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Original Research Article

Awareness and knowledge about glaucoma among patients attending the health centers related to the primary healthcare corporation in Qatar

Rime H. Alauglha, Monia S. Mechrgui*

Department of Ophthalmology, Primary Health Care Corporation, Doha, Qatar

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***Correspondence:**
Dr. Monia S. Mechrgui,
E-mail: mmechrgui@phcc.gov.qa

ABSTRACT

Background: Public awareness of eye diseases can influence the use of eye care services and preventive behaviors. Raising awareness about glaucoma is essential for early detection and blindness prevention. However, the level of awareness at the community level in Qatar remains unclear, making targeted interventions challenging. Objective was to assess the awareness and knowledge of glaucoma among adult patients attending ophthalmology clinics at primary health care corporation (PHCC) centers in Qatar.
Methods: A cross-sectional study was conducted among 300 participants (175 males and 125 females) using a structured questionnaire. The survey collected demographic information and assessed awareness of glaucoma. Statistical analyses included descriptive statistics, Chi-square, ANOVA, and Pearson correlation.
Results: Overall, less than half of participants (131/300) aware of glaucoma. The most common source of information was knowing someone affected by disease (15.7%). Educational level had a significant impact: those with higher education were more aware (48.1%) than those with lower education. Females (51.6%) showed higher awareness than males (38%). Age group 50–60 had the highest awareness (50%), and Arabic speakers were the most informed (52.3%).
Conclusions: Awareness and knowledge about glaucoma among PHCC patients in Qatar were generally low. Public health initiatives should prioritize educational campaigns focusing on risk factors, complications, and the importance of regular eye examinations for early detection and management.

Keywords: Glaucoma, Awareness, Education, Eye care, Qatar

INTRODUCTION

As announced by the world health organization (WHO), glaucoma is the second key cause of visual loss worldwide.[1] It is a group of diseases in which progressive optic neuropathy leads to a characteristic loss in the visual field (VF). Glaucoma is more prevalent in aged individuals and patients with a familial medical history of glaucoma. Glaucoma progresses silently and results in an irreversible loss of sight; hence, it interferes with the normal function of an affected individual. Blindness attributed to glaucoma is only avoidable with early detection and treatment.[2] Regular eye screening during adulthood allows timely detection, thereby, more efficient treatment. However, for people to seek regular checks in eye clinics, they need to be aware of glaucoma and know about the disease and the benefits of early detection and treatment. Since glaucoma has no specific symptoms or signs at the early stages of the disease, it is important to raise awareness of glaucoma among the public. Being aware of glaucoma implies that an individual has heard of the disease. The knowledge of glaucoma indicates the level of understanding of glaucoma as an eye disease. Among Caucasians, the rates of awareness of glaucoma ranged between 22.9% and 93%, with a low level of knowledge that varies between 2.3% and 35%.[3,4] Perception of VF loss is far more complex.

Yet, there is a paucity of research evidence directly assessing how patients with glaucoma describe their awareness of VF loss. Assembling evidence of what patients see and what they do not see would be helpful for at least two reasons. First, it would aid in raising awareness of the true symptoms of the condition, which is particularly important because estimates of those with the disease who remain undiagnosed are so high.[5,6] Second, it may help patients adhere to their treatment regimen if they are falsely reassured about not having the severe symptoms depicted by the typical images of how glaucoma patients see. Good evidence, reviewed extensively elsewhere, is beginning to emerge, highlighting the impact of glaucomatous VF loss on everyday function.[5,6] Nevertheless, results from clinical vision tests do not necessarily correlate well with patients' vision perception.[9-11] For example, some patients are surprised to find something wrong with their vision or attribute noted changes to the normal ageing process, which is supported by qualitative studies investigating patient perception of glaucoma.[12] Perimetric measurements of retinal sensitivity to light depicted in VF test charts by grey areas becoming black patches in more damaged regions represent a simplistic view of vision loss in glaucoma. Other aspects of visual function besides light sensitivity, such as motion perception, discrimination of high spatial frequencies, and color vision, also are involved. Furthermore, key ideas from psychophysics and neuroscience about the mechanisms of compensation for VF loss.[13,14] The early detection and treatment of glaucoma is critical for preventing vision loss. Glaucoma in its primary form can be classified into open-angle (primary open angle glaucoma or POAG) or angle-closure (primary angle closure glaucoma or PACG). These are distinguished based on the anatomical position of the anterior surface of the peripheral iris relative to the posterior corneal surface. These form the anterior chamber angle, which contains the trabecular meshwork and is the main structure through which the aqueous humor drains from the eye.[15]

To date, there is limited data regarding the level of awareness or knowledge of glaucoma in Qatar community. In this study, we conducted a health centers-based survey to evaluate whether Qatari people are aware of glaucoma and assess their knowledge of it. Outcomes of this study may help in building plans to prevent glaucoma-related blindness and may encourage organizing awareness campaigns for glaucoma nationally and internationally.

METHODS

This cross-sectional study is designed to assess the level of awareness and knowledge about glaucoma and identify the primary source of information for patients visiting the health centers associated with primary healthcare corporation in Qatar. The study was conducted in three health centers at Qatar's primary healthcare corporation: Mesaimir, Al Mashaf, and Rawdat Al Khail. These were considered among the largest primary health care centers serving a large proportion of the population with large ophthalmological clinics.

The study was conducted between November 1, 2023, and June 30, 2024, to obtain adequate information for comprehensive analysis.

Ethical approval for this project was provided before taking part in the study. All participants were provided with informed consent. Respondents filled out a questionnaire, which was treated in confidence and kept as private as possible.

A probability random sampling method was applied to select a representative sample from the study population of patients attending the ophthalmological clinics of selected healthcare centers of Qatar's primary healthcare corporation who consented to participate until the minimum required sample size was achieved.

The minimum required sample size of 227 patients visiting the selected health centers achieved 80% power for estimating the expected proportion with 5% absolute precision and 95% confidence. The inclusion criteria were patients aged from 40 to 60 years old who seek consultation in the ophthalmological clinics with complete questionnaire response.

Exclusion criteria were participants less than 40 years or older than 60 years. Patients with medical conditions hindering their response to the questionnaire’s questions (e.g. mentally retarded, pregnant women, etc..). Patients with eye trauma or ocular comorbidities. Patients who did not complete the questionnaire were excluded.

The researcher interviewed the patients and filled in the questionnaire. The English version of the questionnaire was tested for face and content validity with the contribution of an expert ophthalmologist. Reliability testing of the knowledge scale based on the scoring system indicated good internal consistency, as shown by Cronbach's alpha=0.782 for the 18 questions.

First, the researcher introduced herself and invited the eligible patients to participate after demonstrating the objectives and importance of the study project. Then, eligible participants were provided with a hard copy of the questionnaire with all the necessary instructions given to allow completing the questionnaire through the interview.

The questionnaire involved four domains; the first domain included the sociodemographic and clinical data, including age, gender, educational level, mother tongue, personal history of diabetes and/or hypertension or glaucoma and family history of glaucoma. The second domain regarded awareness about glaucoma, which included one question: Have you ever heard about glaucoma? The third domain consisted of sources of information about glaucoma, including TV, newspapers, magazines, friends, a person with glaucoma and physicians. The fourth domain assessed knowledge about glaucoma, including 18 items

divided into four domains: types of glaucoma, risk factors, clinical features, and management.
Arabic version of the questionnaire was translated through a forward-backwards translation sequence. First, forward translation was performed for all the questions, and then the translated version was submitted to an expert in Arabic. Then, backward translation was used to ensure there was no discrepancy between 2 versions during the reverse translation and removal of any misleading or vague words.

SPSS version 28 was used to examine the data collected. The sociodemographic and knowledge-related factors were summarized using descriptive statistics like frequencies and percentages. There may be connections between sociodemographic factors and knowledge, attitude, and practice levels. These associations can be found using inferential statistics like the Chi-square test and logistic regression analysis.

The numerical data has been represented as N and %; a p ≤0.05 and ≤0.01 was considered the cut-off point for statistically significant differences between variables. Categorical variables are presented as frequency and percentage, while continuous variables are presented as mean±SD. Chi-square, One-way ANOVA, and Pearson correlation tests were used to define the association of variables with the extent of understanding of the glaucoma.

RESULTS

A total of 300 participants were interviewed, with a mean age of 49.54±5.605 years. Among the participants, 172 (57.3%) were male, and 128 (42.7%) were female. Of the participants, 212 (70.7%) had university degrees (high education level). Out of 300 participants, 172 (57.3%) were Arabic speakers, 8 (2.7%) of participants were English speakers, and 120 (40%) spoke other languages.

The medical history showed that 229 (76.4%) of participants had a history of vascular diseases (such as DM/HTN). In addition to this, around 10 participants (3.4%) had glaucoma, and 36 (12%) had a positive family history of glaucoma (Table 1).

Of all respondents, only 131 (43.7%) had heard of glaucoma, while around 169 (56.3%) of respondents had never heard of it. Awareness of glaucoma was evaluated, as shown in (Table 2).

Approximately 47 (15.7%) participants obtained information about glaucoma from someone who had this condition. The other participants received information from various sources, including health professionals like allied professionals and physicians (31, 10.3%), media such as TV and radio (17, 6.0%); brochures and posters (23, 7.6%), and friends (14, 4.8%) (Figure 1).

In general, the knowledge of the participants about glaucoma was poor. Around 16 (5.3%) of the participants mentioned that there are many types of glaucoma; the most mentioned risk factors were DM + HTN (n=50, 16.7%), followed by age (n=46, 15.3%) and family history (n=45, 15%). The participants mentioned that the most common symptoms were increased eye pressure and reduced visual acuity (n=56, 18.7%), followed by peripheral vision loss (n=54, 18%) and reduced both central and peripheral vision (n=49, 16.3%), respectively. In addition, 31 (10.3%) participants answered that vision loss is permanent, while 18 (6%) answered that it is temporary.

Moreover, participants shared that the most common treatment options for glaucoma include surgery (n=34, 11.3%), eye drops (n=33, 11%) and laser (n=28, 9.3%), respectively.

Similarly, 57 participants (19%) recognized that glaucoma can cause blindness, 13 participants (17.7%) saw that glaucoma progress gradually, while 57 participants (18.3%) mentioned that people could have glaucoma without realizing it.

Regarding inheritance, 44 (14.7%) participants believed that glaucoma can be inherited, and 60 participants (20%) reported that glaucoma is not a transferable disease. About glaucoma blindness, 32 participants (10.7%) agreed it is irreversible, whereas 30 participants (10%) disagreed. Furthermore, 55 of participants (18.4%) agreed that glaucoma damages nerve vision and its prevalence increased with age. Noninvasive methods for early detection were more frequently mentioned by 54 participants (18%) compared to invasive methods (n=7, 2.4%). Finally, 60 participants (20%) reported that glaucoma significantly impacts a patient's quality of life (Table 3).

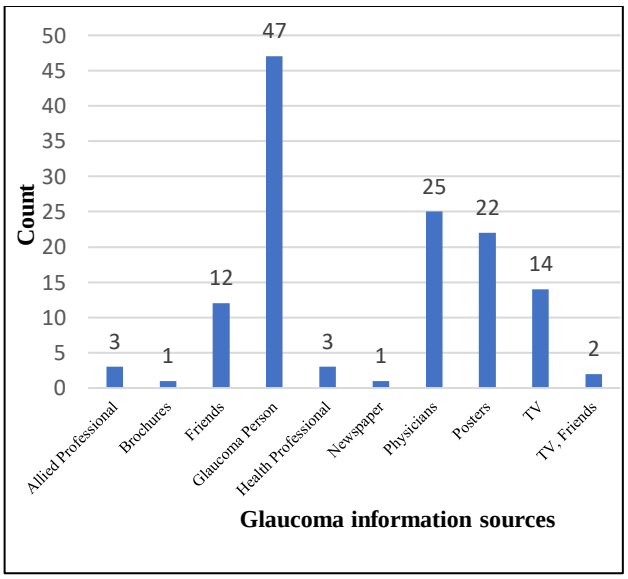

Figure 1: Sources of information about glaucoma.

Regarding awareness among education levels, university-level participants (n=102, 48.1%) showed the highest level of awareness, while the lowest level of awareness was

noticed among participants with primary (n=3, 21.4%) and middle (n=3, 25%) education levels (Figure 2).

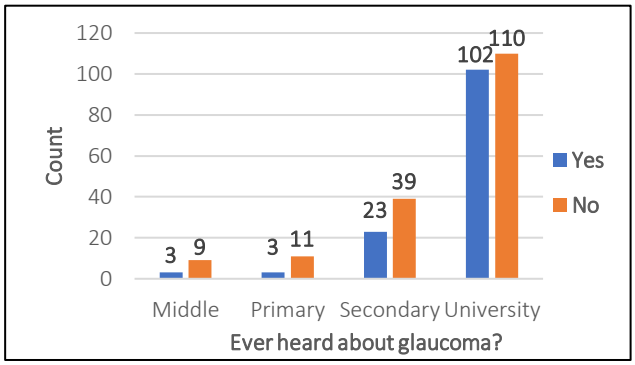

Figure 2: Awareness of the participants about glaucoma regarding education level.

Regarding the awareness of glaucoma among participants, the analysis reported that out of 128 females, 66 (51.6%) showed a higher level of awareness than males (n=65, 38%) (Figure 3).

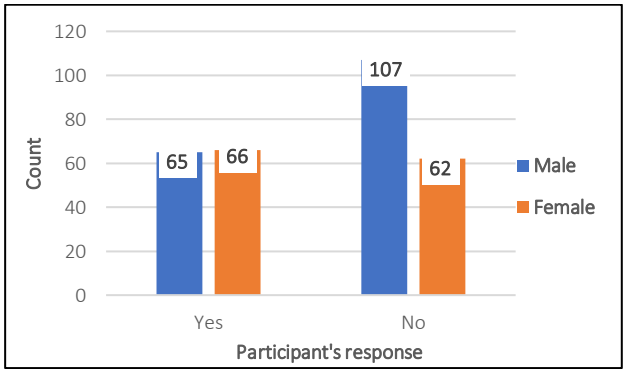

Figure 3: Awareness of the participants about glaucoma regarding gender.

Regarding risk factors, according to participant's responses, DM-HTN was identified as the most common risk factor (n=50, 16.7%), followed by age (n=46, 15.3%) and family history (n=45, 15%). On the other hand, refractive error was seen as the least common risk factor (n=25, 8.3%).

Regarding the association between gender, glaucoma awareness, and knowledge, 66 out of 128 females (51.6%) demonstrated higher awareness of glaucoma than males (n=65, 37.80%). This difference was statistically significant (p=0.012). For other knowledge parameters, there were variations in responses between males and females; however, these differences were not statistically significant (p>0.05), as shown in Table 4.

Association between education level, glaucoma awareness and knowledge revealed that university education level showed highly significant association in awareness of glaucoma than other education levels (p=0.009) and showed significant association in knowledge of glaucoma than other levels in "glaucoma can cause blindness" (p=0.015). At same time, there was no significant difference in association between education levels and other parameters of knowledge of glaucoma (Table 5).

Regarding association between mother tongue and glaucoma awareness, Arabic speaking participants showed stronger awareness than other languages (p=0.001), followed by those with English mother tongue (Figure 4).

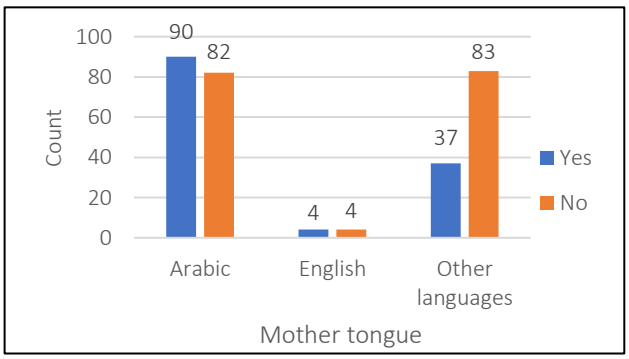

Figure 4: Association between native language and glaucoma awareness.

In terms of the association between age groups and glaucoma awareness, the age group from 50-60 years old showed a higher significant awareness of glaucoma than the other group (p=0.037). Association between vascular diseases (DM/HTN) history and glaucoma awareness: the 229 (76.4%) participants who had a history of vascular diseases (DM/HTN) showed a stronger association with awareness of glaucoma than other participants (p=0.031).

Regarding the association between glaucoma history and awareness, the participants (n=238, 79.33%) who had no history of glaucoma were unaware and showed a higher significant association than other participants (p=0.001) (Figure 5).

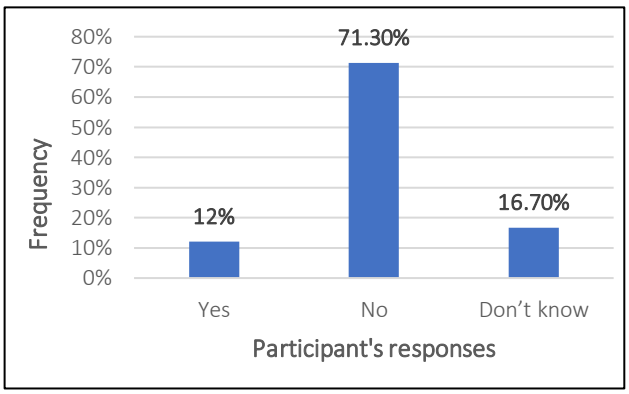

Figure 5: Family history of glaucoma and glaucoma awareness.

Association between the family history of glaucoma and awareness: the participants (n=214, 71.3%) who had no family history of glaucoma were unaware of glaucoma, with a highly significant association than others (p=0.001).

Table 1: Sociodemographic and clinical characteristics of the study participants (n=300).

Variables	Classification	N	Percent (%)
Gender	Female	128	42.7
	Male	172	57.3
Age groups (in years)	40-50	172	57.3
	50.1-60	128	42.7
Age mean±SD=49.54±5.605, minimum=40, maximum=60			
Education level	Middle	12	4.0
	Primary	14	4.6
	Secondary	62	20.7
	University	212	70.7
Mother tongue	Arabic	172	57.3
	English	8	2.70
	Other	120	40.0
Vascular diseases (DM/HTN) history	Yes	229	76.4
	No	70	23.3
	Don't Know	1	0.30
Glaucoma history	Yes	10	3.40
	No	238	79.3
	Don't Know	52	17.3
Family history	Yes	36	12.0
	No	214	71.3
	Don't Know	50	16.7

Table 2: Awareness of the participants about glaucoma disease.

Variable	Responses	N	Percent (%)
Ever heard about glaucoma?	Yes	131	43.70
	No	169	56.30

Table 3: Knowledge about glaucoma.

Variables	Responses	N	Percent (%)
Are there many types of glaucoma?	Yes	16	5.3
	No	5	1.7
	Don’t know	279	93.0
Risk factors associated with glaucoma			
Family history	Yes	45	15
	No	17	5.7
Race	Yes	30	10
	No	32	10.7
DM + HTN	Yes	50	16.7
	No	12	4
Refractive errors	Yes	25	8.3
	No	37	12.3
Age (in years)	Yes	46	15.3
	No	16	5.3
What are the symptoms of glaucoma?			
No symptoms	Yes	40	13.3
	No	22	7.3
Increased eyes pressure	Yes	56	18.7
	No	6	2
Reduced visual acuity	Yes	56	18.7
	No	6	2
Peripheral vision loss	Yes	54	18
	No	8	2.7
Reduced both central and peripheral vision	Yes	49	16.3
	No	14	4.7

Continued.

Variables	Responses	N	Percent (%)
Vision loss			
Permanent	Yes	31	10.3
Temporary	Yes	18	6
Don't know	Don't know	251	83.7
Can glaucoma be prevented?	Yes	40	13.3
	No	11	3.7
	Don't know	249	83
Treatment options			
Eye drops	Yes	33	11
Laser	Yes	28	9.3
Surgery	Yes	34	11.3
No available treatment	Yes	3	1
Don't know	Yes	197	65.7
All previous are false	Yes	5	1.7
Glaucoma can cause blindness	Yes	57	19
	No	4	1.3
	Don't know	239	79.7
Glaucoma progress gradually	Yes	53	17.7
	No	9	3
	Don't know	238	79.3
One may have glaucoma and don't know?	Yes	55	18.3
	No	7	2.4
	Don't know	238	79.3
Glaucoma can be inherited?	Yes	44	14.7
	No	18	6
	Don't know	238	79.3
Is glaucoma transferrable disease?	Yes	3	1
	No	60	20
	Don't know	237	79
Glaucoma blindness is irreversible?	Yes	32	10.7
	No	30	10
	Don't know	238	79.3
Nerve of vision (optic nerve) is damaged in glaucoma?	Yes	55	18.4
	No	7	2.3
	Don't know	238	79.3
Glaucoma prevalence increases with age?	Yes	56	18.7
	No	6	2
	Don't know	238	79.3
Investigations for early detection			
Invasive	Yes	7	2.4
	No	55	18.3
	Don't know	238	79.3
Noninvasive	Yes	54	18
	No	8	2.7
	Don't know	238	79.3
Can glaucoma affect a patient's quality of life	Yes	60	20
	No	1	0.3
	Don't know	239	79.7

Table 4: Association between gender, glaucoma awareness, and knowledge.

Variables	Responses	Female (n=128)	Percent (%)	Male (n=172)	Percent (%)	P value
Awareness						
Ever heard about glaucoma?	Yes	66	51.60	65	37.80	0.012
	No	62	48.40	107	62.20	

Continued.

Variables	Responses	Female (n=128)	Percent (%)	Male (n=172)	Percent (%)	P value
Knowledge						
Are there many types of glaucoma?	Yes	8	13.3	8	12.9	0.365
	No	4	6.7	1	1.6	
	Don't know	48	80	53	85.5	
Risk factors		**Female (n=34)**		**Male (n=28)**		
Family history	Yes	27	79.4	18 64.3%	64.3	0.149
	No	7	20.6	10	35.7	
Race	Yes	16	47.1	14	50	0.510
	No	18	52.9	14	50	
DM + HTN	Yes	29	85.3	21	75	0.242
	No	5	14.7	7	25	
Refractive errors	Yes	15	44.1	10	35.7	0.341
	No	19	55.9	18	64.3	
Age (in years)	Yes	25	73.55	21	75	0.565
	No	9	26.5	7	25	
What are the symptoms of glaucoma?						
No symptoms	Yes	25	73.5	15	53.6	0.086
	No	9	26.5	13	46.4	
Increased eyes pressure	Yes	29	85.3	27	96.4	0.149
	No	5	14.7	1	3.6	
Reduced visual acuity	Yes	30	88.2	26	92.9	0.434
	No	4	44.8	2	7.1	
Peripheral vision loss	Yes	30	88.2	24	85.7	0.530
	No	4	11.8	4	14.3	
Reduced both central and peripheral vision	Yes	26	76.5	23	79.3	0.515
	No	8	23.5	6	20.7	
Vision loss						
Permanent	Yes	18	51.4	13	44.80	0.104
Temporary	Yes	9	25.7	9	31.03	
Don't know	Don't know	8	22.9	7	24.20	
Can glaucoma be prevented?		**Female (n=31)**		**Male (n=26)**		
	Yes	21	67.7	19	73.1	0.810
	No	6	19.4	5	19.2	
	Don't know	4	12.9	2	7.7	
Treatment options		**Female (n=34)**		**Male (n=28)**		
Eye drops	Yes	16	47.10	17	60.70	0.376
Laser	Yes	15	44.1	13	46.4	
Surgery	Yes	16	47.1	18	64.2	
No available treatment	Yes	2	5.9	1	3.5	
Don't know	Yes	3	8.8	3	10.7	
Glaucoma can cause blindness	Yes	31	91.2	26	96.3	0.398
	No	3	8.8	2	7.4	
Glaucoma progress gradually	Yes	28	82.4	25	89.3	0.345
	No	6	17.6	3	10.7	
One may have glaucoma and don't know?	Yes	30	88.2	25	89.3	0.610
	No	4	11.8	3	10.7	
Glaucoma can be inherited?	Yes	24	70.6	20	71.4	0.584
	No	10	29.4	8	28.6	
Is glaucoma transferrable disease?	Yes	2	5.95	1	3.6	0.584
	No	32	94.1	27	96.4	
Glaucoma blindness is irreversible?	Yes	14	41.2	18	64.3	0.059
	No	20	58.8	10	35.7	
Nerve of vision (optic) damaged in glaucoma?	Yes	31	91.2	24	85.7	0.390
	No	3	8.8	4	14.3	
Glaucoma prevalence increases with age?	Yes	31	91.2	25	89.3	0.390
	No	3	8.8	3	10.7	

Continued.

Variables	Responses	Female (n=128)	Percent (%)	Male (n=172)	Percent (%)	P value
Investigations for early detection						
Invasive	Yes	4	11.8	3	10.7	0.610
	No	30	88.2	25	89.3	
Noninvasive	Yes	29	85.3	25	89.3	0.470
	No	5	14.7	3	10.7	
Can glaucoma affect patient's quality of life	Yes	33	97.1	28	100	0.470
	No	1	2.9	0	0	

Table 5: Association between education levels, glaucoma awareness, and knowledge.

Variables	Responses	Middle		Primary		Secondary		University		P value
		n=12	%	n=14	%	n=62	%	n=212	%	
Ever heard about glaucoma?	Yes	3	25.5	3	21.4	23	37.1	102	48.1	0.009
	No	9	75	11	78.6	39	62.9	110	51.9	
Are there many types of glaucoma?	Yes	0	0	0	0	1	1.6	15	7.1	0.129
	No	0	0	0	0	1	1.6	4	1.9	
	Don't know	12	100	14	100	60	96.8	193	91	
Risk factors associated with glaucoma										
Family history	Yes	1	8.3	2	14.3	9	14.52	33	15.5	0.915
	No	0	0	1	7.1	4	6.45	12	5.7	
	No answer	11	91.7	11	78.6	49	79.3	167	78.8	
Race	Yes	1	8.3	1	7.1	5	8.1	23	10.8	0.575
	No	0	0	2	14.3	8	12.9	22	10.4	
	No answer	11	91.7	11	78.6	49	79	167	78.8	
DM + HTN	Yes	1	8.3	3	21.4	10	16.12	36	16.9	0.780
	No	0	0	0	0	3	4.8	9	4.2	
	No answer	11	91.7	11	78.6	49	79	167	78.9	
Refractive errors	Yes	0	0	2	14.3	5	8.1	18	8.5	0.668
	No	1	8.3	1	7.1	8	12.9	27	12.7	
	No answer	11	91.7	11	78.6	49	79	167	78.8	
Age (in years)	Yes	1	8.3	3	21.4	7	11.3	35	16	0.212
	No	0	0	0	0	6	9.7	10	5.2	
	No answer	11	91.7	11	78.6	49	79	167	78.8	
What are the symptoms of glaucoma?										
No symptoms	Yes	1	8.3	2	14.3	8	12.9	29	13.7	0.895
	No	0	0	1	7.1	5	8.1	16	7.5	
	No answer	11	91.7	11	78.6	49	79	167	78.8	
Increased eyes pressure	Yes	1 2	8.3	3	21.4	11	17.7	41	19.3	0.815
	No	0	0	0	0	2	3.3	4	1.9	
	No answer	11	91.7	11	78.6	49	79	167	78.8	
Reduced visual acuity	Yes	1	8.3	3	21.4	12	19.4	40	18.9	0.898
	No	0	0	0	0	1	1.6	5	2.3	
	No answer	11	91.7	11	78.6	49	79	167	78.8	
Peripheral vision loss	Yes	1	8.3	2	14.3	12	19.4	39	18.4	0.663
	No	0	0	1	7.1	1	1.6	6	2.8	
	No answer	11	91.7	11	78.6	49	79	167	78.8	
Reduced both central and peripheral vision	Yes	1	8.3	2	14.3	12	19.4	34	16	0.478
	No	0	0	1	7.1	1	1.6	12	5.7	
	No answer	11	91.7	11	78.6	49	79	166	78.3	
Vision loss										
Permanent	Yes	1	8.3	1	7.1	7	11.3	22	10.4	0.463
Temporary	Yes	1	8.3	0	0	1	1.6	16	7.6	
Don't know	Yes	10	83.4	13	92.9	54	87.1	174	82	
Can glaucoma be prevented?	Yes	1	8.3	2	14.3	7	11.3	30	14.1	0.701
	No	0	0	0	0	3	4.8	8	3.8	
	Don't know	11	91.7	12	85.7	52	83.9	174	82.1	

Continued.

Variables	Responses	Middle		Primary		Secondary		University		P value
		n=12	%	n=14	%	n=62	%	n=212	%	
Treatment options										
Eye drops	Yes	1	8.3	1	8.3	4	6.5	27	12.7	10.519
Laser	Yes	1	8.3	2	14.3	6	9.7	19	8.9	
Surgery	Yes	1	8.3	0	0	0	11.3	26	12.3	
No available treatment	Yes	0	0	0	0	1	1.5	2	1	
Don't know	Yes	9	75	11	78.6	44	71	138	65.1	
Glaucoma can cause blindness	Yes	1	8.3	2	14.3	10	16.2	44	20.6	0.015
	No	0	0	0	0	3	4.8	1	0.6	
	Don't know	11	91.7	12	85.7	49	79	167	78.8	
Glaucoma progress gradually	Yes	1	8.3	2	14.3	11	17.7	39	18.4	0.911
	No	0	0	0	0	2	3.3	7	3.3	
	Don't know	11	91.7	12	85.7	49	79	166	78.3	
One may have glaucoma and don't know?	Yes	1	8.3	2	4.3	12	19.4	40	18.9	0.875
	No	0	0	0	0	1	1.5	6	2.8	
	Don't know	11	91.7	12	85.7	49	79	166	78.3	
Glaucoma can be inherited?	Yes	1	8.3	1	7.1	10	16.2	32	15.1	0.776
	No	0	0	1	7.1	3	4.8	14	6.6	
	Don't know	11	91.7	12	85.7	49	79	166	78.3	
Is glaucoma transferrable disease?	Yes	0	0	0	0	1	1.5	2	1	0.936
	No	1	8.3	2	14.3	12	19.4	45	21.2	
	Don't know	11	91.7	12	85.7	49	79	165	77.8	
Glaucoma blindness is irreversible?	Yes	0	0	1	7.1	5	8.1	26	12.3	0.491
	No	1	8.3	1	7.1	8	12.9	20	9.4	
	Don't know	11	91.7	12	85.7	49	79	166	78.3	
Nerve of vision (optic nerve) is damaged in glaucoma?	Yes	1	8.3	2	14.3	12	19.4	40	18.9	0.875
	No	0	0	0	0	1	1.5	6	2.8	
	Don't know	11	91.7	12	85.7	49	79	166	78.3	
Glaucoma prevalence increases with age?	Yes	1	8.3	1	7.1	12	19.4	42	19.8	0.268
	No	0	0	1	7.1	1	1.5	4	1.9	
	Don't know	11	91.7	12	85.5	49	79	166	78.3	
Investigations for early detection										
Invasive	Yes	0	0	1	7.1	1	1.5	5	2.4	0.348
	No	1	8.3	1	7.1	12	19.4	41	19.3	
	Don't know	11	91.7	12	85.5	49	79	166	78.3	
Noninvasive	Yes	1	8.3	1	7.1	11	17.7	41	19.3	0.417
	No	0	0	1	7.1	2	3.3	5	2.4	
	Don't know	11	91.7	12	85.5	49	79	166	78.3	
Can glaucoma affect a patient's quality of life	Yes	1	8.3	2	14.3	13	21	44	20.6	0.948
	No	0	0	0	0	0	0	1	0.6	
	Don't know	11	91.7	12	85.7	49	79	167	78.8	

DISCUSSION

To the best of the authors' knowledge, this is the first nationwide study on awareness of glaucoma among adults in Qatar.

Glaucoma is a multifactorial optic degenerative neuropathy characterized by the loss of retinal ganglion cells. It combines vascular, genetic, anatomical, and immune factors. Glaucoma poses a significant public health concern as it is the second leading cause of blindness after cataracts, and this blindness is usually irreversible. It is estimated that 57.5 million people worldwide are affected by primary open-angle glaucoma (POAG). People over 60 years of age, family members of those already diagnosed with glaucoma, steroid users, diabetics, as well as those with high myopia, hypertension, central cornea thickness of <5 mm and eye injury are at an increased risk of glaucoma. In 2020, approximately 76 million people were suffering from glaucoma, with that number estimated to reach 111.8 million by 2040.[16]

The high prevalence and high rate of blindness make glaucoma a public health concern and a priority among healthcare planners and policymakers, with an emphasis on the need for glaucoma care pathways for early detection and treatment to prevent blindness.[17] Detection at earlier stages is vital to prevent glaucoma progression.[18]

The results of the present study showed that Qatar participants had low levels of awareness (n=131, 43.70%), which was higher than that in a study done in upper Egypt (15.5%), and higher than a study conducted in Saudi Arabia in Aljouf and Hail Province on 2016 where the level of glaucoma awareness was 16.90%, while in another study done in 2018 in the central region of Saudi Arabia, the level of glaucoma awareness was 67%.[19-21] Our findings were higher than that reported in a study done in Nepal on 2018 where the awareness was 17.4% of the studied participants, and higher than that in a Serian study conducted in 2023, where the level of awareness was 33.6%.[22] Our participant's level of awareness was slightly lower than that reported in a study done in Ethiopia, where their level of awareness was 48.5%. In a Jordanian study in 2021, the level of awareness was 81.6%.[23,24] This variation between the level of awareness in our study than that Jordanian one may be related to the higher sample size of the Jordanian study (488 participants), and the difference in age between both studies, where the Jordanian study done on subjects aged from 16 years old and above, also the Jordanian study stated that "in slang Arabic language, glaucoma is translated to blue water and cataract is translated to white water''. This similarity in terms may have resulted in using them interchangeably with no distinction; however, some of the participants who had heard of glaucoma defined glaucoma as cataract, which could be another reason explaining the variance between our study and the other studies.

The purpose of this study is to find out about people's awareness and knowledge of glaucoma. "Glaucoma awareness" is described as "hearing about glaucoma". Accordingly, any more understanding of glaucoma is regarded as "glaucoma knowledge". Even though glaucoma is the second most common cause of blindness globally, only 131 participants (43.7%) in our survey were aware of the condition.[25] This is marginally more than the findings from prior research conducted in Abokobi and Nigeria, which were 36.68% and 39.3%, respectively.[26] Despite the similarity in the percentage of awareness among these countries, we cannot be certain of the similarity for several reasons: the questionnaires are not identical, the method of sample collection, and the place from which the sample was taken. This is from the point of view of the methods, and other differences were related to the health and awareness systems in each of these countries. However, when we talk about the Middle East, in particular, studies from Jordan and Saudi Arabia reported higher rates than what was mentioned in our study.[27-29]

In contrast to some past research where participants were given questionnaires, in our study, we conducted interviews with participants to prevent them from selecting answers without prior knowledge, so the participants who did not know about glaucoma didn't respond. The level of knowledge could be impacted if the questions were in the form of a written questionnaire since respondents might.

Regarding awareness of glaucoma related to education levels, university level showed the highest level of awareness (48.1%), while the lowest level of awareness was noticed inside primary and middle education levels (21.4% and 25% respectively), these findings were on the same line as reported in a study conducted in Saudi Arabia, Jordan and Ethiopia.[23,24,30]

Awareness among gender showed higher level of awareness of glaucoma in females than in males (51.60% in females, and 38% in males), with significant association (p=0.012). These findings were in contrast with those of the study conducted in Saudi Arabia, this variation may be related to the higher frequency of males than females in that study (61.9% males and 38.1% females), while our results were on the same line as that reported by Katibeh et al.[30,31]

The most common source of information was glaucoma persons (15.7%), while lowest one was brochures, Newspapers and TV, radio (0.3% for each), our findings were supported by a study done in Germany on 2002, and Saudi Arabia.[30,32]

According to the participant's answer, the most common risk factor was DM-HTN (16.7%), followed by age (15.3%), then family history (15%), while the lowest risk factor was refractive error (8.3%), these findings were supported by Ho et al and Alqahtani et al also, the same findings were reported by Dada et al.[30,33,34]

Regarding mother language, the 90 participants (52.3%) who have Arabic as their mother tongue showed strong significant awareness than other languages, with (p=0.001), followed by those who have English mother tongue (n=4, 50%), then other languages (n=37, 30.8%), these findings were in contrast than that reported by Alqahtani et al who found that participants with Bilingual Ar/En showed higher knowledge (23.5%), followed by English language (22.2%), while those with Arabic language showed the lowest level (19%).[30]

Furthermore, the age group from 50 to 60 years old showed highly significant awareness of glaucoma than the other group (p=0.037); these findings were on the same line as that reported by Tenkir and Dada, while Abu Hassan et al reported that there was no significant relation between awareness, knowledge of glaucoma and age was noticed.[24,31,35]

Our results revealed that participants who had vascular diseases (DM/HTN) history showed highly significant awareness than other participants (p=0.031), these findings were supported by an Ethiopian study in 2017, and Alqahtani same findings reported by Katibeh et al.[23,30,31]

The participants who had no Glaucoma history were unaware of glaucoma with a highly significant association than other participants (p=0.001), and those who had no family history of glaucoma were significantly unaware of

glaucoma (p=0.001), and lots of previous studies have supported our findings.[20,24,30]

Regarding participants' knowledge about the management of glaucoma in our study, 31.6% mentioned that it could be cured, and 1% mentioned that it couldn't be treated. Regarding participants' awareness of the different ways of managing glaucoma, 11% (33 respondents) mentioned using eye drops, 9.3% (28 respondents) stated laser, and 11.3% (34 respondents) pointed out eye surgery as an option. Comparing our findings with a study done in the Jazan Region in Saudi Arabia in 2023, our results showed better knowledge among our participants than that in Saudi Arabia management of glaucoma, while the Saudi study showed better knowledge about glaucoma could be cured who mention that "As regards participants' knowledge about the management of glaucoma, 55.8% knew it could be cured, and 20.9% were aware that glaucoma patients needed lifelong treatment.[37] Concerning participants' awareness of the different ways of managing glaucoma, 5.9% mentioned the use of eye drops, 10.9% pointed out eye surgery as an option, 2.6% stated laser and only 24.5% recognized all 3 as options for glaucoma.

Even though the knowledge of our study participants was poor, the results of the present study indicate better participant knowledge in comparison with studies conducted in Uttar Pradesh, Nepal, and rural India, which reported that only 6.3%, 5.5%, and 1.89% had good knowledge about glaucoma, respectively.[38-40]

Limitations

This study has some limitations. The sample size was sufficient to evaluate the main hypothesis. Yet, the size and distribution of the sample were not broad enough. The study did not assess the attitude of participants towards glaucoma, which might have an impact on acquiring knowledge that might affect the knowledge assessment. The participant's bias could not be eliminated as an individual's expression, language, and style of understanding may affect the participant's response.

CONCLUSION

We noticed that awareness of glaucoma among the participants studied was low. The level of knowledge among those reporting to be aware of glaucoma was also poor. One can suspect that the level of glaucoma awareness will be similarly low in the general population.

A higher level of awareness of glaucoma was noticed in females than in males; the older aged group (i.e., 50 to 60 years old) showed higher awareness of glaucoma than the younger aged group, university graduated participants showed a higher level of awareness than primary and middle level, the participants who had vascular diseases (DM/HTN) history, and family history of glaucoma showed a higher level of awareness in comparison with other participants.

An efficient information, education, and communication (IEC) strategy needs to be designed to increase community awareness about glaucoma so that early diagnosis and treatment of individuals with this condition may be possible, thereby preventing visual impairment and preserving the quality of life.

People with a family history of glaucoma and vascular diseases (DM/HTN) history should receive early screening and education on the condition due to the high inheritance rate of the condition. Similarly, individuals who have a high-risk factor for glaucoma should have genetic counseling to see whether they have glaucoma genes. The scientific community needs to conduct more studies to determine the variables that control the awareness and knowledge of glaucoma.

Recommendations

Raise awareness about glaucoma through a series of engaging activities around the country. Invite patients, eye care providers, health officials and the general public to contribute to preserving sight. Continuous awareness campaigns for the public about glaucoma and its symptoms and risk factors. Design educational programs about eye diseases, especially glaucoma, to improve patient awareness, knowledge, attitude and practice of glaucoma. Increased awareness about the importance of regular eye examinations to detect early health deviation, as well as early detection, treatment, and prevention of complications. TV is a very important tool that can play a vital role in bringing glaucoma suspects to screening centers, hence an early diagnosis. Organized community awareness methods must disseminate more ability to increase the general public's understanding to avoid injury and late diagnosis of glaucoma. Increase awareness campaigns for the general public and for people at high risk, such as diabetics, hypertensive patients, and first-degree relatives of glaucoma patients. Improve the quality of awareness campaigns through phone, mobile, internet and social media technologies and the use of celebrities and social influencers to reach different ages and segments of the community. Empowering health staff in various health sectors to perform the awareness-raising role in addition to the therapeutic functional role and the appropriate encouragement for this.

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