathy	Parents	21	77.8%
	Sister	4	14.8%
	Brother	4	14.8%
Relation to family member with dry eye	Parents	76	51.4%
	Sister	71	48.0%
	Brother	71	48.0%
Are you aware of any eye disease	Dry Eye	349	60.3%
	Cataract	224	38.7%
	Glaucoma	193	33.3%
	None	156	26.9%
	Diabetic Retinopathy	127	21.9%
What is your source of information about this disease?	Internet	256	46.7%
	Family, Friend, Relatives	194	35.4%
	Course/Lecture	148	27.0%
	Ophthalmology Clinic	140	25.5%
	Previous History	95	17.3%
	Reading e.g., Book, newspaper, magazines	87	15.9%
	Campaign	63	11.5%
	Media e.g. TV, Radio	56	10.2%
	Optometry Clinic	32	5.8%

Table 2: Family history, awareness, and sources of information of eye diseases of the participants

		N	%
Can you mention any risk factors for the development of diabetic retinopathy?	Physical diseases such as high blood pressure and diabetes	249	45.0%
	Family history	202	36.5%
	Age	164	29.7%
	Other	147	26.6%
	Medications	83	15.0%
Can you mention any risk factors for dry eye?	Other	224	44.3%
	Age	177	35.0%
	Family history	157	31.0%
	Medications	156	30.8%
	Physical diseases such as high blood pressure and diabetes	99	19.6%
Can you mention any risk factors for cataract?	Age	296	52.3%
	Family history	189	33.4%
	Physical diseases such as high blood pressure and diabetes	147	26.0%
	Other	142	25.1%
	Medications	119	21.0%
Can you mention any risk factors for glaucoma?	Age	229	42.6%
	Family history	210	39.1%
	Physical diseases such as high blood pressure and diabetes	177	33.0%
	Other	148	27.6%
	Medications	125	23.3%

Table 3: Awareness of risk factors of eye diseases of the participants

	I don't know			No		Yes	
		N	%	N	%	N	%
Information about cataract	Does it cause blindness?	295	50.9%	82	14.2%	202	34.9%
	Can it be avoided?	298	51.5%	53	9.2%	228	39.4%
	Can it be treated?	225	38.9%	16	2.8%	338	58.4%
	Do you think that your vision will return to what it was after treatment?	295	50.9%	101	17.4%	183	31.6%
Information about glaucoma	Does it cause blindness?	292	50.4%	41	7.1%	246	42.5%
	Can it be avoided?	320	55.3%	58	10.0%	201	34.7%
	Can it be treated?	277	47.8%	41	7.1%	261	45.1%
	Do you think that your vision will return to what it was after treatment?	344	59.4%	114	19.7%	121	20.9%
Information about diabetic retinopathy	Does it cause blindness?	339	58.5%	53	9.2%	187	32.3%
	Can it be avoided?	322	55.6%	38	6.6%	219	37.8%
	Can it be treated?	347	59.9%	47	8.1%	185	32.0%
	Do you think that your vision will return to what it was after treatment?	380	65.6%	121	20.9%	78	13.5%
Information about dry eye	Does it cause blindness?	231	39.9%	295	50.9%	53	9.2%
	Can it be avoided?	160	27.6%	31	5.4%	388	67.0%
	Can it be treated?	154	26.6%	27	4.7%	398	68.7%
	Do you think your vision will return to what it was after treatment?	198	34.2%	28	4.8%	353	61.0%

Table 4: Knowledge of eye diseases of the participants

Cataract Information				P value{u/K}	Glaucoma information		P value{u/K}
		M	SD		M	SD	
Sex	Female	1.60	1.30	0.532	1.50	1.33	0.275
	Male	1.67	1.45		1.39	1.46	
Academic year	Graduate	1.81	1.37	0.011*	1.65	1.36	<0.001*
	5th Year	2.03	1.22		2.18	1.29	
	4th Year	1.98	1.38		1.85	1.39	
	6th Year	2.09	1.57		2.09	1.61	
	1st Year	1.44	1.42		1.00	1.37	
	2nd Year	1.50	1.26		1.42	1.38	
	3rd Year	1.49	1.47		1.21	1.34	
College	Medical	2.00	1.36	<0.001*	1.97	1.39	<0.001*
	Non- medical	1.29	1.35		.90	1.23	
Any family member with cataract	No	1.54	1.40	<0.001*	1.43	1.43	-
	Yes	2.38	1.18		1.46	1.35	
Any family member with glaucoma	No	1.63	1.40	-	1.41	1.42	0.132
	Yes	1.88	1.37		1.76	1.33	
Kindependent samples Kruskal-Wallis test uindependent samples Mann-Whitney U Test *p<0.05, Significant							

Table 5: Association of knowledge of cataract and glaucoma with sociodemographic characteristics and family history of respective disease

Diabetic retinopathy information		M	SD	P value{u/K}	Dry eye information		P value{u/K}
					M	SD	
Sex	Female	1.10	1.27	0.723	2.38	1.13	<0.001*
	Male	1.18	1.39		1.88	1.40	
Academic year	Graduate	1.39	1.39	<0.001*	2.08	1.29	0.022*
	5th Year	1.76	1.26		2.38	1.07	
	4th Year	1.61	1.37		2.41	1.17	
	6th Year	1.88	1.36		2.28	1.28	
	1st Year	.82	1.28		1.82	1.42	
	2nd Year	.92	1.22		2.20	1.32	
	3rd Year	1.01	1.32		1.90	1.37	
College	Medical	1.52	1.37	<0.001*	2.34	1.19	<0.001*
	Non- medical	.79	1.22		1.78	1.41	
Any family member with diabetic retinopathy	Yes	1.18	1.34	<0.001*	2.29	1.34	-
	No	1.12	1.35		2.03	1.34	
	Yes	2.15	.99		3.00	.56	
Any family member with dry eye	No	1.21	1.38	-	1.91	1.40	<0.001*
	Yes	1.01	1.25		2.45	1.05	
Kindependent samples Kruskal-Wallis test uindependent samples Mann-Whitney U test *p<0.05, Significant							

Table 6: Association of knowledge of diabetic retinopathy and dry eye with sociodemographic characteristics and family history of respective disease

Glaucoma association with blindness was acknowledged by 42.5% of students, which suggests some understanding of its severity [13]. However, only 45.1% were aware that it is treatable. Given that glaucoma is often asymptomatic until advanced stages, it is crucial for students to understand the importance of regular eye check-ups and early intervention [14]. Acknowledging age and family history as risk factors for glaucoma was prominent. Participants also recognized physical diseases like high blood pressure and diabetes. These findings indicate a reasonable awareness of the multifaceted risk factors associated with glaucoma, which is also consistent with the previous studies [15].

There is a common misconception about diabetic retinopathy, with 65.6% of participants believing that vision can return to normal after treatment. This finding highlights the need to clarify the realistic outcomes of treatment and emphasize the role of prevention in managing this diabetes- related eye condition [16]. A substantial proportion recognized physical diseases like high blood pressure and diabetes as risk factors for diabetic retinopathy [17]. Family history and age were also acknowledged. These findings reflect a basic understanding of the association between systemic health conditions and diabetic retinopathy.

While most students recognize that dry eye is treatable and can be avoided, a significant proportion remained unsure if it causes blindness. This uncertainty underscores the importance of education to differentiate between treatable discomfort and severe vision impairment [18]. Age and family history were acknowledged as potential risk factors. Additionally, the influence of medications and physical diseases like high blood pressure and diabetes were recognized. The diversity of risk factors suggests a need for further education on this condition [19].

Awareness about eye diseases among the participants varied. Dry eye had the highest awareness level, followed by cataract and glaucoma. This underscores the need for improved knowledge dissemination among college students to raise awareness about common eye conditions [20]. The sources of information regarding eye diseases were diverse. The internet emerged as the most significant source, followed by family, friends, and relatives.

The statistically significant associations between knowledge of eye diseases and academic year and college suggest that the curriculum in medical colleges is more effective in imparting knowledge about eye conditions. This finding highlights the potential for incorporating eye health education into the extracurricular campaigns [4].

Family history of cataract positively influenced knowledge of participants. This underscores the role of family in raising awareness and suggests that family medical histories should be used as an educational tool [21]. Conversely, the family history of glaucoma did not significantly impact knowledge. This result indicates that more targeted efforts are required to educate students about the familial risks associated with glaucoma [22].

5. Recommendations

Educational programs should be tailored to address the specific knowledge gaps and misconceptions identified in this study. This includes clarifying risk factors for eye diseases and enhancing awareness of conditions like glaucoma and diabetic retinopathy. Academic institutions should consider integrating eye health topics into their curricula, particularly in non- medical colleges. This integration can include lectures, workshops, or awareness campaigns to ensure students receive essential eye health education. It is crucial to address misconceptions about eye diseases, such as the belief that vision always returns to normal after treatment. Clear and accurate information should be provided to ensure that students have a realistic understanding of these conditions.

Family medical histories can be utilized as a tool to enhance awareness. Encouraging students to discuss their

family medical backgrounds and understand the genetic risks associated with eye diseases can be an effective strategy. Emphasis should be placed on early detection and prevention of eye diseases. Regular eye check-ups and healthy eye habits should be promoted to reduce the incidence of these conditions.

6. Limitations

It is important to acknowledge certain limitations. The research sample primarily consists of college students, which may only fully represent the entire population. The data relies on self-reported information, which can introduce response bias. The research was conducted at a specific university, so the findings might only universally apply to some colleges and universities in Saudi Arabia.

7. Conclusion

A significant proportion of participants exhibited awareness of conditions like dry eye, cataract, and glaucoma; there is room for improvement, as a substantial number remained unaware of these diseases. Study findings underscore the importance of educational interventions to enhance awareness, especially for students in non-medical disciplines. It also highlights the influence of family history on knowledge levels and emphasizes the role of various sources of information, including the Internet and educational channels. These insights can inform targeted eye health education programs for college students.

Conflict of interest

The authors declare no conflict of interest. All authors read and approved the final version of the paper.

Authors Contribution

All authors contributed equally in this paper.

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