

# Assessment of Knowledge and Awareness of Ocular Allergy Among Undergraduate Students, University of Tabuk, Tabuk City, Saudi Arabia

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## ABSTRACT

**Background:** Proper knowledge and awareness of university students about ocular allergy may help in decreasing the illness duration or even prevent it.

**Objectives:** To assess the knowledge and awareness among University of Tabuk students.

**Material and Method:** This descriptive cross-sectional study was conducted at the University of Tabuk, Tabuk city, Saudi Arabia among a random sample of undergraduate students from all faculties. Data were collected using self-administered online questionnaire established electronically on Google documents.

**Results:** The study included 382 students. Their age ranged between 18 and 48 years with a mean  $\pm$ SD of  $21.2 \pm 2.5$  years. They were distributed between Medical/paramedical colleges (28%), scientific colleges (33.5%) and theoretical colleges (38.5%). History of ocular allergy was reported by 20.2% of them. One hundred fifteen students (30.1%) have heard about ocular allergy. The main source of their information regarding ocular allergy was the internet (50.4%). About two-thirds of the students knew correctly the eye structures involved in ocular allergy (67.8%) and that the best way to prevent ocular allergy is to avoid the source of trigger (61%). On the other hand, minority of them (11.3%) knew the medications used for treating ocular allergy. Overall, sufficient knowledge regarding

ocular allergy was observed among 19.1% of the participants. Older students and those of sixth academic level were more knowledgeable about ocular allergy compared to their counterparts.

**Conclusion:** The level of awareness and knowledge of ocular allergy was insufficient among Tabuk University students in the Kingdom of Saudi Arabia. Therefore, great effort should be made by authorized persons in improving awareness and knowledge regarding this relatively common community problem in order to reduce its impact on the quality of life and academic achievement of students.

**Keywords:** Ocular, Allergy, University, Students, Knowledge.

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## INTRODUCTION

Ocular allergy (Allergic Conjunctivitis AC) is a spectrum of disorders that involve abnormal inflammatory response of the conjunctiva to ordinarily harmless antigens.<sup>1</sup> Major types of AC include seasonal allergic conjunctivitis (SAC), perennial allergic conjunctivitis (PAC) and giant papillary conjunctivitis (GPC) which considered to be non-sight threatening. Less common but more severe types are vernal keratoconjunctivitis (VKC) and atopic keratoconjunctivitis (AKC) as they may jeopardize the vision by causing corneal ulcers and scarring.<sup>1</sup> Watery eyes and itching correspond for the most frequent complaints of AC (88%), followed by redness (78%), soreness (75%), swelling (72%) and stinging (65%).<sup>1</sup> Globally several studies have estimated the prevalence of ocular allergies to be 5% to 40% of the overall population.<sup>1,2</sup> However, AC prevalence is believed to be higher as Amir A et al. reported that only 10% of sufferers seek medical

attention.<sup>2</sup> In a survey of medical practitioners from Eastern Europe and the Middle East, they concluded that AC was the most frequent diagnosis among patients presenting with red eyes (35%).<sup>3</sup> AC sustains a significant burden on the sufferers. It almost invariably affects their ocular and general quality of life remarkably changing their work performance and productivity as well as carrying an enormous economic load.<sup>4</sup> A previous study among university students in Ghana suggested that knowledge and awareness towards Ocular allergy were not up to the mark, as only (34.7%) of the students were aware of ocular allergy.<sup>5</sup> Moreover, universities students play a pivotal role in spreading awareness toward their communities. Proper knowledge and awareness may help in decreasing the illness duration or even prevent it. Therefore, this study aims to assess the knowledge and awareness among University of Tabuk students.

**MATERIALS AND METHODS**

This study was conducted at the University of Tabuk, Tabuk city, Saudi Arabia. A random sample of undergraduate students from all faculties was invited to participate in the study. It was carried out as a descriptive cross-sectional, questionnaire-based study.

A validated self-administered online questionnaire was distributed among undergraduate students. Multiple choice and true-false questions were framed to obtain information about respondents' knowledge and awareness about ocular allergy along with their demographic characteristics such as age and gender, year of study, and college major.

Based on a previous study the prevalence of ocular allergy has reached up to 40%<sup>4</sup>, and at 95% level of confidence with an assumed precession of 5%, the minimum sample size required is 369 Subjects.

Data were collected using self-administered online questionnaire established electronically on Google documents.<sup>6</sup> The questionnaire was anonymous targeting currently enrolled students from the various colleges of the university. The link was distributed with the help of the representative of each college on social networks. The script was presented in Arabic for easy understanding and convenience of the study participants. It took about 4 to 6 minutes.

Coding book was prepared for entering the data. Variables such as gender were scaled using the binary options zero and one. The continuous values such as age were identified as a number and unit. Variables that are impossible, incorrect, irrelevant or outlier (e.g., an age of 250) were identified and corrected prior to initiation of statistical analysis.

Respondents were identified and demographic data such as (age, gender, year of study, college major) and health history including chronic illnesses, eye diseases, personal or family history of allergy will be gathered in the first part.

The second part consisted of 22 items aiming to measure the awareness and knowledge of ocular allergy. Having heard of ocular allergy was defined as "awareness" and having some understanding of ocular allergy were defined as knowledge. Right answers were assigned a score of "1" whereas wrong or missed answered were assigned a score of "0". The total knowledge score was computed by adding scores. The knowledge percentage score was estimated. Students scored below 60% were considered having "insufficient knowledge" whereas those scored 60% and more were considered having "sufficient knowledge. Continuous variables such as age were summarized in terms of the mean and standard deviation. While the categorical variables such as gender, college major were summarized and reported regarding the frequency distribution. Chi-square test was utilized to test for the association between categorical level of knowledge and possible associated factors. Statistical Package for Social Sciences software (SPSS), version 22 was used for data entry and statistical analysis and a p-value less than 0.05 was considered for statistical significance level.

**RESULTS**

The study included 382 students. Their age ranged between 18 and 48 years with a mean  $\pm$ SD of 21.2 $\pm$ 2.5 years. Their background characteristics are summarized in table 1. Almost two-thirds (68.8%) were females. They were distributed between Medical/paramedical colleges (28%), scientific colleges (33.5%) and theoretical colleges (38.5%). About one-third of them (30.4%) were recruited from 4th academic level. Only 11.8% had a history of chronic diseases. Approaching one-third of them had a personal history (34%) and/or family history (34.3%) of allergy. Past-history of eye diseases was reported by 44% of the participants whereas a history of ocular allergy was reported by 20.2% of them.

**Table 1: Background characteristics of the participants (n=382)**

		Frequency	Percentage
<b>Gender</b>	<b>Male</b>	119	31.2
	<b>Female</b>	263	68.8
<b>Age in years</b>	<b>≤22</b>	327	85.6
	<b>&gt;22</b>	55	14.4
<b>College</b>	<b>Medical/paramedical</b>	107	28.0
	<b>Scientific</b>	128	33.5
	<b>Theoretical</b>	147	38.5
<b>Academic level</b>	<b>Preparatory</b>	26	6.8
	<b>1<sup>st</sup></b>	55	14.4
	<b>2<sup>nd</sup></b>	52	13.6
	<b>3<sup>rd</sup></b>	116	30.4
	<b>4<sup>th</sup></b>	64	10.8
	<b>5<sup>th</sup></b>	37	9.7
	<b>6<sup>th</sup></b>	32	8.4
<b>History of chronic diseases</b>	<b>No</b>	337	88.2
	<b>Yes</b>	45	11.8
<b>Personal history of allergy</b>	<b>No</b>	252	66.0
	<b>Yes</b>	130	34.0
<b>Family history of allergy</b>	<b>No</b>	251	65.7
	<b>Yes</b>	131	34.3
<b>Past-history of eye diseases</b>	<b>No</b>	214	56.0
	<b>Yes</b>	168	44.0
<b>History of ocular allergy</b>	<b>No</b>	305	79.8
	<b>Yes</b>	77	20.2

**Table 2: Responses of the participants to knowledge questions about ocular allergy (n=382)**

Questions	Right answer	
	No.	%
▪ Does ocular allergy affect millions of people worldwide each year? <b>YES</b>	176	46.1
▪ Could ocular allergy lead to visual loss? <b>YES</b>	184	48.2
▪ Ocular allergy is one of the most common eye conditions encountered by General Practitioners as well as eye care practitioners <b>TRUE</b>	125	32.7
▪ Majority of people who have ocular allergy experience itching as the primary source of discomfort <b>TRUE</b>	268	70.2
▪ What is your understanding of ocular allergy? <b>Inflammation of the eye in response to harmless foreign substance/Discomfort and pains within the eye</b>	294	77.0
▪ Eye structures involved in ocular allergy include <b>Conjunctiva, cornea, limbus, eyelid</b>	259	67.8
▪ Are ocular allergies transmitted from person to person? <b>NO</b>	147	38.5
▪ What is the best way to prevent ocular allergy? <b>Avoid the source of triggers</b>	233	61.0
▪ Do you know substances that trigger allergies in the eye? <b>YES</b>	119	31.2
▪ Do you know of medications used for treating ocular allergy? <b>YES</b>	43	11.3
▪ Some eye allergies are inherited <b>TRUE</b>	141	36.9
▪ Smoking is a risk factor for ocular allergy <b>TRUE</b>	116	30.4
▪ Knowledge of signs and symptoms of ocular allergy <b>Redness, itching, discharge, blurred vision, photophobia and tearing</b>		
≤3	204	53.4
>3	178	46.6
▪ Knowledge of the forms of ocular allergy <b>Seasonal, vernal, perennial and atopic conjunctivitis</b>		
≤2	317	83.0
>2	65	17.0

**Table 3: Factors associated with knowledge of Tabuk University students regarding ocular allergy.**

		Level of knowledge		χ <sup>2</sup> (p-value)
		Insufficient N=309 N (%)	Sufficient N=73 N (%)	
Gender	Male (n=119)	99 (83.2)	20 (16.8)	0.59 (0.441)
	Female (n=263)	210 (79.8)	53 (20.2)	
Age in years	≤22 (n=327)	278 (85.0)	49 (15.0)	25.0 (<0.001)
	>22 (n=55)	31 (56.4)	24 (43.6)	
College	Medical/paramedical (n=107)	87 (81.3)	20 (18.7)	0.03 (0.987)
	Scientific (n=128)	103 (80.5)	25 (19.5)	
	Theoretical (n=147)	119 (81.0)	28 (19.0)	
Academic level	Preparatory	23 (88.5)	3 (11.5)	26.42 (<0.001)
	1 <sup>st</sup> (n=26)	49 (89.1)	6 (10.9)	
	2 <sup>nd</sup> (n=55)	43 (82.7)	9 (17.3)	
	3 <sup>rd</sup> (n=52)	104 (89.7)	12 (10.3)	
	4 <sup>th</sup> (n=116)	44 (68.8)	20 (31.3)	
	5 <sup>th</sup> (n=64)	27 (73.0)	10 (27.0)	
	6 <sup>th</sup> (n=32)	19 (59.4)	13 (40.6)	
History of chronic diseases	No (n=327)	277 (82.2)	60 (17.8)	3.16 0.076
	Yes (n=45)	32 (71.1)	13 (28.9)	
Personal history of allergy	No (n=252)	207 (82.1)	45 (17.9)	0.75 (0.386)
	Yes (n=130)	102 (78.5)	28 (21.5)	
Family history of allergy	No (n=251)	204 (81.3)	47 (18.7)	0.07 (0.791)
	Yes (n=131)	105 (80.2)	26 (19.8)	
Past-history of eye diseases	No (n=214)	173 (80.8)	41 (19.2)	0.001 (0.978)
	Yes (n=168)	136 (81.0)	32 (19.0)	
History of allergic conjunctivitis	No (n=305)	249 (81.6)	56 (18.4)	0.55 (0.458)
	Yes (n=77)	60 (77.9)	17 (22.1)	

One hundred fifteen students (30.1%) have heard about ocular allergy as illustrated in figure 1. The main source of their information regarding ocular allergy was the internet (50.4%), followed by friends/relatives (42.6%), mass media (22.6%), school curriculum (18.3%) and ophthalmologist (17.4%). (Figure 2)

Table 2 shows that most of the participants (77%) understood what is meant by ocular allergy and 70.2% of them could recognize that majority of people who have ocular allergy experience itching as the primary source of discomfort. About two-thirds of the students knew correctly the eye structures involved in

ocular allergy (67.8%) and that the best way to prevent ocular allergy is to avoid the source of trigger (61%). On the other hand, minority of them (11.3%) knew the medications used for treating ocular allergy.

More than half of the participants (53.4%) knew three or less of the main signs and symptoms of ocular allergy and only 17% knew more than two of the forms of ocular allergy. Overall, sufficient knowledge regarding ocular allergy was observed among 19.1% of the participants as displayed in figure 3.

From table 3, it is seen that older students (aged over 22 years) were more knowledgeable about ocular allergy compared to younger students (43.6% versus 15%) had sufficient knowledge. This difference was statistically significant,  $p < 0.001$ . Similarly, students of the sixth academic level were more knowledgeable about ocular allergy compared to those of preparatory or 1<sup>st</sup> year level (40.6% versus 11.5% and 10.9%) had sufficient knowledge, respectively,  $p < 0.001$ . Other studied factors were not significantly associated with students' knowledge regarding ocular allergy.

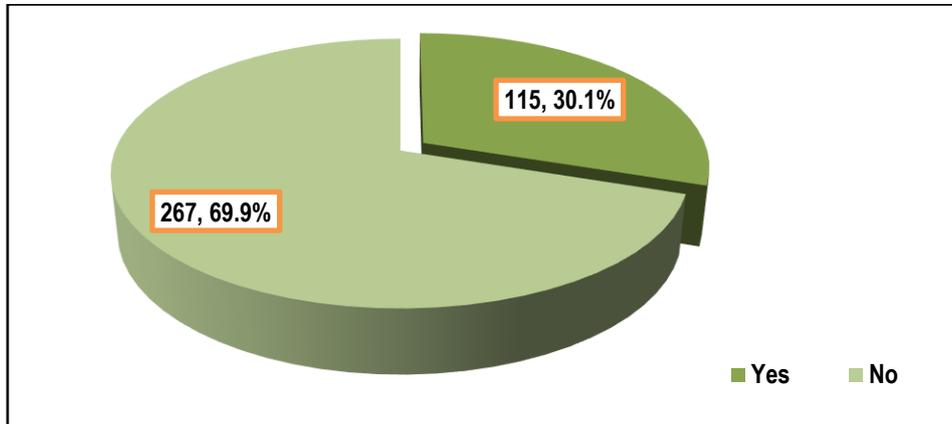


Figure 1: Hearing about ocular allergy among Tabuk University students, Saudi Arabia

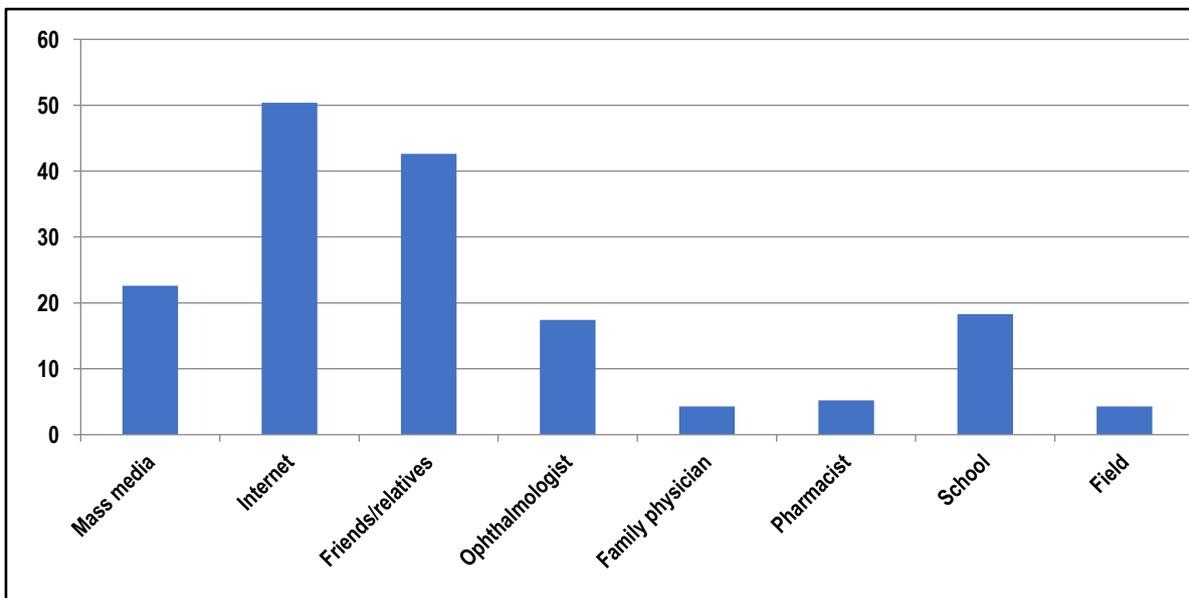


Figure 2: Source of information about ocular allergy among Tabuk University students, Saudi Arabia

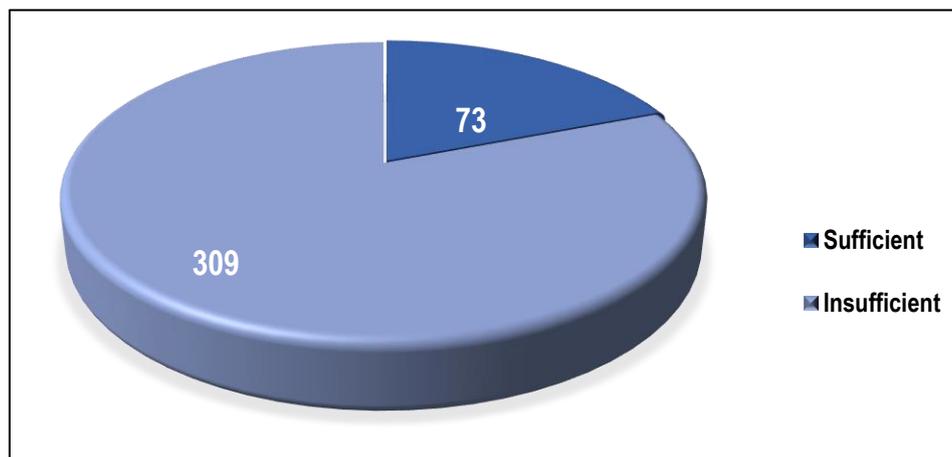


Figure 3: Overall knowledge of the Tabuk University students regarding ocular allergy.

## DISCUSSION

In the last few decades, there is an apparent increase in allergic diseases with a considerable percentage of the world's population suffering ocular allergies.<sup>2</sup> Sufficient knowledge and awareness of the public about ocular allergy may help in reducing the illness burden. Therefore, this study was carried out to assess the knowledge and awareness among University of Tabuk students, who can disseminate the knowledge to the whole community.

This study included students from different colleges in the university; medical, scientific and theoretical colleges. However, there was no difference between them regarding knowledge of different aspects of ocular allergy, although it was hypothesized that students of medical colleges would be more knowledgeable.<sup>5</sup> This could be attributed to the fact that ocular allergy is not considered a top priority eye problem and therefore has not received sufficient attention as glaucoma and cataract, even among medical students despite its adverse symptoms and complications.<sup>7</sup>

In the present study, 77% of the students could correctly define ocular allergy as inflammation of the eye in response to harmless foreign substance/ with discomfort and pains within the eye. In a similar study carried out in Ghana among public university students, 55.9 % of students knew the correct definition of ocular allergy.<sup>5</sup>

Regarding main signs and symptoms of ocular allergy such as redness, itching, discharge, photophobia, blurred vision and tearing, less than half of the students (46.6%) could recognize more than three of them. Most of the students in this study (70.2%) recognized that majority of people who have ocular allergy experienced itching as the primary source of discomfort. In a study conducted in Ghana<sup>5</sup>, itching was the most recognized symptom whereas photophobia was the least recognized one. It has been documented that itching is typical of ocular allergy and diagnosis without the ocular itching is always problematic.<sup>8-10</sup>

In the present study, less than one-third (31.2%) of the students knew the agents which trigger the allergic reaction. In a study carried out in Ghana<sup>5</sup>, a higher percentage was reported (42.1%). This finding indicates that the knowledge of the students is suboptimal as knowledge of allergy triggers is the key element in prevention and control of ocular allergy.<sup>11,12</sup> However, 61% of them knew that the best way to prevent ocular allergy is avoiding the source of allergy triggers. A close figure has been reported from Ghana (55.9%).<sup>5</sup>

It has been reported that the ideal non-pharmacological approach to prevention of allergic of eye disease is the avoidance of allergens, despite the challenges it causes due to the lack of consistence on the distributions and density of these triggers among the population.<sup>13</sup>

In the present study, a minority of the participants (11.3%) could identify drugs used in the treatment of ocular allergy and were mainly from medical colleges. Slightly higher figure (21.3%) has been reported in a study carried out in Ghana among University students.<sup>5</sup>

In this study, the main source of the students' information regarding ocular allergy was the internet (50.4%), followed by friends/relatives (42.6%), mass media (22.6%), school curriculum (18.3%) and ophthalmologist (17.4%). In a study conducted in Ghana<sup>5</sup>, media and the Internet were the main sources of information about ocular allergy, followed by information from eye

care providers, and finally family and friends. There is a need to create a formal educational program at both the University and the primary care levels to increase awareness and knowledge of the university students and the general public about the ocular allergy. It has been reported from a study carried out in Ghana that people who obtain their information from media and internet expressed a lower level of knowledge regarding ocular allergy compared to those obtained their information from the ophthalmologist.<sup>5</sup> In the present study, since a great majority of the study subjects reported multiple sources of information, we could not compare individual sources of information.

This study has some limitations. Among them is the utilization of a self-administered questionnaire which subjected to bias. Second, a collection of data through an online approach which could affect the generalizability of results. The third is the cross-sectional design of the study which proves only association and not causality. However, the study has some strength such as the sufficient sample size and the inclusion of students from different colleges.

From the present study, it can be concluded that the level of awareness and knowledge of ocular allergy was insufficient among Tabuk University students in the Kingdom of Saudi Arabia, with no significant difference between medical and non-medical colleges. Therefore, great effort should be made by authorized persons in improving awareness and knowledge regarding this relatively common community problem in order to reduce its impact on the quality of life and academic achievement of students.

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