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RESEARCH ARTICLE

LEVEL OF AWARENESS AMONG STUDENTS IN TAIF UNIVERSITY TOWARD KERATOCONUS, TAIF, SAUDI ARABIA

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Abstract

Objectives: To determine the level of awareness of keratoconus (KC)among students at Taif University in Taif, Saudi Arabia.

Subjects and Methods:A cross-sectional study was done on 957 students from Taif university, KSAfrom March to August 2021. An online-based survey was done using a pr-designed questionnaire that included items on socio-demographic data, having KC, and awareness about KC.

Results: 33.8% of students heard about KC, 12.7% heard about it from social media, and 29.5% reported that KC is a thin protruded cornea. Almost half 53.6% reported that KC might lead to myopia, 24.6% is related to allergy, 33.9% thought it is hereditary and the majority 49.2% did not know its treatment. The prevalence of poor, fair, and good knowledge regarding KC was 48.9%, 38.1%, and 13% respectively. Femalessignificantlyknewthe relationship between KC and myopia, allergy, and heredity, did not know KC treatment and had good knowledge aboutKCcompared to males. Non-medical students had a significanthigher percent of those who knew that KC is a thin protruded cornea but did not know KC treatment.

Conclusion: This study revealed insufficient knowledge regarding KC among studied students. This is a need to increase awareness about KC through health awareness programs and community campaigns for better eye health.

Introduction:-

Keratoconus (KC) is a corneal thinning condition that affects people of all ages. It is a progressive disorder that usually affects both eyes, but it may also affect only one. However, the progress and severity of the disorder in each eye are usually unequal. As a result of corneal scarring, vision impairment may occur. Family history of keratoconus, eye rubbing, allergy, eczema, and asthma are the most significant risk factors for KC.[1,2] The cause of KC still vague, multifactorial with environmental and genetic factors. [3]

Regarding clinical presentation, patients usually present with blurry vision, mild eye irritation, sensitivity to light, and distorted vision. Regular eye checkups can diagnose KC. There is variation regarding the treatment of KC since it depends on symptoms severity and includes spectacles, contact lenses, collagen cross-linkage, refractive surgery, and keratoplasty. [4]

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Previous studies assessed the prevalence of KC in Saudi Arabia. In the Taif region, the prevalence rate of participants seeking laser vision correction was 8.59%.[5] While in the Hail region, the prevalence was 4 per 100,000 adult population. [6]

In Saudi Arabia, some previous studies assessed the level of awareness regarding KC. A study in Abha conducted among non-medical students showed more than half of its participant had poor awareness.[7] Similarly, three studies conducted among the general population reported that the level of awareness was poor among most participants, 81.3%, 67.5%,63.3%, respectively. [8,9,10]

Since the awareness of KC is considered as a key factor for better utilization of eye health care.[7] This study aimed to determine the level of awareness of KC among students at Taif University in Taif, Saudi Arabia.

Subjects and Methods:-

A cross-sectional study was done in the time study duration from March to August 2021. To assess the level of awareness among students toward KC, Taif, Saudi Arabia. A total of 957 participants involved who are students at Taif university with age ranging from 17-31years, of both genders, from medical and non-medical colleges, of all nationalities who agreed to participate in the study by using a sample size formula.

$$N = \frac{Z_{1-\frac{a}{2}}^2 P(1-P)}{d^2}$$

with a margin of error of 0.05 and a 95% confidence level, a minimum sample of 655 was determined. While students from outside Taif University, graduate students, participants older than 31 years or younger than 17 years, and those who disagreed to participate were excluded.

An online-based survey was done using a pr-designed questionnaire. The questionnaire included items to collect socio-demographic data and questions related to having KC and awareness of the students about KC.[7]In addition to one question to match the study objectives.

The questionnaire included six knowledge questions: 1) have you ever heard about KC? 2) how did you learn about keratoconus? 3) what is KC? 4) do you think is it may lead to myopia? 5) do you think is it related to allergy? And 6) do you think is it hereditary? For every right answer, a score of "1" was given, and for every wrong answer, a score of "0" was given, leaving a total score of 6. Those who had a score less than 50% of the total score were classified as having poor knowledge, those who had a score of 50%-75% were classified as having fair knowledge, and those who had a score > 75% were classified as having good knowledge.

An ethical approval of the present study was obtained from the research ethics committee of Taif university. Data were analyzed using SPSS version 26. Qualitative data were presented as numbers and percentages, and the Chi-squared test ($\chi 2$) was applied to assess the relationship between variables. Quantitative data were presented as mean and standard deviation (Mean ± SD) and where Mann-Whitney and Kruskal Wallis tests were used for non-parametric variables. A p-value of <0.05 was used as statistically significant.

Results:-

(Table 1) shows that the mean age of students was 21.68 ± 1.91years, 54.6% were females, 98% had a Saudi nationality, and 95.4% were single. Of them, 62.4% were from non-medical colleges, and 22.7% were from the faculty of medicine and surgery. Of the participants, 2.4% of students reported that they had KC. (Table 2) shows that 33.8% of students heard about KC, 12.7% heard about it from social media, and 29.5% reported that KC is a thin protruded cornea. Of the students, 53.6% reported that KC might lead to myopia, 24.6% reported that KC is related to allergy, and 33.9% think it is hereditary. Most of the students 49.2% did not know the treatment of KC.

(Table 3) show that female students had a significantly higher percentage of those who knew a relationship between KC and myopia, allergy, and heredity (p=< 0.05). On the other hand, female students had a significantly higher percentage of those who did not know KC treatment (p=<0.05). On the other hand, a non-significant rectorship was found between students' gender and having KC, hearing about KC, and sources of hearing about the (p=> 0.05).

(Table 4) show that non-medical students had a significantly higher percentage of those who had KC, who knew that KC is a thin protruded cornea, and who did not know about KC treatment (p=<0.05). On the other hand, a non-significant rectorship was found between students' college type and all knowledge items related to KC (p=> 0.05).

(Figure 1) shows that 48.9%, 38.1%, and 13% had poor, fair, and good knowledge regarding KC, respectively.
(Table 5) show that females and those who did not have KC had a significantly higher percentage of those who had good knowledge (p=< 0.05). On the other hand, a non-significant relationship was found between the level of knowledge about KC and participants' age, nationality, marital status, and college type (p=> 0.05).

Discussion:-

This study aimed to assess the level of awareness among students in Taif university toward Keratoconus. In this study, nearly one-third only 29.5% define KC as a thin protruded cornea. Likewise in previous studies only (24.2% 34.3% 27.2% 21.4%) respectively defined it correctly. [7,8,9,10]

Regarding the knowledge about the KC risk factor,only 24.6%of our participants think that it's related to allergythis percent is somewhat in agreement with the result revealed from another study as 32.9% of its participant think that KC related to allergy.[8] In contrast to this finding is revealed from the study done in an Abha city, where 9.7% of the participants think that KC related to allergy. In addition, only 33.9% of our participants think it is hereditary. Compared to another study, 21.4% of their participants reported it as hereditary.[7]However, nearly half53.6% of the participants answered correctly that KC might lead to myopia. A similar result was reported in previous studies.[8,9] in contrast, nearly one-third 33.6% answered it correctly.[7]

In our study, 49.2 % of the students replied that they did not know which is recommended treatment for KC and this similar percent revealed from studies done in Abha 51.7%[7] and 42% in Aseer city.[10]

Regarding the source of knowledge, 10.6% only of our participants know about KC from their doctor. Similarly, results were reported in previous studies. [7,8,9,10]Explaining these findings we believe taking the knowledge from the right source is crucial to improve the knowledge and awareness regarding the disease.

Early in the disease, the patient is typically asymptomatic. As the disease progresses, visual acuity decreases, and eventually, the patient notices visual distortion with significant vision loss. These changes are due to the development of irregular astigmatism, myopia, and in many cases, corneal scarring. In addition, the cornea becomes thinner. Early detection and identification of KC risk factors can lead to a better prognosis. As a result, a lack of public awareness has a negative impact on the early identification and treatment of KC. [8]

In this regard, the present study showed that only 13% of our participants had good awareness regarding KC, while almost half of the participants (48.9%) had poor awareness. Similar findings were reported in previous studies in Saudi Arabia, showing that most of its participants had a poor level of awareness regarding KC. [7,8,9,10]This high level of poor awareness could be attributed to the lack of education program among the general population in Saudi Arabia regarding KC since all these studies were conducted in the last two years.

The current study showed a non-significant relationship between the level of awareness about KC and participant's characters and college type. However, a previous study reported that young age (17–21 years) is associated with poor awareness. [7]

In this study, females had a significantly higher percentage of those who had good knowledge in the relationship between KC and myopia, allergy, and heredity .in contrast, Ina previous studypoor awareness was significantly associated with females. [7]On the other hand, another study showed that there are no statistically significant differences between knowledge and gender.[9]

This work found that non-medical students had a significantly higher percentage of those who had KC, who knew that KC is a thin protruded cornea and who did not know about KC treatment, the explanation for that the lack of knowledge among medical students might be the students who answered the questions are from the preclinical years.

Limitation

This study included few limitations, as not including a question regarding in the students' academic years, therefore we could not identify the relationship between the academic year and KC awareness. A response bias may be encountered as the participants were asked to self-report and use a web-based survey tool during the Covid pandemic. A bias population may be present as all were smartphone computer users in the study area**.**

Table 1:- Distribution of studied participants according to their characters (No.:957).

Variable	No. (%)
Age	
≤ 25 years	925 (96.7)
> 25 years	32 (3.3)
Age (mean SD)	21.68 ± 1.91
Gender	
Female	523 (54.6)
Male	434 (45.4)
Nationality	
Saudi	938 (98)
Non-Saudi	19 (2)
Marital status	
Widow	2 (0.2)
Single	913 (95.4)
Married	37 (3.9)
divorced	5 (0.5)
College	
Medical	360 (37.6)
Non-medical	597 (62.4)
College of Business Administration	124 (12.9)
college of Literature	79 (8.3)
Faculty of Education	41 (4.3)
College of Design and Applied Arts	16 (1.7)
Faculty of Computing and Information Technology	75 (7.8)
College of Sharia and Regulations	54 (5.6)
faculty of Pharmacy	30 (3.1)
Faculty of Medicine and Surgery	217 (22.7)
College of Science	123 (12.9)
College of Health Sciences	113 (11.8)
College of Engineering	71 (7.4)
Other	14 (1.5)

Table 2:- Distribution of studied participants according to their knowledge about the disease (No.:957).

Variable	No. (%)
Have you ever heard about KC?	
No	634 (66.2)
Yes	323 (33.8)
How did you learn about keratoconus?	
The doctor	101 (10.6)
Friends and relatives	154 (16.1)
Social media	122 (12.7)
I do not know	580 (60.6)
What is KC?	
Corneal inflammation	65 (6.8)
Increase thickness of cornea	88 (9.2)
Thin protruded cornea	282 (29.5)
Immunological diseases	15 (1.6)

I do not know	507 (53)
Do you think is it may lead to myopia?	
No	30 (3.1)
I do not know	414 (43.3)
Yes	513 (53.6)
Do you think is it related to allergy?	
No	209(21.8)
I do not know	513 (53.6)
Yes	235 (24.6)
Do you think is it hereditary?	
No	154 (16.1)
I do not know	479 (50)
Yes	324 (33.9)
How to treat it?	
Surgical intervention	343(35.8)
Contact lens	48 (5.8)
Eye drops	40 (4.2)
Glasses	55 (5.8)
I do not know	471 (49.2)

Table 3:- Relationship between participants' gender and having KC and knowledge about the disease (No.:957).

Variable	Female No. (%)	Male No. (%)	$\chi 2$	p-value
Do you have keratoconus?				
No	12 (52.2)	11 (47.8)	4.17	0.124
I do not know	381 (56.8)	290 (43.2)		
Yes	130 (49.4)	133 (50.6)		
Have you ever heard about KC?				
No			0.04	0.834
Yes	205 (49.2)	173 (45.8)		
	318 (54.9)	261(45.7)		
How did you learn about keratoconus?				
The doctor	59 (58.4)	41 (41.6)	1.6	0.658
Friends and relatives	78 (50.6)	67 (49.4)		
Social media	67 (54.9)	55 (45.1)		
I do not know	319 (55)	261 (45)		
What is KC?				
Corneal inflammation	30 (46.2)	35 (53.8)		
Increase thickness of cornea	51 (58)	37 (42)	14.52	**0.006**
Thin protruded cornea	177 (62.8)	105 (37.2)		
Immunological diseases	10 (66.7)	5 (33.3)		
I do not know	255 (50.3)	252 (49.7)		
Do you think is it may lead to myopia?				
No	13 (43.3)	17 (56.7)	13.29	**0.001**
I do not know	202 (48.8)	212 (51.2)		
Yes	308 (60)	205 (40)		
Do you think is it related to allergy?				
No	136 (65.1)	73 (34.9)	23.2	**<0.001**
I do not know	244 (47.6)	269 (52.4)		
Yes	143 (60.9)	92 (39.1)		
Do you think is it hereditary?				
No	91 (59.1)	63 (40.9)	18.64	**<0.001**
I do not know	229 (47.8)	250 (52.2)		
Yes	203 (62.7)	121 (37.3)		
How to treat it?				

Surgical intervention	206 (60.1)	137 (39.3)	10.94	**0.027**
Contact lens	24 (50)	24 (50)		
Eye drops	17 (42.5)	23 (57.5)		
Glasses	35 (63.6)	20 (36.4)		
I do not know	241 (51.2)	230 (48.8)		

Table 4:- Relationship between participants' college and their knowledge about the disease (No.:957).

Variable	College		$\chi 2$	p-value
	Medical No. (%)	Non-medical No. (%)		
Do you have keratoconus?				
No	10 (43.5)	13 (56.5)	16.24	**<0.001**
I do not know	278 (41.4)	393 (58.6)		
Yes	72 (27.4)	191 (72.6)		
Have you ever heard about KC?				
No	142 (37.6)	236 (62.4)	0.001	0.979
Yes	218 (37.7)	361 (62.3)		
How did you learn about keratoconus?				
The doctor or MOH	42 (41.6)	59 (58.4)		
Friends and relatives	48 (31.2)	106 (68.8)	4.32	0.22
Social media	51 (41.8)	71 (58.2)		
I do not know	219 (37.8)	361 (62.2)		
What is KC?				
Corneal inflammation	15 (23.1)	50 (76.9)		
Increase thickness of cornea	38 (43.2)	50 (56.8)	25.6	
Thin protruded cornea	135 (47.9)	147 (52.1)		**<0.001**
Immunological diseases	3 (20)	12 (80)		
I do not know	169 (33.3)	338 (66.7)		
Do you think is it may lead to myopia?				
No	9 (30)	21 (70)	3.79	0.15
I do not know	144 (34.8)	270 (65.2)		
Yes	207 (40.4)	306 (59.6)		
Do you think is it related to allergy?				
No	92 (44)	117 (56)	4.75	0.093
I do not know	182 (35.5)	331 (64.5)		
Yes	86 (36.6)	149 (63.4)		
Do you think is it hereditary?				
No	58 (37.7)	96 (62.3)	0.32	0.849
I do not know	184 (38.4)	295 (61.6)		
Yes	118 (36.4)	206 (63.6)		
How to treat it?				
Surgical intervention	145 (42.3)	198 (57.7)	12.02	**0.013**
Contact lens	18 (37.5)	30 (62.5)		
Eye drops	6 (15)	34 (85)		
Glasses	22 (40)	33 (60)		
I do not know	169 (35.9)	302 (64.1)		

Figure 1:- Percentage distribution of students according to their knowledge level about KC.

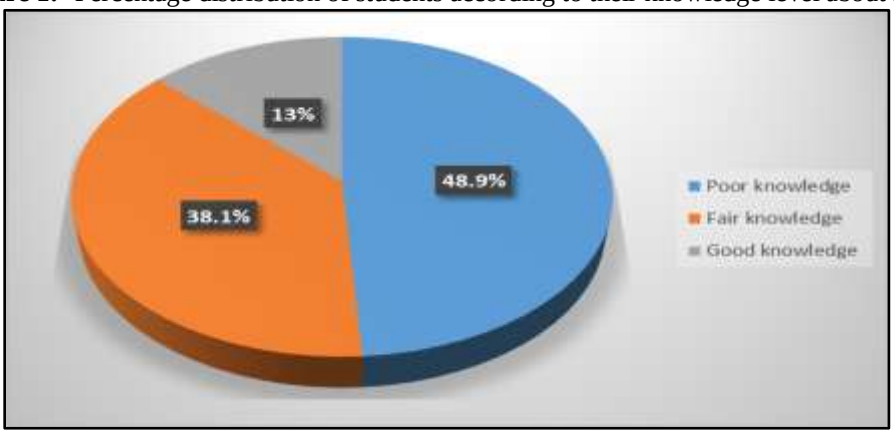

Table 5:- Relationship between participants' characters and their knowledge level (No.:957).

Variable	Knowledge level			$\chi 2$	p-value
	Poor No. (%)	Fair No. (%)	Good No. (%)		
Age					
≤ 25 years	447 (48.3)	355 (38.4)	123 (13.3)	4.77	0.092
> 25 years	21 (65.6)	10 (31.3)	1 (3.1)		
Age (mean SD)	21.71 ± 2.04	21.7 ± 1.89	21.55± 1.46	2*	0.723
Gender					
Female	229 (43.8)	220 (42.1)	74 (14.1)	12.09	**0.002**
Male	239 (55.1)	145 (33.4)	50 (11.5)		
Nationality					
Saudi	460 (49)	354 (37.7)	124 (13.2)	4.67	0.96
Non-Saudi	8 (42.1)	11 (57.9)	0 (0.0)		
Marital status					
Unmarried	448 (48.7)	349 (37.9)	123 (13.4)	3.59	0.166
Married	20 (54.1)	16 (43.2)	1 (2.7)		
College					
Medical	161 (44.7)	144 (40)	55 (15.3)	4.98	0.083
Non-medical	307 (51.4)	221 (37)	69 (11.6)		
Do you have keratoconus?	1 (4.3)	15 (65.2)	7 (30.4)	56.68	< **0.001**
No	299 (44.6)	266 (39.6)	106 (15.8)		
I do not know	168 (63.9)	84 (31.9)	11 (4.2)		
Yes					

Conclusion:-

In this study, the prevalence of poor knowledge regarding KC was 48.9%. Non-medical students had a significantly larger percentage of those who were aware that KC is a thin protruding cornea but were unaware of the treatment options.Due to the lack of understanding of KC among the students surveyed, it is necessary to raise awareness about KC through health awareness programs and community campaigns to improve eye health.

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Conflict of interest

None.

Ethical approval
Registered at Taif university research Ethical committeebetweenApril 2021 to April 2022 (Application number 42-153)

Authors contributions
All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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