

## Awareness and Knowledge of Glaucoma among Selected Population Groups in Aden

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### Abstract

**Introduction:** This study was conducted to assess the level of glaucoma awareness and knowledge among people in Aden, and to show the effect of age, sex, education level, occupation and residency on the awareness of glaucoma.

**Methods:** Community-based cross sectional descriptive study was conducted in Aden Governorate, during the period November 2021 – February 2022. Five hundred participants, aged 24 years old and more, were interviewed. A structured questionnaire was used to gather information on person's demographics, awareness and knowledge of glaucoma. Data were recorded and analyzed using SPSS program-20.

**Results:** Out of the five hundred participants, 316 were females. Overall; 84% were aware of glaucoma, and showed statistically significant association between awareness and their education, occupation and residency. However, there was no statistically significant association between awareness and the sex or various age groups. The main source of information was the relatives. The highest percentage (67.1%) of the aware group reported that glaucoma can result in blindness. Increased intraocular pressure, increased age and diabetes were the main risk factors chosen by the participants.

**Conclusion:** The results of this study indicate a high level of awareness of glaucoma among people in Aden but inadequate knowledge about it. Health education programs should be activated at all levels of health and eye care services to increase knowledge about glaucoma to prevent the irreversible loss of vision due to the second main cause of blindness worldwide.

**Keywords:** Glaucoma, Awareness, Knowledge, Aden.

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## الإدراك والمعرفة بمرض المياه الزرقاء لدى مجموعات مختارة من سكان محافظة عدن

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### ملخص الدراسة

**المقدمة:** تهدف هذه الدراسة إلى تقييم مستوى إدراك الناس في محافظة عدن بمرض المياه الزرقاء ومدى معرفتهم به. كما تبين تأثير العمر والجنس والمستوى التعليمي والوظيفة ومكان الإقامة على مستوى الوعي بمرض المياه الزرقاء.

**المنهجية:** أجريت دراسة مقطعية على خمسمائة شخص أعمارهم 24 عام وما فوق في محافظة عدن خلال الفترة من نوفمبر 2021 إلى فبراير 2022، وذلك عبر تعبئة استبيان مغلق يتضمن الإجابة على مجموعة من الأسئلة المتعلقة بالإدراك ومستوى المعرفة لمرض المياه الزرقاء.

**النتائج:** شملت الدراسة 500 مشارك منهم 316 أنثى، 84% كانوا مدركين لمرض المياه الزرقاء. وقد كانت هناك علاقات ذات دلالة إحصائية بين الإدراك بمرض المياه الزرقاء والمستوى التعليمي والمهنة بالإضافة إلى مكان الإقامة، في حين لم تكن هناك علاقات ذات دلالة إحصائية بين الوعي بمرض المياه الزرقاء ومتغيري الجنس والعمر. المصدر الرئيسي لمعلومات المشاركين هو الأقارب. النسبة الأعلى من المدركين بمرض المياه الزرقاء (67.1%) يعلمون بأنه يؤدي إلى العمى. كان ارتفاع ضغط العين والتقدم في العمر ومرض السكري أهم العوامل التي يعلم المدركون بارتباطها بمرض المياه الزرقاء.

**الاستنتاج:** أوضحت الدراسة وجود مستوى عالٍ من الإدراك بمرض المياه الزرقاء لدى السكان في محافظة عدن في حين أن مستوى المعرفة بالمرض كان منخفضاً. وعليه، يجب تفعيل برامج التثقيف الصحي لرفع مستوى معرفة الناس بمرض المياه الزرقاء وبالتالي منع فقدان النظر الدائم نتيجة الإصابة بثاني أهم أسباب فقدان النظر عالمياً.

**الكلمات المفتاحية:** المياه الزرقاء، الإدراك، المعرفة، عدن.

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## Introduction

**G**laucoma is the second leading cause of blindness after cataract and the leading cause of irreversible blindness worldwide [1]. It accounts for 8% of all blindness in the world affecting an estimated 3.12 million blind people [2].

Glaucoma is a neuropathy with structural (optic disc damage) and functional loss (visual field loss)[3][4]. It is associated with Intraocular pressure (IOP)-related damage to the optic nerve, which results in the loss of retinal ganglion cells[5]. IOP is considered the only modifiable glaucoma risk factor[6].

Glaucoma is generally asymptomatic and the patient may not notice the peripheral visual field loss until late in the disease at which point permanent vision loss arises [7]. Therefore, early detection and appropriate treatment is essential[8], which can be facilitated by better knowledge of the prevalence and incidence of glaucoma, and the risk factors associated with primary open-angle glaucoma, which is the most common type of glaucoma [9].

However, many people in developing countries do not have regular and timely eye examinations due to lack of awareness and knowledge of glaucoma related blindness[10].

To the best of our knowledge, this is the first study in Yemen, that has been made to assess the level of glaucoma awareness and knowledge among people in Aden, which will reflect the level of the same issue in other cities of the country, and hence, this will

expose the real need for education programs targeting adult people in Aden and other Yemeni cities whether they have glaucoma or not. The study also aimed to identify the effect of age, sex, education level and occupation on the awareness of glaucoma.

## Methods

### *Study design and setting*

A community-based cross sectional descriptive study was conducted in Aden Governorate, during the period November 2021 – February 2022. Aden governorate includes eight districts (Seera, Al-Mualla, Al-Tawahi, Khormaksar, Al-Mansora, Alsheikh-Othman, Dar-saad, and Al Buraieqeh), covering 7000 km<sup>2</sup> with a population of 1.020.000 inhabitants [11]. The study covered only four randomly selected districts (Seera, Khormaksar, Al-Mualla and Al Buraieqeh) and work places selected by simple random sampling methods.

### *Study population*

Adults aged 24 years and more who were living in the selected four districts of Aden Governorate were targeted. Accessible participants at the University of Aden and governmental school teachers and workers, hospitals' attendees, polyclinic patients and workers who agreed to be included in the sample during the period of data collection were enrolled. Doctors and those who work in ophthalmic departments were excluded.

### **Sample size**

The minimum sample size of 383 was determined using Stat. Cal. formula for population survey or descriptive study for simple random sampling methods. Approximately 192000 structures were counted for the four districts. The sample size determination was based on 5% margin of error and 95% confidence interval ( $\alpha=0.05$ ). The sample size was increased to 500 persons who were chosen randomly. Simple random sampling was done to select study population.

### **Data collection**

A structured questionnaire was used to gather information on person's demographics, awareness and knowledge of glaucoma. Awareness was measured by asking the participants whether or not they have heard of glaucoma. Knowledge was measured by asking the participants about the clinical presentations and risk factors of the disease. Data collection involved face-to-face interviews with participants. The questions used for the survey were pretested by first testing them on 30 persons in different community places. On the basis of the testing results, the questions were modified for the final questionnaire and were designed to be more understandable and briefer.

### **Data analysis**

Data were recorded and analyzed using SPSS program version 20, (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequencies and percentages were used to describe the socio-demographic characteristics, glaucoma awareness and knowledge. Categorical variables were analyzed with Pearson's chi-square test. A two

tailed *P*-value less than 0.05 was considered statistically significant.

### **Ethical consideration**

Official letter was obtained from the Research Ethics Committee (REC) at the Faculty of Medicine and Health Sciences. Informed consent was taken from the participants after discussing the purpose of the study. They were assured about the right to refuse, and confidentiality of the information they gave before data collection.

## **Results**

Out of 500 participants, 84% (420) have heard about glaucoma. Table 1 shows the socio-demographic characteristics of the participants by glaucoma awareness, where awareness found more among females than males but this difference was not statistically significant, ( $\chi^2=1.33$ ,  $P=0.249$ ). Regarding the glaucoma awareness and age groups, it was found that awareness decreases with increasing age, but this was not statistically significant ( $\chi^2=2.21$ ,  $P=0.530$ ). Glaucoma awareness was higher among those having secondary and university education (91.1%) than illiterate and primary educational level. This association was statistically significant ( $\chi^2=40.75$ ,  $P<0.001$ ). There was also a significant relationship between glaucoma awareness and the occupation and residency of the respondents ( $\chi^2=21.92$ ,  $P=0.001$ ,  $\chi^2=15.75$ ,  $P=0.001$ ) respectively.

**Table 1.** Socio-demographic Characteristics of Respondents by Glaucoma Awareness

Item	Yes		No		Pearson chi-square
	No.	%	No.	%	
<b>Sex</b>					
Male	150	35.7	34	42.5	$\chi^2 = 1.33$ $P = 0.249$
Female	270	64.3	46	57.5	
<b>Age (years)</b>					
24-38	191	45.5	43	53.8	$\chi^2 = 2.21$ $P = 0.530$
39-53	165	39.3	25	31.3	
54-68	51	12.1	10	12.5	
≥ 69	13	3.1	2	2.5	
Mean ± SD (Min. – Max.)		41.5 ± 11.8 (24 – 79)			
<b>Educational level</b>					
Illiterate	14	3.3	9	11.25	$\chi^2 = 40.75$ $P < 0.001$
Primary school	23	5.5	19	23.75	
Secondary school	72	17.1	19	23.75	
University	311	74.0	33	41.25	
<b>Occupation</b>					
Not working	94	22.4	25	31.3	$\chi^2 = 21.92$ $P = 0.001$
Officer	100	23.8	16	20.0	
Health worker	88	21.0	7	8.8	
Teacher	66	15.7	5	6.3	
Hand worker	36	8.6	12	15.0	
Private	25	6.0	10	12.5	
Security	11	2.6	5	6.3	
<b>Districts</b>					
Seera	89	21.2	25	31.3	$\chi^2 = 15.75$ $P = 0.001$
Khormaksar	83	19.8	17	21.3	
Al-Mualla	118	28.1	30	37.5	
Al Buraiqeh	130	31.0	8	10.0	

Table 2 shows the source of information about glaucoma in all districts. The highest percentage of

respondents (37.9%) got their information from relatives, followed by health staff (21.7%).

**Table 2:** Source of Information about Glaucoma Among Respondents (n=420)

Source	No.	%
<b>Relatives</b>	159	37.9
<b>Health staff</b>	91	21.7
<b>Media</b>	67	16.0
<b>Patient with glaucoma</b>	63	15.0
<b>Others</b>	40	9.5

In Table 3; out of 420; 4.3% have glaucoma and 32.9% had at least one of their relatives with glaucoma. By asking the participants what is glaucoma, 56.7% answered that it is ocular hypertension, 25.7% said it is ocular hypertension with optic nerve lesion and vision loss while (17.6%) said it is ocular hypertension with optic nerve lesion.

On the other hand; 20.2% had knowledge that a person may have glaucoma with no symptoms, and 40.5% said that they know that anyone can get glaucoma. Around 67% of the aware participants know that glaucoma leads to blindness, and 46.9% said that the lost vision can be restored with treatment.

In response to the questions about the factors that may increase the risk of glaucoma, it is found that 69.8% of the aware participants know that risk increases with increased intraocular pressure, 64.3% know that the risk increases with age, and 54.3%, 44.8% know that the risk increases with the presence of diabetes and hypertension, respectively. The responses of the rest of participants were either negative answers or they don't know the answer. Regarding the response to the statement if the risk increases with the presence of family history of glaucoma, or the presence of refractive error or if the risk increases with using steroids, it was found that 47.4%, 63.3% and 72.6% respectively don't know the answer.

**Table 3:** Response to Questions about Knowledge of Glaucoma (n=420)

<b>Do you have glaucoma</b>	Yes: 18	4.3%
<b>Any one of your relatives has glaucoma</b>	Yes: 138	32.9%
<b>What is glaucoma?</b>		
- ocular hypertension	238	56.7%
- ocular hypertension with optic nerve lesion	74	17.6%
- ocular hypertension with optic nerve lesion and vision loss.	108	25.7%

Response to questions about knowledge	Yes	(%)	No	(%)	Don't know	(%)
May person has glaucoma with no symptoms	85	20.2%	100	23.8%	235	56.0%
Can anyone get glaucoma	170	40.5%	65	15.5%	185	44.0%
Does glaucoma lead to blindness	282	67.1%	7	1.7%	131	31.2%
Can glaucoma patient restore vision with treatment	197	46.9%	53	12.6%	170	40.5%
Risk increases with increased intra ocular pressure	293	69.8%	7	1.7%	120	28.6%
Risk increases with age	270	64.3%	32	7.6%	118	28.1%
Risk increases with the presence of family history of glaucoma	61	14.5%	160	38.1%	199	47.4%
Risk increases with DM	228	54.3%	28	6.7%	164	39.0%
Risk increases with Hypertension	188	44.8%	54	12.9%	178	42.4%
Risk increases with the presence of refractive error	58	13.8%	96	22.9%	266	63.3%
Risk increases with using steroid	85	20.2%	30	7.1%	305	72.6%

## Discussion

The global prevalence of glaucoma for population aged 40–80 years is 3.54%. In 2013, the number of people aged 40–80 years with glaucoma worldwide was estimated to be 64.3 million, increasing to 76.0 million in 2020 and expected to reach to 111.8 million in 2040 [12]. Approximately, 15% of global blindness is due to glaucoma and around 600,000 people go blind annually [13].

Yemen shares land borders with two other Arab countries; Saudi Arabia to the north and Sultanate of Oman to the northeast. In Saudi Arabia, glaucoma accounts for blindness in 3% of the population above the age of 40 years [14], while in Oman the prevalence of glaucoma among the Omani population aged 30 years and above was 4.75% [15]. In Saudi Arabia, multiple studies made in different geographical areas of the kingdom have demonstrated generally adequate awareness and

knowledge of glaucoma [14,16,17]. However, a study among the attendees of a local eye care hospital in Jeddah, Saudi Arabia revealed low awareness and knowledge levels [18].

In Yemen, we lack a national blindness survey and glaucoma prevalence studies to know the extent of this disease. According to a single study made in a private eye hospital in Sana'a, glaucoma was the second most common cause of bilateral blindness [19]. In the present study, there was no significant statistical association between awareness of glaucoma and either the age or sex, which is similar to studies conducted in Ghana [20], Jordan [21] and Egypt [22]. In contrast, a study in Saudi Arabia demonstrated significant association between age and awareness of glaucoma, which was high among younger population, whereas, gender was not significantly related [16]. On the other hand, the awareness and knowledge of glaucoma was directly proportional

with education level similar to studies conducted in Saudi Arabia [16], Egypt [22] and Nigeria [23], while opposite to the Jordanian study [21], in which the educational level of the participants didn't significantly affect their knowledge of glaucoma.

In this study, there was significant association between glaucoma awareness and the occupation. This is similar to a study conducted in Nigeria [23]. In addition, the awareness of glaucoma was significantly related to the residency of the respondents, which could be attributed to the demographic data of the participants, in which high number of them were from Al-Mualla, and Al Buraiqeh. This is opposite to studies conducted in Saudi Arabia [16] and Egypt [22], in which the awareness and the geographical area were not significantly related. Furthermore, the majority of the respondents in the present study got their information from their relatives followed by the health staff, similar to other studies [21,24].

Out of the 500 interviewed participants; 84% have heard about glaucoma but the highest percentage of them (56.7%) couldn't define the condition properly. The same finding was reported in the Jordanian study in which 81.6% heard about glaucoma but only 34.2% defined glaucoma correctly [21], whereas in a study conducted in Saudi Arabia; 70% of the respondents have heard about glaucoma, but no information shown in that study regarding the knowledge about the definition of the disease [18]. Another study in Saudi Arabia showed that 44.2% of the participants know that glaucoma causes damage to the optic nerve [25]. On the other hand, a study in India showed that

only 13.5% have heard about glaucoma, and 68% of them couldn't describe the condition [26]. In the present study, only 20.2% know that a glaucoma patient can be asymptomatic, which is nearly similar to a study in India, in which only 18.0% of glaucoma-aware participants had knowledge of the asymptomatic course of the disease [24]. In a related context, the Jordanian study showed that 39.7% know that symptoms of glaucoma are absent in the early stages [21].

Concerning vision loss in glaucoma, 67.1% of our participants responded that glaucoma leads to blindness. Though, 46.9% thought that vision loss due to glaucoma can be restored with treatment and only 12.6% know that vision loss is irreversible. A study in Saudi Arabia showed that 33.7% of the participants know that vision loss due to glaucoma is permanent [18]. Similar finding was reported in central India where 24.0% of the participants know about the irreversible nature of vision loss in glaucoma [24] whereas in the Jordanian study, only 10.4% know about the irreversibility of blindness [21]. However, in the Egyptian study 57.4% responded that glaucoma doesn't lead to blindness [22].

With regards the risk factors of glaucoma; increased IOP, increased age and diabetes known to be risk factors of the disease by 69.8%, 64.3%, 54.3% of the participants, respectively, while 72.6%, 63.3%, and 47.4% didn't know that using steroids, presence of refractive error, and the presence of family history of glaucoma are risk factors of the disease, respectively. In Saudi Arabia, family history of glaucoma (39.2%),



increased eye pressure (37.6%) and steroid medication (18.5%) were the most identified risk factors [18].

In the Jordanian study, 82.3% know that aging and diabetes are risk factors of glaucoma, while 47.6% know that steroid-containing eye drops are risk factor [21]. In the Egyptian study only 9.2%, 8.2% and 12.2% know that age, diabetes and myopic refractive error are risk factors of the disease, respectively [22].

#### **Limitation of the study**

The present study has the limitation of including only four districts of the total eight districts of Aden governorate and selected accessible population groups. Thus, the findings cannot be generalizable.

### **Conclusion**

Although glaucoma awareness was high, the findings display inadequate knowledge about glaucoma. Larger nation-wide surveys are needed to assess the level of awareness and knowledge of the disease among the population. The study findings stress the need for health education about glaucoma as the second main cause of blindness worldwide and a major cause of irreversible vision loss in Yemen.

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