

# Awareness and knowledge about glaucoma among patients attending outpatient clinics of Jordan University Hospital

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## Abstract:

**PURPOSE:** To evaluate the level of awareness and knowledge about glaucoma among Jordanians and determine the relationship between glaucoma knowledge and selected variables.

**METHODS:** This was a descriptive and cross-sectional study conducted at a central hospital. Face-to-face interviews were performed to obtain sociodemographic data and information about glaucoma from Jordanian participants attending different outpatient clinics of Jordan University Hospital (JUH). A convenient sample of 488 participants aged 16 years and above were recruited. Consent form was signed by each participant before starting the interview.

**RESULTS:** The mean age of the study population was  $45.71 \pm 15.44$  years, ranging 16 to 89 years. There were 163 (33.4%) females and 325 (66.6%) males. 81.6% of participants had heard of glaucoma. Only 34.2% of participants defined glaucoma correctly. 52.4% of participants had a low level of knowledge about glaucoma. The main source of information was from family members, relatives, and friends (66.6%); however, this source inversely influenced the level of knowledge.

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

## Keywords:

Attitudes, awareness, glaucoma, Jordanian, knowledge

## INTRODUCTION

As announced by the World Health Organization, glaucoma is the second key cause of visual loss worldwide.<sup>[1]</sup> It is a group of diseases in which progressive optic neuropathy leads to a characteristic loss in visual field. Glaucoma is more prevalent in aged individuals and in 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 in an affected individual.

Blindness attributed to glaucoma is only avoidable with early detection and treatment.<sup>[2]</sup> 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 to have knowledge about the disease and the benefits of early detection and treatment. Since glaucoma has no specific symptoms or signs at early stages of disease, it is of great importance to raise awareness to 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 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%.<sup>[3,4]</sup> To date, there are very limited data on the level of awareness or attitudes to

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glaucoma in the Jordanian community. In this study, we conducted a hospital-based survey to evaluate whether Jordanians are aware of glaucoma and assess the level of their knowledge about it. The outcomes of this survey may help in building plans to prevent glaucoma-related blindness and may encourage organizing awareness campaigns for glaucoma nationally and internationally.

## METHODS

### Study design

This study was descriptive and cross-sectional with a convenient sample to assess the level of awareness and knowledge about glaucoma among adults in the Jordanian community. A convenient sample size including 488 participants was used in this study. Adults aged 16 years and above were eligible to be included. The diagnosis of glaucoma was not an exclusion. Study participants were recruited from adults who attended different outpatient clinics at Jordan University Hospital (JUH) since it is a central hospital in Jordan that is visited by patients from all regions of the country as well as urban and rural areas. This study was approved by the JUH Institutional Review Board, Amman, Jordan. Subjects voluntarily accepted to participate after being asked. Participants signed informed consent before starting the interview by field researchers.

### Surveys and interviews

This study was approved by JUH and was conducted in accordance with the World Medical Association and the Declaration of Helsinki. Participants in this study were interviewed face to face by field researchers in the waiting rooms of the outpatient clinics of JUH. Survey data were collected through a pro forma, a document that we designed to organize the collected data and facilitate their analysis, having both open-ended and close-ended questions. Survey questions were taken from published manuscripts that dealt with glaucoma awareness and knowledge in other populations.<sup>[5-9]</sup> Awareness of glaucoma was defined as previously hearing of the disease, whereas knowledge of glaucoma implies the level of understanding this eye disease. Attitudes dealt with the preventive measures they apply or encourage others to apply. Each interview took approximately 7 min. After completion of the interview, respondents were handed a sheet that contained basic information about glaucoma such as definition, risk factors, progression factors, and preventive measures. The questionnaire included two sections: the first section handled demographic data such as gender, age, marital status, and nationality and socioeconomic data including occupation, education level, and residence. The second part included questions about glaucoma such as definition, risk factors, progression factors, preventive measures, and the source of information.

To validate our questionnaire before the actual data collection took place, a pilot test involving responses from 30 participants was conducted to check the readability of the questionnaire in collecting accurate and meaningful data. Minor changes were

made before the final version was completed and made ready for use on the large scale. The data from the pilot test were not included in the final analysis.

### Statistical analysis

The data were managed and analyzed using SPSS software version 16 (IBM Corp., New York, NY, USA). Consistency of data was checked by double entry and checking for outliers. Descriptive analysis including derivation of proportions, mean, and standard deviations was performed. To determine correlations between categorical variables, a Chi-square test was performed. Multiple logistic regression analysis was performed to assess the effect of multiple variables on the knowledge level.  $P < 0.05$  was considered statistically significant. Blooms Taxonomy was applied to analyze the level of knowledge.

## RESULTS

A total of 488 participants were interviewed (males – 325, 66.6% and females – 163, 34.4%) for about 7 mins per participant. The age of the study sample ranged from 16 to 89 years (mean,  $45.71 \pm 15.44$  years). There were statistically significantly more males and females whose age ranged between 25 and 60 years than those younger than 25 or older than 60 ( $\chi^2 = 19.522$ ,  $P = 0.000$ ). Table 1 presents the sociodemographic characteristics of the participants.

Three hundred and ninety-eight (81.6%) of 488 respondents had heard of glaucoma and 90/488 (18.4%) respondents had never heard of glaucoma. Knowledge of glaucoma was evaluated as shown in Table 2. One hundred and thirty-six (34.1%) of 398 respondents had defined glaucoma correctly with several levels of details [Table 2]. Table 3 shows the history of glaucoma among respondents and their families and the preventive measure they apply. Of 488 respondents, 20 (4.1%) were diagnosed with glaucoma and 144/488 (36.5%) had a family history of glaucoma [Table 3]. Patients affected with glaucoma did not show a better knowledge level than non-affected participants (odds ratio [OR] = 1.050, confidence interval [CI] 95% (0.377–2.399), ( $P = 0.590$ )). Participants who had a family history of glaucoma were three times more likely to show a high level of knowledge (OR = 3.676, CI 95% [0.170–0.436]) ( $P = 0.000$ ). Subjects who routinely underwent eye examinations were seven times more likely to have a high knowledge of glaucoma than those who did not (OR = 7.042, CI 95% [0.044–0.461]) ( $P = 0.000$ ). The levels of glaucoma knowledge and their distributions are shown in Table 4.

Sources of information included internet (1.3%); media (mainly TV) (12.0%); reading (magazines and newspapers both electronic and printed) and lectures (4.3%); information from school (3.8%); doctors or ophthalmologists (12.0%); and family members, relatives, or friends (66.6%) [Table 5].

No significant relation between knowledge of glaucoma and age was noticed (OR = 1.227, CI 95% [0.424–3.556]) ( $P = 0.192$ )

**Table 1: Sociodemographic data of respondents**

Parameter	n (%)
Age (years)	
≤25	43 (8.8)
26-45	198 (40.6)
46-65	186 (38.1)
>65	61 (12.5)
Gender	
Male	325 (66.6)
Female	163 (33.4)
Marital status	
Single	82 (16.8)
Married	390 (79.9)
Widow	12 (2.5)
Divorced	4 (0.8)
Nationality	
Jordanian	461 (94.5)
Non-Jordanian	27 (5.5)
Geographic region	
Central	449 (92)
North	22 (4.5)
South	11 (2.3)
Outside the Country	6 (1.2)
Educational level	
Group A <sup>a</sup>	30 (6.1)
Group B <sup>b</sup>	163 (33.4)
Group C <sup>c</sup>	228 (46.7)
Group D <sup>d</sup>	31 (6.4)
Group E <sup>e</sup>	36 (7.4)
Job	
Does not work	33 (6.8)
Student	14 (2.9)
Homemaker	92 (18.9)
Retired	72 (15)
Vocational	20 (4.1)
Teacher	40 (8.2)
Employee in public sector	91 (18.6)
Employee in private sector	32 (6.6)
Private job	45 (9.2)
Professional	38 (7.8)
University faculty member	10 (2.0)
Monthly income (USD)	
≤700	249 (51.0)
701-1199	123 (25.2)
1200-1699	62 (12.7)
1700-2799	30 (6.14)
≥2800	24 (4.9)

Information regarding age, gender, marital status, nationality, geographic region, educational level, job, and monthly income were collected from interviewees. Total (n=488). <sup>a</sup>Group A includes illiterate and primary school; <sup>b</sup>Group B includes vocational center, intermediate school, and high school; <sup>c</sup>Group C includes diploma and bachelor's degrees; <sup>d</sup>Group D includes doctors, dentists, pharmacists, engineers, and lawyers; <sup>e</sup>Group E includes graduate studies (master and doctorate degrees)

[Table 6]. No significant difference in the level of knowledge across gender (OR = 1.035, CI 95% [0.626–1.489]) (*P* = 0.572) was detected [Table 6]. Several factors were investigated as potential contributors to the knowledge level, but only the following factors showed a significant role: the family history

of glaucoma (OR = 3.676, CI 95% [0.170–0.436]) (*P* = 0.000), the performance of regular checkups (OR = 7.04, CI 95% [0.044–0.461]) (*P* = 0.000), and the source of information (OR = 1.226, CI 95% [1.131–1.329]) (*P* = 0.000). Multiple logistic regression analysis of the significantly contributing factors showed a significant role of family history (*P* = 0.000) and the source of information (*P* = 0.000) but non-significant effect for regular checkups (*P* = 0.857). Other factors including the educational level (OR = 1.109, CI 95% [0.271–2.998]) (*P* = 0.643), occupation (OR = 1.289, CI 95% [0.457–3.64]) (*P* = 0.098), income (OR = 1.407, CI 95% [0.542–3.652]) (*P* = 0.084), and previous history of glaucoma (OR = 1.050, CI 95% [0.377–2.399]) (*P* = 0.590) did not show a significant influence on the level of knowledge of glaucoma. In addition, gaining information from people other than those in the medical field had significantly reduced the level of knowledge about glaucoma (OR = 2.355, CI 95% [0.558–9.930]) (*P* = 0.018). Although expected to contribute to the knowledge level, the educational level of the participants did not significantly affect their knowledge of glaucoma; however, we noted that participants with professional or postgraduate degree showed a lower percentage of low knowledge level when compared to participants with bachelor degree or lower [Table 6]. Subjects in different professions did not significantly differ in the level of knowledge about glaucoma. Respondents who received a lower income had a lower level of knowledge although it was not significant [Table 6].

## DISCUSSION

Glaucoma is the third leading cause of severe bilateral blindness among Jordanians.<sup>[10]</sup> As a non-symptomatic cause of irreversible vision loss, early detection and effective treatment of glaucoma can prevent progression of this pathology. Awareness and knowledge of glaucoma can improve the outcome of this disease and help patients maintain an independent lifestyle, especially the elderly who have a higher risk to be affected. A high level of awareness to glaucoma comparative to that in developed countries was detected among Jordanians in this study.<sup>[11,12]</sup> Awareness in a Canadian study was found to be 73% of 243 respondents, whereas it was 81.6% of 488 Jordanian subjects. A high percentage, 34.1%, was able to define it correctly in a comparative percentage to Canadians, among whom 29% could identify the accurate definition.<sup>[13]</sup> In comparison to the populations of the Middle East, awareness among Jordanians (81.6%) was higher than that in Egyptians (15.5%) and Iranians (46.6%).<sup>[14,15]</sup> Only 19.2% of Iranians were able to define it correctly, while 34.1% of Jordanians did.<sup>[14]</sup> When compared to Saudi Arabians, one study showed a low level of knowledge about glaucoma among Saudi Arabians (14.8%),<sup>[16]</sup> whereas another Saudi study found that 66.5% of respondents had a good level of knowledge about glaucoma.<sup>[17]</sup> The relatively high awareness and knowledge levels among Jordanians might be attributed to the high educational level of our population as well as the strong social and family ties between them that increase sharing

**Table 2: Knowledge of glaucoma**

Question content	Number of respondents with a correct answer, n (%)
Definition of glaucoma	136 (34.1)
Irreversibility of the resulting blindness	41 (10.4)
Preventability of blindness	309 (78.2)
The absence of symptoms for glaucoma	157 (39.7)
Risk factors for glaucoma	
Family history	259 (65.9)
Gender	87 (22)
Aging	325 (82.3)
Diseases/drugs that affect the risk of glaucoma	
Diabetes	364 (82.3)
Heart disease	168 (42.5)
Hypertension	298 (75.4)
Anemia	159 (40.4)
Short sightedness	188 (47.7)
Long sightedness	132 (33.4)
Cataract	73 (18.5)
Steroid-containing eye drops	188 (47.6)

Questions about the definition, symptoms, irreversibility, prevention, and risk factors were asked to interviewees. Number and percentage of respondents with a correct response for each question were determined

**Table 3: Patient history of glaucoma and preventive measures**

Patient history and preventive measures	n (%)
Diagnosed with glaucoma	20 (4.1)
Have a family member with glaucoma	144 (36.5)
Expect to become affected by glaucoma	102 (26)
Regular eye checkup	126 (31.9)
Encourage family members to have regular eye checkups	391 (98.7)

Subjects were asked whether they are affected or they expect to get affected by glaucoma and about their family history of glaucoma. They were also asked about the preventive measures they apply or recommend to family members to avoid this disease

**Table 4: Blooms classification of the level of glaucoma knowledge**

Level of knowledge	Number of respondents (%)
Low	198 (52.4)
Average	170 (45)
High	10 (2.6)

Subjects were grouped into three groups depending on the level of knowledge they have about glaucoma. The level of knowledge was determined depending on the percentage of questions about glaucoma that were answered correctly by the respondent

life experiences and information including that about diseases. This can be reflected by the results of this manuscript that showed the significant contribution of family members, friends, and relatives as a source of information about glaucoma. In our study, we interviewed participants to avoid their choice of answers without previous knowledge, while participants were handed questionnaires in other studies. If questions were provided in a written questionnaire, the level of knowledge may be affected since participants may choose their answers in the questionnaire without true knowledge of the information. Other

studies compared the awareness and knowledge of glaucoma in populations of rural and urban regions and found more awareness and knowledge in urban regions.<sup>[18]</sup> Even though the awareness to glaucoma is high among Jordanians, the knowledge of glaucoma is of low level among more than half of the Jordanian population involved in this study. 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, only 8/398 (2%) of the participants who had heard of glaucoma defined glaucoma as cataract. The low level of knowledge of glaucoma might be attributed to several factors such as the reliance on relatives and friends as the major source of information in addition to the lack of enough doctor-patient time in clinics due to the large number of patients seen by the doctors in primary health-care clinics as well as in ophthalmology clinics. The glaucoma knowledge level might be uplifted by increasing the number of serving doctors in primary care and ophthalmology clinics and improving their communication skills with the patients they approach to guarantee a correct delivery of information to them regardless of their educational levels and backgrounds. This was implied by the results of our study that showed no influence of the participant being affected by glaucoma on his/her knowledge about it. In addition, public health programs should include raising awareness and knowledge about glaucoma among their targets since it is a main cause of irreversible blindness in our society and worldwide. The importance of this was reflected by the presence of a significant effect of performing routine checkups on the knowledge level of glaucoma ( $P = 0.047$ ).

As a major contributor to vision loss in Jordan and worldwide, lack of knowledge about glaucoma makes improving information about this disease a necessity to Jordanian and global communities. Previous studies on the Jordanian population's awareness to glaucoma showed a low level of awareness and knowledge, but did not correlate the level of knowledge with the source of information.<sup>[19,20]</sup> They neither investigated the influence of the career nor the monthly income on the level of knowledge about glaucoma.<sup>[19,20]</sup> This study is the first that investigated the factors that may affect knowledge about glaucoma among Jordanians. The uniqueness of this study is related to the evaluation of the knowledge level and the categorization of participant responses according to the level of knowledge about glaucoma. Participants who had <50% of their responses to questions that included information about glaucoma correct were considered to have low knowledge level, whereas those who had 50%–70% or more than 70% correct answers were considered to have average or high knowledge levels, respectively.

The limitations of this study include performing the interviews in JUH outpatient clinics; however, JUH is a central hospital to which patients are referred from hospitals and clinics in other cities and rural regions. Recruitment of interviewees could confer a certain degree of representation, but there could have been selection bias. There was also a difficulty running this

**Table 5: Sources of glaucoma knowledge**

Source	Percentage of respondents who mentioned each source	95% CIs
Internet	1.3	-0.456-1.5456
Media	12.0	0.0531-9469
Reading and lectures	4.3	0.3586-8914
School	3.8	0.4895-1.1105
Doctor or ophthalmologist	12.0	0.3507-0.8874
Family members, relatives, or friends	66.6	0.3334-0.5579

Subjects were asked about the source of their information about glaucoma. Responses were grouped as shown in this table. CIs=Confidence intervals

project in all the three geographic regions of Jordan and to include both rural and urban regions. However, some patients were referred to JUH from all geographic regions of the country and a few of them were included in this study.

Respondents of different age groups did not show a significant variability in knowledge level; consequently, educational programs should target all age categories. The lower knowledge level among participants with bachelor's degree or lower educational level may reflect a weakness in health educational programs among university and school students. Future studies with a larger sample size in each educational level may show variabilities in the level of knowledge about glaucoma among participants with different educational levels.

The majority of those who had knowledge of glaucoma acquired it from people with whom they have relationships (family members, friends, and more distant relatives) followed by media and physicians or ophthalmologists by the same degree. However, more than half of the participants did have a low level of knowledge of glaucoma. The internet was the least common source of information about glaucoma among Jordanians. Health education should be given more focus, especially in ophthalmology clinics of JUH as well as public hospitals and health-care centers. Similar results were obtained from a representative German population survey where friends were the main source of information (44%), whereas physicians were the source of information in 13% of the respondents.<sup>[11]</sup> Furthermore, media particularly TV and radio should be given more focus as the main vehicles to health-educate the public as demonstrated in a study performed in England where awareness was increased from 22% to 69% after radio enlightenment among an Indian population.<sup>[12]</sup> In populations of southern India, the most common source of awareness of glaucoma was TV/magazines followed by family members with glaucoma.<sup>[5,21]</sup>

The inaccessibility of eye-care services to some Jordanians might be a contributing factor to the late presentation and advanced eye disease at the time of diagnosis. Increasing the level of knowledge about glaucoma and its irreversible blinding effect is therefore mandatory among our population. Family members with a history of glaucoma did show a high level of knowledge; hence, they should be involved in campaigns that

**Table 6: Factors affecting glaucoma knowledge**

Factor	Number and percentage with low knowledge of glaucoma, n (%)	P
Age (years)		0.192
≤25	11 (2.9)	
26-45	78 (20.6)	
46-65	82 (21.7)	
>65	27 (7.1)	
Gender		0.572
Male	132 (34.9)	
Female	66 (17.5)	
Geographic region		0.819
Central	182 (48.1)	
North	5 (1.3)	
South	8 (2.1)	
Outside the country	3 (0.8)	
Educational level		0.685
Group A <sup>a</sup>	12 (3.0)	
Group B <sup>b</sup>	59 (14.8)	
Group C <sup>c</sup>	76 (25.4)	
Group D <sup>d</sup>	12 (3.2)	
Group E <sup>e</sup>	19 (5.0)	
Job		0.098
Does not work	8 (2.1)	
Student	3 (0.8)	
Homemaker	44 (11.6)	
Retired	30 (7.9)	
Vocational	10 (2.6)	
Teacher	15 (4.0)	
Employee in public sector	42 (11.1)	
Employee in private sector	11 (2.9)	
Private Job	13 (3.4)	
Professional	16 (4.2)	
University faculty member	6 (1.6)	
Monthly income (USD)		0.084
≤700	108 (28.6)	
701-1199	44 (11.6)	
1200-1699	18 (4.8)	
1700-2799	14 (3.7)	
≥2800	14 (3.7)	

Respondents with low level of knowledge about glaucoma were grouped depending on their sociodemographic data and their counts as well as percentages were calculated. <sup>a</sup>Group A includes illiterate and primary school; <sup>b</sup>Group B includes vocational center, intermediate school, and high school; <sup>c</sup>Group C includes diploma and bachelor's degrees; <sup>d</sup>Group D includes doctors, dentists, pharmacists, engineers, and lawyers; <sup>e</sup>Group E includes graduate studies (master and doctorate degrees)

encourage performing eye screening regularly after 40 years of age. Encouraging the public to present for early checkup and offering more public health educational programs may prevent blindness due to glaucoma among Jordanians as well as other populations.

## CONCLUSIONS

There was a high level of awareness but low level of knowledge of glaucoma in the Jordanian community surveyed in this study. Health education plans should focus on glaucoma as a

major cause of vision loss among Jordanians and worldwide to reduce the irreversible blindness from this disease.

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### Conflicts of interest

There are no conflicts of interest.

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