

# Awareness of glaucoma in the western region of Saudi Arabia

Nawaf Almarzouki<sup>1</sup>

<sup>1</sup>Department of Ophthalmology, King Abdulaziz University Hospital, Jeddah, Saudi Arabia

\*Corresponding author: [nawaf.almarzouki@gmail.com](mailto:nawaf.almarzouki@gmail.com)

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## Abstract

**Aim:** To evaluate the awareness about glaucoma among adults and its related health problems in Jeddah, western region of Saudi Arabia and to assess the relationship between the awareness and knowledge about glaucoma across the socio-demographic characteristics. This will help to develop educational and screening programs of glaucoma which could help in early detection and diagnosis of the disease therefore reducing its sight threatening outcomes.

**Methods:** A descriptive, cross-sectional study which included a sample of 608 adults in June 2019. Participants took part filling in the online multiple-choice socio-demographic and glaucoma awareness questionnaire. **Results:** The mean age of the participants was 28.3 years  $\pm$ 11.4 with (59.2%) males and (40.8%) females. The majority of the respondents 70.9% were single and the majority had a bachelor's degree. Overall, 66.3% of the participants had knowledge about glaucoma, whereas 33.7% had no previous knowledge about glaucoma. Significant association between higher educational level and awareness of glaucoma was ( $P= 0.024$ ). Females and age group ( $\geq 40$ ) also showed significant associations with glaucoma awareness ( $P= <0.0001$  and  $P= <0.0001$  respectively). 58% of the aware group suffering from glaucoma and 36% has a family history or relatives diagnosed with glaucoma. High IOP and old age were the main risk factors chosen by the participants (74.2% and 72.5% respectively). The majority of the aware group reported that glaucoma can result in blindness and could be preventable.

**Conclusion:** Assessing the glaucoma awareness in this study, the outcomes showed that majority had good knowledge of glaucoma. Larger surveys which include all cities of the country are suggested to assess the level of awareness and helps in establishing proper educational and screening programs.

**Keywords:** Awareness, Glaucoma, Knowledge, Saudi Arabia

## 1. Introduction

Glaucoma is a condition affecting the optic nerve. It usually occurs when fluid builds up in the anterior chamber, which elevates the intraocular pressure (IOP) and damage the optic nerve [1]. Glaucoma progression is closely related to elevation in the IOP [2]. Furthermore, glaucoma is considered the second most common cause of bilateral blindness worldwide, representing 14% of the blind population [3-6]. Therefore, raising awareness about Glaucoma had become of a great importance.

Having “awareness” of glaucoma means that a person has a pervious knowledge about the disease or any proper understanding of the disease [7]. Being aware about glaucoma can increase the chance of identifying undetected cases, as glaucoma advances gradually, with few or no recognizable symptoms in the early stage [7,8]. This Mindfulness about glaucoma and other eye diseases, as well as the appropriate treatment and the

need for regular follow-up with an eye care provider, can play a significant role in the prevention of irreversible visual impairment from eye diseases such as glaucoma [5, 9, 10].

A study in Chennai, India, revealed that the level of awareness was generally low, and that highly educated people had more knowledge about glaucoma than did people with limited education [11]. In addition, a study done in Hyderabad, in southern India, to assess knowledge about eye diseases showed that awareness of cataract was 69.8%, of night blindness was 60.0%, and of diabetic retinopathy was 27.0%, whereas awareness of glaucoma was very poor 2.3% [12]. Moreover, a study done in Riyadh, Saudi Arabia, showed that knowledge of glaucoma was poor compared with knowledge of other eye problems [13]. However, few reports have been done in our region about chronic eye diseases, and glaucoma was the least disease to be aware of in comparison with other diseases [13]. Therefore, the aim of this study was to assess the awareness of glaucoma and its related health issues among adults in the western region of Saudi Arabia.

## 2. Material and methods

A descriptive, cross-sectional study took place at King Abdulaziz University Hospital (KAUH) in Jeddah, Saudi Arabia, in June 2019. The study was approved by the Ethics Committee at King Abdulaziz University Hospital. This study adhered to the tenets of the Declaration of Helsinki.

The study comprised of a sample size of 608 adults. Inclusion criteria were participants who were from Jeddah and at least 20 years of age. Participants completed Arabic, online self-report Google-form questionnaire, within which online consent was obtained. The questionnaire was composed of three sections of multiple-choice questions, all of which with single answer except single question about risk factors they could choose multiple answers, each question in the third section has (I don't know) answer. The first section contained questions regarding socio-demographic details, as follows: age, sex, marital status, education status, area of accommodation as which region and city in Kingdom of Saudi Arabia, in addition to a question about working in the medical field. The second section consisted of questions regarding awareness of glaucoma, and general and eye health. The third section included questions that assessed knowledge about glaucoma. This questionnaire was shared via WhatsApp, Twitter, and Telegram.

Data entry was performed using Google Sheet, and statistical analysis was performed with Statistical Package for the Social Sciences (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp) using chi-square tests.

## 3. Results

A total of 608 adults living in Jeddah were included in this study. The mean age of the participants was 28.3 years  $\pm$ 11.4 (range 20–77 years old). There were 360 (59.2%) males and 248 (40.8%) females. The majority of the respondents 70.9% were single, and most of them had at least a bachelor's degree. Only 33.2% of the respondents had worked, or were still working, in the medical field. Table 1 and Table 2 show the results of the research.

Table 1. Demographics

Variables	Frequency (n=608)	Percent (%)	
<b>Gender</b>	Male	360	59.2
	Female	248	40.8
<b>Educational Degree</b>	less than high school	5	.8
	high school	182	29.9
	diploma	41	6.7
	bachelor	344	56.6
	high educated	36	5.9
<b>Age Group</b>	<40	502	82.6
	$\geq$ 40	106	17.4

Table 2. Awareness and knowledge about Glaucoma in comparison to age group and gender

	Total	Gender		p value	Age Group		P value
		Male	Female		<40	≥40	
Have you ever heard of glaucoma? (yes)	403	211(52.4%)	192(47.6%)	<0.0001	314(77.9%)	89(22.1%)	<0.0001
Where did you first hear about glaucoma (News Media)	181	91(50.3%)	90(49.7%)	0.512	128 (70.7%)	53(29.3%)	<0.05
Where did you first hear about glaucoma (Brochures/ posters)	83	47(56.6%)	36(43.4%)	0.453	59(71.1%)	24(28.9%)	0.124
Where did you first hear about glaucoma (health workers)	82	41(50%)	41(50)	0.723	69(84.1%)	13(15.9%)	0.169
Where did you first hear about glaucoma (People with glaucoma)	215	124(57.7%)	91(42.3%)	<0.05	190(88.4%)	25(11.6%)	<0.001
How would you explain glaucoma? (High eye pressure damaging eye)	234	109(46.6%)	125(53.4%)	<0.05	173(73.9%)	61(26.1%)	<0.05
How would you explain glaucoma? (Causes damage to the eye nerve)	200	98(49%)	102(51%)	0.606	174(87%)	26(13%)	<0.0001
How would you explain glaucoma? (Causing visual field loss)	38	21(55.3%)	17(44.7%)	0.606	31(81.6%)	7(18.4%)	<0.0001
Do you have family member with glaucoma?	123	68(55.3%)	55(44.7%)	0.606	81(65.9%)	42(34.1%)	<0.0001
Have you examined your eyes? (yes)	147	64(43.5%)	83(56.5%)	<0.05	108(73.5%)	39(26.5%)	0.121
Do you have glaucoma? (yes)	348	194(55.7%)	154(45.3%)	0.054	277(79.6%)	71(20.4%)	<0.05
Do you have hypertension currently? (yes)	11	6(54.5%)	5(45.5%)	0.0001	6(54.5%)	5(45.5%)	<0.05
Do you have diabetes mellitus currently?	37	22(59.5%)	15(40.5%)	0.111	15(40.5%)	22(59.5%)	<0.0001
Can glaucoma occur without symptom?	25	14(56%)	11(44%)	0.315	7(28%)	18(72%)	<0.0001
What are the risk factors for glaucoma? (High eye pressure)	131	74(56.5%)	57(43.5%)	0.061	102(77.9%)	29(22.1%)	0.187
What are the risk factors for glaucoma? (Family history of glaucoma)	361	187(51.8%)	174(48.2%)	<0.0001	294(81.4%)	67(18.6%)	0.708
What are the risk factors for glaucoma? (Black race)	357	189(52.9%)	168(47.1%)	<0.0001	283(79.3%)	74(20.7%)	<0.05
What are the risk factors for glaucoma? (Steroid usage)	267	134(50.2%)	133(49.8%)	<0.0001	213(79.8%)	54(20.2%)	0.272
Is blindness from glaucoma preventable?	122	71(58.2%)	51(41.8%)	0.176	107(87.7%)	15(12.3%)	0.244
Is glaucoma curable? (yes)	37	18(48.6%)	19(51.4%)	<0.05	32(86.5%)	5(13.5%)	0.685
When does glaucoma affect vision? (As soon as it starts)	100	53(53%)	47(47%)	0.356	91(91%)	9(9%)	<0.05
When does glaucoma affect vision? (In the late stage)	301	163(54.2%)	138(45.8%)	<0.05	244(81.1%)	57(18.9%)	0.644
Can glaucoma cause blindness? (yes)	238	139(58.4%)	99(41.6%)	0.109	184(77.3%)	54(22.7%)	<0.001
Is glaucoma treatable? (yes)	50	22(44%)	28(56%)	<0.001	32(64%)	18(36%)	<0.001
What treatments do you know? (Medicines – eye drops)	299	149(49.8%)	150(50.2%)	<0.001	242(80.9%)	57(19.1%)	<0.001
What treatments do you know? (Surgery)	352	182(51.7%)	170(48.3%)	0.0001	284(80.7%)	68(19.3%)	0.375
What treatments do you know? (Radiation/laser)	394	209(53%)	185(47%)	0.0001	315(79.9%)	79(20.1%)	0.054
What is the purpose glaucoma treatment? (To restore vision)	242	124(50%)	124(50%)	<0.05	212(85.5%)	36(14.5%)	<0.05
What is the purpose glaucoma treatment? (To delay progression)	334	180(53.9%)	154(46.1%)	<0.05	262(78.4%)	72(21.6%)	<0.05
Is glaucoma damage reversible via treatment? (yes)	220	115(52.3%)	105(47.7%)	<0.05	181(82.3%)	39(17.7%)	0.867
Is glaucoma heritable from families? (yes)	229	126(55%)	103(45%)	<0.0001	178(77.7%)	51(22.3%)	<0.05
Are you at risk of glaucoma? (yes)	161	76(47.2%)	85(52.8%)	<0.001	129(80.1%)	32(19.9%)	<0.05
	199	101(50.8%)	98(49.2%)	<0.05	155(77.9%)	44(22.1%)	<0.05
	132	57(43.2%)	75(56.8%)	<0.0001	106(80.3%)	26(19.7%)	0.624
	42	20(47.6%)	22(52.4%)	<0.05	27(64.3%)	15(35.7%)	<0.05

Overall, 66.3% of the participants had knowledge about glaucoma, whereas 33.7% had no information about glaucoma. The relationship between education level (higher education) and awareness of glaucoma was significant ( $P= 0.024$ ). Participant sex (Female), and age group ( $\geq 40$ ) also showed significant associations with glaucoma awareness ( $P= <0.0001$  and  $P= <0.0001$  respectively).

The most common source of information for these respondents was patients suffering from glaucoma, at a total of 58%. Moreover, 36% of the total respondents have a family history or relatives diagnosed with glaucoma. Additionally, 57.2% underwent regular eye check exams.

Considering those who reported being aware of glaucoma (n=403), 74.2% of the participants considered high IOP to be a risk factor for glaucoma, followed by old age (72.5%). Conversely, only 6.5% considered being of black race to be a risk factor. Regarding potential vision loss, 76.2% of the aware participants reported that glaucoma could eventually cause blindness. More than half of the aware participants 64% believed blindness could be preventable; only 4% believe it is not preventable. In addition, 48.6% indicated that glaucoma is curable, with 14.9% saying it is not curable, and 36.5% not knowing the answer. Moreover, 81.4% reported that glaucoma is a treatable disease, and 1.7% not treatable; the remaining 16.9% did not know the answer. Considering the treatment options, the majority of the aware participants cited surgery, followed by eye drops; laser treatment came last. The study also found that 44.9% of the aware respondents believed that the purpose of treatment is to regain vision, 35.2% believed that the purpose is to delay the progress of the disease, whereas the remaining 19.9% did not know the answer.

#### 4. Discussion

This cross-sectional study aimed to determine the level of awareness and knowledge regarding glaucoma among the adult population in western region of Saudi Arabia which enrolled 608 participants. The level of awareness about glaucoma was relatively high in the study group. In total, 66.3% of the respondents were aware of glaucoma which is consistent with Alnujaim et al 2018 study from Riyadh, where 64% of the study participants were aware of glaucoma [2]. Our findings also resemble Al-Lahim et al 2018 report in Tabuk, northwestern of Saudi Arabia, in which 67.5% of participants had a knowledge of the disease [14]. Moreover, in other international studies, 65.5% of a study sample in Southeast Nigeria demonstrated a high level of awareness [15]. An Australian study in 1997 revealed a very high awareness level (93%), However, other surveys in Switzerland 2006, India 2001, and Ethiopia 2010, showed that the levels of awareness were low (24.7%, 2.4% and 2.3%, respectively) [9,12,16,17]. This variation might be due to differences in education level, age, and socioeconomic status.

There was a significant association between awareness of glaucoma and other variables, such as age group, gender, and educational level in this study. These associations with respect to age and educational level are consistent with Alnujaim et al study from Riyadh [2]. Conversely, Al-Lahim et al 2018 study in Tabuk revealed that only education level to be significant [14]. Moreover, Mansouri et al 2006 study in Switzerland did not find any relationship between demographic characteristics and the level of awareness of glaucoma [9]. Variation in the demographic characteristics in the study samples may contribute to these differences in results. The primary source of participants' knowledge regarding glaucoma in the study was people suffering from glaucoma (58%). This parallels the results of Rewri and Kakkar's study in rural India [18], but differs from several studies, in which the participants selected an ophthalmologist (69%), the internet (46%), or mass media (35.4%) as their source of information [9,17,18]. This particular result in the study could be due to a high incidence of glaucoma or diabetes in Saudi Arabia; diabetes is a possible predecessor to glaucoma, which might lead to a high rate of exposure to people with glaucoma.

Based on the questionnaire answers in this study, we have demonstrated a good knowledge (66.3%) about glaucoma generally. This agrees with Alnujaim et al 2018 study from Riyadh which showed a high level of knowledge, as well as Nkum et al.'s study done in Ghana in 2015 [2,19]. On the contrary, Attebo et al.'s study, done in Australia, showed that only 29% had knowledge of glaucoma, and only 27% of the participants had sufficient knowledge about glaucoma in Nkum et al.'s study [16,19]. The high level of knowledge in the present study could be attributed to campaigns organized by the Saudi Ministry of Health and medical faculties through seminars, workshops and social media which targeted people in hospitals and other public places like shopping malls and social events which in turn rises the knowledge about Glaucoma. Limitations of this study are a high percentage of the participants were from a young age group.

#### 5. Conclusion

When evaluating the glaucoma awareness in this study, the outcomes showed that majority had good knowledge of glaucoma with only a few having excellent knowledge. Larger surveys which include all cities of the country are suggested to assess the level of awareness and helps in establishing proper educational and screening campaigns.

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