

RESEARCH PAPER

GLAUCOMA AWARENESS, KNOWLEDGE, AND EYE-CARE SEEKING BEHAVIOUR AMONG FIRST-DEGREE RELATIVES OF GLAUCOMA PATIENTS AT A REGIONAL HOSPITAL IN GHANA

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ABSTRACT

Glaucoma is the leading cause of irreversible blindness worldwide. Early detection and treatment can prevent blindness. Individuals, especially those with positive family history of glaucoma ought to have knowledge of the disease and seek assessment regularly for early detection and treatment of the disease. The study explores and describes glaucoma awareness, knowledge, and eye care-seeking behavior of first-degree relatives of glaucoma patients who attend the Accra Regional Hospital Eye Unit. The descriptive cross-sectional study utilized a questionnaire to interview 306 conveniently sampled participants with mean \pm SD age of 35.5 ± 10.3 years. Among participants, 52.6% were males. There was a moderate level of awareness of glaucoma (60.8%) among study participants. Most respondents did not know the risk factors of glaucoma (66.3%), the asymptomatic nature of glaucoma (80.7%), and irreversibility of vision loss in glaucoma (89.6%). Only 23.2% of respondents had screened for glaucoma. Social media was the main source of glaucoma awareness (45.7%) and information to screen for glaucoma (52.4%). The occupation ($p=0.001$) and level of education ($p<0.0005$) of respondents were significantly associated with knowledge of glaucoma. Similarly, the occupation ($p=0.001$), level of education ($p=0.035$), and being informed to screen for glaucoma ($p<0.0001$) were significantly associated with glaucoma screening. Knowledge of glaucoma and glaucoma screening among first degree relatives of glaucoma patients are low. There is the need for eye-care professionals to provide accurate and comprehensive education on glaucoma and also embark on targeted glaucoma screening programs.

Keywords: glaucoma, awareness, knowledge, screening, relatives

INTRODUCTION

Glaucoma is an ocular disease characterized by progressive vision loss and atrophy of the optic nerve (Barton and Hitchings, 2013). It is the second leading cause of blindness in the world and the leading cause of irreversible blindness globally (Resnikoff et al., 2004). Quigley and Broman (2006) estimated that by the year 2020, 58.6 million people would be diagnosed with primary open-angle glaucoma (POAG), and 11.1 million people would be bilaterally blind from primary open-angle glaucoma. In Africa, Glaucoma accounts for 15% of blindness (Resnikoff et al., 2004). However, Ghana is one of the highest-ranking countries in the world affected with the disease, having more than six percent of its population affected (Budenz et al., 2013, Ntim-Amponsah et al., 2004a).

Over the years, efforts to eliminate glaucoma blindness has been focused on glaucoma patients who may have already sustained significant vision loss upon their first visit to the clinic. However, persons with positive family history of POAG are estimated to be 9.2 times at risk of developing the disease, and population studies evaluating the role of family history of glaucoma have observed an increased prevalence of the disease among first-degree relatives (Nguyen et al., 2000). Studies also show that the treatment-seeking behavior of patients is greatly dependent on their awareness and knowledge of the disease (Livingston et al., 1995, Landers et al., 2002). Published surveys from developing countries has indicated low levels of awareness of glaucoma in studied populations (Ntim-Amponsah et al., 2004b, Balo et al., 2004, Bodunde et al., 2006, Onyekwe et al., 2009, Tenkir et al., 2010).

To the best of our knowledge, no study has been done on glaucoma awareness and knowledge among first-degree relatives of glaucoma patients in Ghana. The study therefore sought to assess the awareness,

knowledge, and eye care seeking behavior of first-degree relatives of glaucoma patients. The study provides information that can enable health policy makers to develop national educational and screening programs purposely targeted at at-risk populations to ensure early detection and management of glaucoma.

METHODS

Study Design, Area, And Population

The study is a descriptive cross-sectional study conducted among first-degree relatives of glaucoma patients who attended the Accra Regional Hospital Eye Clinic from January 2020 to March 2020. The Accra Regional Hospital, Ridge is one of the major health care facilities in the Accra metropolis and receives case referrals from other health care facilities within the Greater Accra Region and neighboring regions (Central Region, Eastern Region, Western Region, Volta Region)

Inclusion and Exclusion Criteria

The study included first-degree relatives including parents, siblings, and offspring of glaucoma patients who visited the eye unit of the Accra Regional Hospital. We excluded anyone who was not a first-degree relative of the glaucoma patients identified and first-degree relatives who did not consent to participate in the study.

Data Collection

The instrument used for data collection in the study was a structured questionnaire adapted from previous similar studies (Eke et al., 1999, Rajendrababu et al., 2014, Oakley et al., 2013). The questionnaire was used to gather information on participants' demographics, socio-economic status, awareness and knowledge of glaucoma, screening status, and eye care-seeking behaviour.

Data Collection Method and Process

Data were collected via face-to-face or telephone interviews. Glaucoma patients were asked if they came with anyone who met the inclusion criteria (a parent, sibling or offspring). The potential participants' relationship with the patient was ascertained to make sure they were within the inclusion criteria. Those who consented (verbally) to participate in the study were guided by the researcher to fill out the questionnaire in a language they understood. A quiet room at the eye unit was selected for conducting the research interviews. Data were collected from one participant at a time and ten participants were assessed per day. In the event where the glaucoma patients visited the eye unit alone, contacts of their first-degree relatives were obtained from the patient after the purpose of the study had been explained to him or her. These first-degree relatives whose contacts were obtained were called over the telephone, and those who consented (verbally) to participate were guided to answer the questions on the questionnaire as it was read to them over the telephone in a language they understood.

Awareness and Knowledge on Glaucoma

Participants were asked if they have ever heard of glaucoma and their source of information on glaucoma. They were also asked to describe glaucoma by choosing from a list of four options. Subsequent questions tested knowledge on risk factors such as aging, family history, diabetes, and hypertension. Participants' knowledge on the types of vision loss in glaucoma including peripheral loss, central loss, and complete loss was also ascertained.

Defining Knowledge Levels of Glaucoma

A participant was considered to have good knowledge if he/she was able to identify the risk factors for glaucoma, describe vision loss in glaucoma, indicate that glaucoma can be asymptomatic in early stages and that vision loss is irreversible. Fair knowledge was considered if at least one of the factors above was identified. Poor knowledge was ascribed to participants if none of the factors above was identified.

Glaucoma Screening and Eye Care Seeking Behavior

The questionnaire identified participants who had been screened for glaucoma and participants who had not been screened for glaucoma. It also identified participants who had at least one eye examination a year and those who had never had an eye examination.

Sample Size and Sampling Technique

Purposive and convenient sampling techniques were used for the study. A sample size of 385 participants was expected based on the formula; $n = Z^2 P(1-P)/d^2$ where n is the desired sample size (when population is greater than 10,000), Z is the standard normal deviation set at 1.96 which correspond to a 95% confidence interval, P is the proportion in the target population estimated to have a particular characteristic (50%) and d is the degree of accuracy (5%).

Statistical Analyses

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 25.0 (Armonk, NY) compatible with Windows 10. Descriptive data was analysed using frequencies and percentages. Associations were determined using chi-square and analysed using bivariate and multivariate

logistic regression. Statistical significance was set at $P < 0.05$ at a confidence interval of 95%

Ethical Approval

Ethical approval was obtained from the Committee on Human Research Publication and Ethics of the Kwame Nkrumah University of Science and Technology (KNUST), College of Health Sciences (CHRPE/AP/151/20), and the Accra Regional Hospital Research Office. Informed consent was obtained from the participants after clearly explaining study aims and objectives. The study upheld the tenets of the Declaration of Helsinki in all procedures.

RESULTS

Socio-demographic Characteristics

The study involved 306 first-degree relatives of glaucoma patients representing a response rate of 79.5%. The mean (SD) age of the respondents was 35.5 (10.3) years (range, 18-65 years). Most participants had tertiary education, had blue or white collar jobs, and were offspring of glaucoma patients (Table 1).

Table 1: Socio-demographic Characteristics of Respondents (N=306)

Socio-demographic Characteristics	Frequency	%
Age (years)		
15-25	48	15.7
26-36	143	46.7
37-47	67	21.9
48-58	39	12.8
59-69	9	2.9
Sex		
Male	161	52.6
Female	145	47.4
Education		
Basic	51	16.7
Secondary	77	25.2
Tertiary	178	58.2
Occupation		
Student	35	11.4
Blue-Collar	136	44.4
White-Collar	133	43.5
Pensioner	2	0.7
Relationship with Patient		
Parent	0	0.0
Sibling	112	36.6
Offspring	194	63.4

% - Percentage of respondents

Awareness of Glaucoma

Nearly 61% of respondents were aware of glaucoma (Fig. 1) and most respondents (45.7%) had social media as their source of glaucoma awareness (Fig. 2). A little over 55% of respondents were not aware that their relatives have glaucoma (Fig. 3). Respondents' occupation ($p < 0.001$) and educational level ($p < 0.001$) were significantly associated with glaucoma awareness (Table 2).

Glaucoma awareness and eye-care seeking behavior

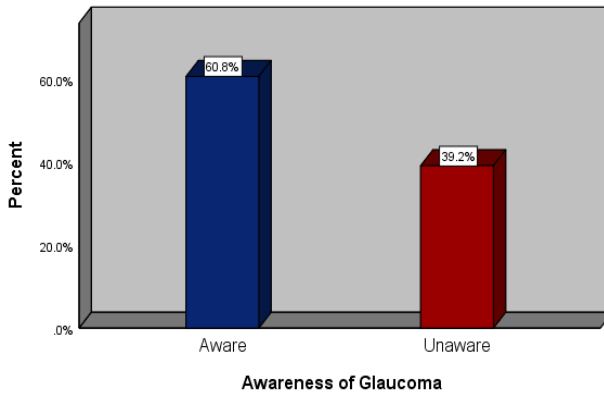


Fig. 1: Respondents Aware and Unaware of Glaucoma

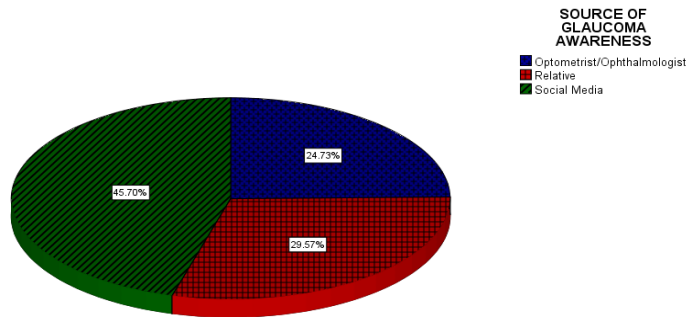


Fig. 2: Sources of Glaucoma Awareness among Respondents

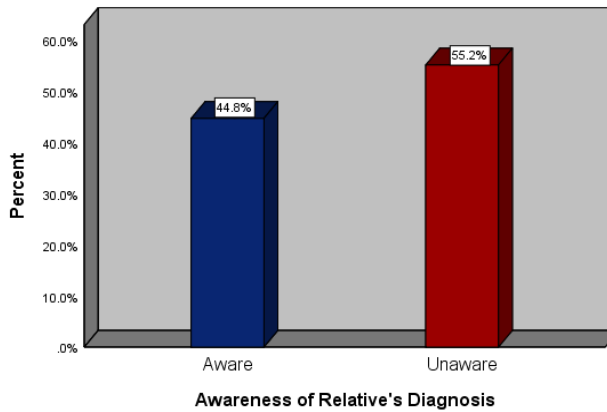


Fig. 3: Respondents Aware and Unaware of Relative's Glaucoma Diagnosis

Table 2: Association between Respondents’ Occupation/Educational Level and Glaucoma Awareness

Variable	Awareness of Glaucoma		P-value
	Unaware n (%)	Aware n (%)	
Occupation			
Student	12 (10)	23 (12.4)	
Blue-collar	71 (59.2)	65 (34.9)	<0.0001
White-collar	37 (30.8)	96 (51.6)	
Pensioner	0	2 (1.1)	
Educational level			
Basic	30 (25)	21 (11.3)	
Secondary	42 (35)	35 (18.8)	<0.0001
Tertiary	48 (40)	130 (69.9)	

% - Percentage of respondents n – number of respondents

Knowledge on Glaucoma

More than half of respondents (68.6%) were not able to define glaucoma. About a third of respondents (33.6%) identified aging or family history as a risk factor for glaucoma. A little

over half of respondents (51%) acknowledged that glaucoma can be treated, and a similar figure indicated that eye drops is the treatment option. Only 10.5% of respondents knew that vision loss in glaucoma is irreversible (Table 3).

Table 3: Knowledge of Glaucoma among Respondents

Variable	Frequency	%
Definition of Glaucoma		
Condition associated with high eye pressure	65	21.2
Condition associated with nerve damage	4	1.3
Condition that causes blindness	92	30.1
Do not know	145	47.4
Can glaucoma be asymptomatic?		
Yes	59	19.3
No	16	5.2
Do not know	231	75.5
Vision Loss in Glaucoma		
Peripheral vision loss	22	7.2
Central vision loss	9	2.9
Complete vision loss	18	5.9
Do not know	257	84.0
Glaucoma Risk Factors		
Aging	42	13.7
Family History	61	19.9
Hypertension	0	0.0
Diabetes	0	0.0
Do not know	203	66.3
Can glaucoma be treated?		
Yes	157	51.3
No	3	1.0
Do not know	146	47.7
What are the treatment options?		
Eye drops	157	51.3
Surgery	0	0.0
N/A	149	48.7
Is vision loss in glaucoma reversible?		
Yes	59	19.3
No	32	10.5
Do not know	215	70.3
What is the normal value of eye pressure?		
Between 8 and 12mmHg	0	0.0
Between 11 and 21mmHg	11	3.6
Do not know	295	96.4

% - Percentage of respondents

There was a statistically significant association between knowledge of glaucoma and respondents' occupation ($p=0.001$), and level of education ($p<0.0005$) (Table 4).

Table 4: Association between Respondents' Occupation/Educational Level and Knowledge of Glaucoma

Variable	Respondent's definition of glaucoma				P-value
	Condition associated with high eye pressure	Condition associated with nerve damage	Condition that causes blindness	Do not know	
Occupation	n (%)	n (%)	n (%)	n (%)	
Student	10 (15.4)	0	9 (9.8)	16 (11.0)	
Blue-collar	17 (26.2)	0	35 (38.0)	84 (57.9)	0.001
White-collar	37 (56.9)	4 (100)	47 (51.1)	45 (31.0)	
Pensioner	1 (1.5)	0	1 (1.1)	0	
Education Level					
Basic	4 (6.2)	0	10 (10.9)	37 (25.5)	
Secondary	11 (16.9)	0	20 (21.7)	46 (31.7)	<0.0005
Tertiary	50 (76.9)	4 (100)	62 (67.4)	62 (42.8)	

% - Percentage of respondents n – number of respondents

Glaucoma Screening

Most respondents (65.7%) had not been informed to screen for glaucoma (Fig. 4). Among those informed to screen for glaucoma, their primary source of information was the social media (52.4%), followed by relatives (30.5%) (Fig. 5). Only 23.2% of respondents have actually screened for glaucoma (Fig. 6). There was a statistically significant association between glaucoma screening and respondents' occupation ($p=0.001$) and level of education ($p=0.035$) (Table 5). Bivariate logistic regression analysis showed that awareness of glaucoma ($OR=71.81$, $p<0.0001$) and informed to screen for glaucoma ($OR=413.82$, $p<0.0001$) were significantly associated with glaucoma screening. Multiple logistic regression also

showed that informed to screen for glaucoma was significantly associated with glaucoma screening (Table 6).

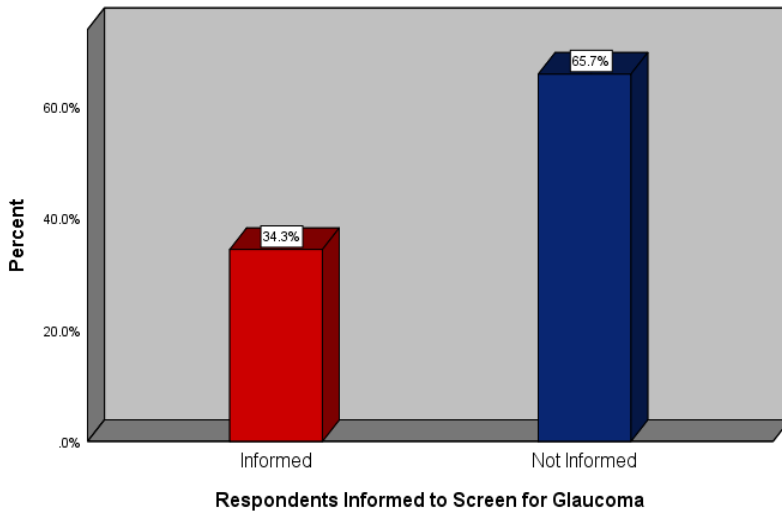


Fig. 4: Respondents Informed and Not Informed to Screen for Glaucoma

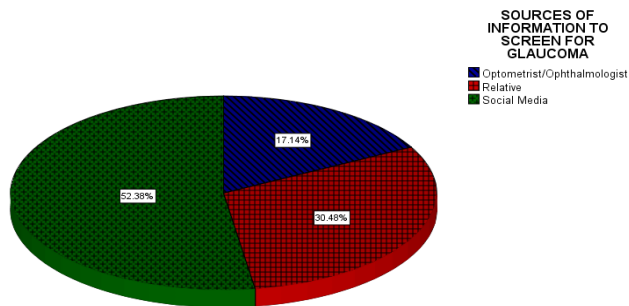


Fig. 5: Sources of Respondents' Information to Screen for Glaucoma

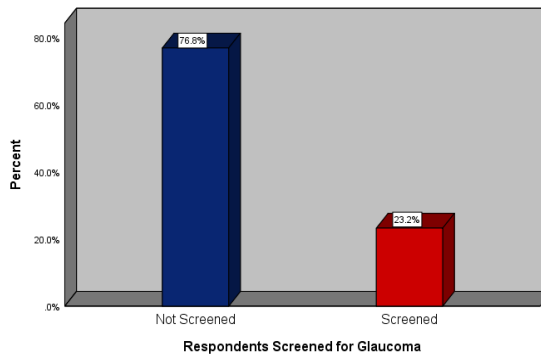


Fig. 6: Respondents Screened and Not Screened for Glaucoma

Table 5: Association between Respondents’ Occupation/Educational Level and Glaucoma Screening

Variable	Screened for Glaucoma		
	Not Screened	Screened	
Occupation	n (%)	n (%)	P-value
Student	24 (10.2)	11 (15.5)	0.001
Blue-collar	117 (49.8)	19 (26.8)	
White-collar	94 (40)	39 (54.9)	
Pensioner	0	2 (2.8)	
Educational Level			
Basic	45 (19.1)	6 (8.5)	0.035
Secondary	62 (26.4)	15 (21.1)	
Tertiary	128 (54.5)	50 (70.4)	

% - Percentage of respondents n – number of respondents

Table 6: Bivariate and Multiple Logistic Regression of factors influencing Glaucoma Screening

Variable	Bivariate Analysis			Multivariate Analysis		
	Glaucoma Screening	Glaucoma Screening	Glaucoma Screening	Glaucoma Screening	Glaucoma Screening	Glaucoma Screening
	OR	95% CI	P-value	AOR	95% CI	P-value
Glaucoma Awareness						
Unaware	Ref	-	-	Ref	-	-
Aware	71.81	9.81-525.55	<0.0001	1.73	0.11-28.22	0.702
Informed to Screen						
Not Informed	Ref	-	-	Ref	-	-
Informed	413.82	55.61-3079.54	<0.0001	312.98	29.54-3316.49	<0.0001

OR= Odds Ratio AOR= Adjusted Odds Ratio CI= Confidence Interval Ref=Reference Category

Eye Examinations of Respondents

More than half of respondents (56.2%) have an eye examination at least once every year

and more than a fifth of the respondents (23.5%) have never had an eye examination (Fig. 7).

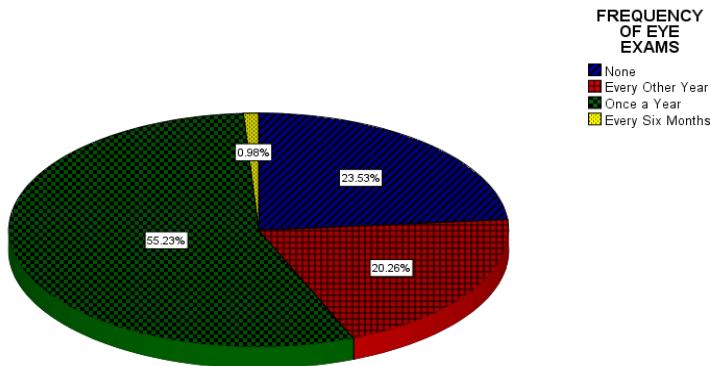


Fig. 7: Frequency of Eye Examinations by Respondents

DISCUSSION

The study investigated the awareness, knowledge, and eye care-seeking behaviour of first-degree relatives of glaucoma patients attending the eye clinic of the Greater Accra Regional Hospital. The results showed that

majority of the study participants were aware of glaucoma (60.8%) but had poor knowledge of the disease, and 76.8% of them have never screened for glaucoma. The main factors associated with glaucoma awareness and knowledge were education and occupation,

and the main factor associated with glaucoma screening was informed to screen.

Glaucoma awareness has been reported in different populations with varied findings. In our study, majority of the participants were aware of glaucoma; a finding similar to those reported in previous studies. For instance, Nkum et al. (2015) reported a 74% glaucoma awareness among adult patients attending a tertiary hospital in Ghana. Komolafe et al. (2013) in a study assessing the level of awareness and knowledge on glaucoma among selected health care workers at a health institution in south western Nigeria also found that more than two-thirds of participants had heard of glaucoma. However, in other studies conducted in Ghana (De-Gaulle and Dako-Gyeke, 2016), Nigeria (Kizor-Akaraiwe et al., 2017), Ethiopia (Heisel et al., 2021), and India (Krishnaiah et al., 2005) there was a lower degree of glaucoma awareness. This shows that glaucoma awareness may vary among different study populations or geographical regions. Social media was found to be the main source of information on glaucoma among participants in this study. Notably, in a study conducted by Bannor et al. (2017), the general public identified social media as an effective medium for health professionals to share health-related messages. Social media users in Ghana have increased over the years (Kemp, 2020) and thus it is expected that more people have access to information including health information on social media.

Knowledge on glaucoma among respondents in the present study was low. Majority of respondents could not define glaucoma (68.6%), and had no or inaccurate knowledge on the symptoms (80.7%), pattern of vision loss (86.9%), and risk factors (66.3%) of the disease. Only 10.5% of respondents knew that vision loss in glaucoma is irreversible. However, 51.3% of respondents indicated that the disease can be treated with eye drops. The low knowledge of glaucoma

among respondents raises a question on the accuracy of information on glaucoma obtained from the social media. It also suggests that eye care practitioners do not educate first-degree relatives of glaucoma patients or a less accurate information is relayed to first-degree relatives by the glaucoma patients. Consequently, less than half of respondents (44.8%) were aware of their relative's glaucoma diagnosis – a percentage less than that of respondents who are generally aware of glaucoma (60.8%). Earlier studies had reported low knowledge of glaucoma among respondents. Nkum et al. (2015) in a study among adult patients at a tertiary hospital eye clinic in Ghana found that only 14% of participants could give a precise definition of glaucoma. Similarly, in a study in Ethiopia, Heisel et al. (2021) found that although 44% of participants were aware of glaucoma, only 28.2% rated their knowledge as good or very good. Lesser numbers are also reported in a study in Nepal which showed that among 60.6% of participants who were aware of glaucoma, only 5.5% had knowledge on glaucoma (Gyawali and Sarkar, 2014).

In this study, participants' education and occupation were significantly associated with knowledge and awareness of glaucoma. Participants with high level of education and white-collar jobs were more likely to be aware and have adequate knowledge on glaucoma. Previous studies also report similar findings. Bizuneh et al. (2020) for instance reported that persons with either primary or secondary level education were three times more likely to be aware of glaucoma compared to those without any formal education. Also, Kizor-Akaraiwe et al. (2017) in a study conducted in Nigeria showed a strong association between knowledge on glaucoma and level of education; the higher the level of education, the greater the number of people with good knowledge. They further showed a significant association between occupation and knowledge on glaucoma. In their study, most

farmers and labourers among participants had poor knowledge on glaucoma. However, the authors stated that the association between occupation and knowledge on glaucoma may be due to the association between level of education and knowledge on glaucoma. Nkum et al. (2015) in his study also reported statistically significant differences between occupation type and glaucoma awareness.

Notably, eye care-seeking behaviour among first-degree relatives of glaucoma patients in this study was not remarkable. Only, 23.2% of respondents had screened for glaucoma although more than a third (34.3%) had been informed to screen. Again, majority (52.4%) of respondents informed to screen for glaucoma received information through the social media. More than half of respondents (56.2%) indicated that they have eye examinations at least once a year. However, it is uncertain if these examinations included thorough glaucoma screening. There was a significant association between being informed to screen for glaucoma and glaucoma screening which posits that first-degree relatives who have been informed to screen for glaucoma are more likely to undergo glaucoma screening. The low number of respondents who have undergone screening may be attributed to the fact that most study participants lacked adequate knowledge of the disease especially regarding how it could affect their vision without presenting symptoms or signs at early stages. Notably, only 19.3% of respondents were aware that glaucoma can be asymptomatic at the early stages. Level of education and occupation was also associated with glaucoma screening. First-degree relatives of glaucoma patients with high level of education are more likely to have good knowledge of glaucoma and thus are also likely to screen for the disease. Again, the significant association between occupation and glaucoma screening may be due to the association between level of education and glaucoma screening. The cost of eye-care

services is a major barrier in accessing eye-care (Ebeigbe, 2018) but educated first-degree relatives of glaucoma patients are likely to be employed into well-paying occupations thus enabling them to overcome any financial barrier in accessing eye-care. Also, some working institutions require initial medical screening before employment or conduct regular medical screening for their workers. Workers in such institutions take advantage of these opportunities and get screened for glaucoma.

CONCLUSION AND RECOMMENDATION

The study showed a moderate awareness and low knowledge of glaucoma among first-degree relatives of glaucoma patients attending the Greater Accra Regional Hospital. Most first-degree relatives of glaucoma patients (76.8%) had not been screened for glaucoma although a little over half (56.2%) had an eye examination once or twice every year. Social media was the main source of glaucoma awareness and information to screen. First-degree relatives with high level of education and in white-collar jobs were likely to be aware of glaucoma and also have knowledge on glaucoma. First-degree relatives who had been informed to screen for glaucoma were also more likely to screen for the disease.

First-degree relatives of glaucoma patients are known to be at risk of glaucoma. Thus, they should be thoroughly educated by eye care professionals and be informed or encouraged to screen for glaucoma. Accurate and comprehensive health information should be published on social media so that the public can be well-informed to make good decisions and take necessary actions towards their health. The eye care secretariat of the Ghana Health Service and eye care professionals should also embark on targeted eye screening programs for early detection and treatment of glaucoma.

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