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Awareness and knowledge on glaucoma in Ikpoba-Okha, south-south Nigeria

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Abstract

Background: Glaucoma is a leading cause of blindness in the world, second only to cataract. Awareness of the nature and treatment of a common eye condition such as glaucoma could be important, as this could translate to better uptake of treatment, thereby reducing the risk of progression to irreversible blindness or ocular damage
Methods: This study was a descriptive cross-sectional study of awareness and knowledge of glaucoma among adults in Ikpoba-Okha Local Government Area, Edo State. A multistage sampling technique was used to select 5 communities (wards) out of the 10 wards in the Local Government Area for the survey.
Results: A total of 430 respondents participated in the study. One hundred and sixty-three (38%) of the respondents had heard of glaucoma (awareness). Among these, 20.9% of the respondents knew that glaucoma was damage to the nerve of the eye due to high pressure in the eye; 23.3% knew glaucoma to be high pressure in the eye. Respondents in the age group of 30-39 years ($p< 0.001$) and those with tertiary level of education ($p< 0.001$) had higher awareness of glaucoma. Those with tertiary education had the most knowledge about glaucoma ($p= 0.058$). Logistic regression showed that younger subjects (adjusted odds ratio = 2.566; 95% CI = 1.636, 4.023; $p = 0.001$) and those with formal education (adjusted odds ratio = 3.579; 95% CI = 1.290, 9.901; $p = 0.014$) were more likely to be aware of glaucoma.
Conclusion: The results show that health education and formal education among the adults in this local government area would be important in prevention of blindness from glaucoma.

Key words: Awareness; knowledge; glaucoma

Introduction

Glaucoma is a leading cause of blindness in the world, second only to cataract.[1-5] It is also the leading cause of irreversible blindness worldwide, with primary open-angle glaucoma being the most implicated subtype.[1-4] Glaucoma, often referred to as the "sneak thief of sight", is a diverse group of disorders which is potentially progressive with characteristic optic neuropathy and visual field loss, in which intraocular pressure is usually a key modifying factor.[6] Examination of the optic disc is the most valuable method of diagnosing glaucoma, as characteristic optic nerve head changes are seen on fundoscopy before visual field loss is detectable.[7] There are about 60.5 million people world-wide with open angle glaucoma and angle closure glaucoma, with a possible increase to 79.6 million by 2020, and of these, 74% will have open angle glaucoma.[8] Management is geared at preventing or minimizing progression, and includes medical, surgical and laser.[6] Primary open angle glaucoma (the most common type of glaucoma) is usually asymptomatic in the initial stages.[6] Despite the high prevalence of this condition, patients with glaucoma that visit the eye clinic for ophthalmic examinations

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for the first time do so for non-glaucoma issues.[9]

Congdon et al,[5] in a study on the causes and prevalence of visual impairment among adults in the United States found out that glaucoma and cataract accounted for more than 60% of blindness among American blacks.

It has been estimated that half of the people living with glaucoma in the world reside in Asia,[4] with about 10 million of such people living in China alone.[10] The epidemiology of glaucoma in Africa is not clear, but the prevalence has been reported to be between 1.5% - 3.1% for open-angle glaucoma, and 0.6% - 2.3% for angle closure glaucoma.[7,11] In Ghana a prevalence of 7.7% (30 years and above) and 8.5% (40 years and above) was reported.[12]

The Nigeria National Blindness and Visual Impairment Survey found out that the prevalence of glaucoma-related blindness was 0.7% among patients 40 years of age and older, and it was also seen that increasing prevalence was associated with increasing age.[13] Murdoch et al,[7] in a population-based survey for glaucoma in rural Northern Nigeria found out an overall prevalence of open angle glaucoma of 1.02% in individuals 45 years of age and older.

By definition, awareness, simply put, is knowledge that something exists.[14] The Oxford Advanced Learners Dictionary refers to knowledge as the information, understanding and skill that one gains through education or experience.[15] It is the awareness, consciousness, or familiarity gained by experience or learning.[15]

Awareness of glaucoma is seen to range from 2.4% to 24.7% in African populations to European populations respectively.[16,17] Other studies have also revealed better awareness and knowledge of glaucoma among respondents from developing countries.[17-21] This clearly shows that there is better awareness and knowledge of glaucoma amongst more educated societies.

Awareness of the nature and treatment of a common eye condition such as glaucoma could be important, as this could translate in better uptake of treatment, thereby reducing the risk of progression to irreversible blindness or ocular damage.[22] It is a well-known problem in eye care in this part of the world that many individuals ignore eye symptoms like deteriorating vision, believing that it is expected with advancing age.[23] This is made worse by the fact that causes of blindness associated with age are normally of gradual progression, and often unnoticed until the very late stages.

Thus, it is important to assess the awareness and the knowledge people in our communities have about glaucoma. This will help determine the knowledge gap and form a baseline for conducting eye health awareness campaigns to educate the people and increase their awareness and knowledge of this irreversible.

Materials and methods

Study Area: Ikpoba-Okha Local Government area is one of the 18 local government areas in Edo State. It has ten political wards, and is made up of urban, semi-urban, and rural settings. It has a population of about three hundred and seventy-two thousand and eighty (372,080) from the National Population census in 2006,[24] and is bounded on the West, East, North and South by Oredo, Orhionmwan, Uhunmwode Local Governments and Koko in Delta State respectively. The tribes are the Binis (the predominant tribe), Esan, Urhobo, Igbo and the Hausa. It has a land area of 1288.7689 square kilometres.[24] There are twenty-one Primary Health Care centres in the local government, with one of them (Ugbekun) having an ophthalmic unit manned by an ophthalmic nurse, and an ophthalmic senior registrar posted to it. Outreach programmes are conducted twice a month in the local government area by ophthalmologists from the University of Benin Teaching Hospital (UBTH).

Study Design: This study was a descriptive cross-sectional study of awareness and knowledge of glaucoma among adults in Ikpoba-Okha Local Government Area, Edo State.

Study Population: This study was conducted on adults eighteen years and older in the study area who had lived in the chosen community for 6 months or more.

Inclusion criteria: these included all consenting adults aged 18 years and older who have lived in Ikpoba-Okha LGA for ≥6 months

Exclusion criteria included non-consenting adults, all adults who have not lived up to 6 months in Ikpoba-Okha LGA and all subjects below eighteen years

Study duration: This study was done from January 6th to July 31st 2015

Sample size determination: The total population is greater than 10,000, the sample size was calculated using the Leslie-Kish[25] formula: $N=Z^2pq/d^2$

Where: N = desired sample size, Z = standard normal deviate, usually set at 1.96, corresponding to 95% confidence interval, p = proportion of people with knowledge of glaucoma in the urban and suburban population of Lome, Togo (29.7%),[26] q = 1.0 – p, and d = degree of accuracy.

Thus using 0.297 as the prevalence (p) in the target population estimated to have a particular characteristic, Z statistic is 1.96 and desired accuracy set at 0.05 level, N is calculated to be equal to $= (1.96)^2(0.297)(0.703)/(0.05)^2 = 320$

Giving an attrition rate of 10%, a minimum of 352 subjects were required. Hence, 430 respondents were recruited.

Sampling Technique: A multistage sampling technique was done.

Stage 1: A simple random sampling was used to select five out of the ten political wards (Ogbeson, Ihinmwinrin, Ugbekun, Ologbo, Oregbeni, Ute, Ogheghe, Evbuomodu, Ukhiri and Evbuoriaria). The wards chosen were Ihinmwinrin, Ukhiri, Evbuoriaria, Ute and Ologbo wards, with each of them having five communities each. The method used was the lottery method, where the names of all the wards were written on small pieces of paper, and five were picked randomly from a hat.

Stage 2: A simple random sampling (as described above) was used to select five communities, one from each of the selected wards. Umelu, Obazagbon, Ikpe, Ute and Obe communities were chosen to represent Ihinmwinrin, Ukhiri, Evbuoriaria, Ute and Ologbo wards respectively.

Stage 3: Determination of the number of respondents needed in each ward proportional to size by population was done. This was done using simple mathematical proportion. Hence 106, 92, 74, 100 and 58 respondents were chosen from Ihinmwinrin (with a population of 47545), Ukhiri (with a population of 41277), Evbuoriaria (with a population of 33195), Ute (with a population of 44864) and Ologbo (with a population of 26020) wards.

Stage 4: From the center of each ward, the 'bottle spinning' technique was used to determine the direction to follow. The houses on the road corresponding to the direction chosen were numbered, starting from number 1. Consecutive houses were then visited and all eligible persons 18 years and above were interviewed until the required number of respondents allocated to that community was achieved.

Ethical consideration: This study was approved by the Ethics and Research Committee of the University of Benin Teaching Hospital. Approval was obtained from the Local Government Authority and the Medical Officer in charge of health in the local government. The community leaders were visited and informed, and permission obtained from them. Informed consent was obtained from all the participants.

Data collection procedure: The survey team was made up of the researcher, three ophthalmology resident doctors, three final year medical students, two community health extension workers (CHEW) and one ophthalmic nurse. All members of the survey team were trained by the researcher for a period of two days on their expected roles in administering the questionnaires. Members of the team were taught to administer the questionnaire in English language and Pidgin-English language. The training took place in the Primary Health Care Centre Ugbekun. Courtesy visits were then paid to the selected communities, local government officials (the councillors from the 5 selected communities and the community for the pilot study) and local health officials. Data collection was completed in five weeks (one week per community) on Tuesdays, Wednesdays and Fridays between 9am and 3pm. Adjustments were made on market days. Average administration time for the questionnaire was 15 minutes. All members of the team were fluent in English language and Pidgin-English language, and were allowed to administer the questionnaire independently. The CHEWs were fluent in Bini language, and were responsible for administering the questionnaire to respondents who could only speak Bini language. There were no respondents who could understand neither English, Pidgin-English nor Bini.

Pilot Study: A pilot study was done in Ugbekun community in the same local government area (not selected for the study) with similar socio-demographic characteristics for two days. This was to provide members of the team with practical field experience, thus enabling correction of details

previously omitted and to minimize inter-observer variations as well as standardize of the filling of the questionnaires. The 'bottle spinning' technique from the centre of the town was used to determine the direction to go. One hundred participants from 61 consecutive households were interviewed. Options like "taking garri or cassava meals", "spiritual attack" and "spread from person to person" were added to the list of the question on possible risk factors for glaucoma. Awareness and knowledge of glaucoma were seen to be generally poor amongst the respondents of the pilot study.

Survey activity: The study was carried out at the respondents' homes. A structured interviewer administered questionnaire designed by the researcher based on the specific objectives of the study was used. The questionnaire was divided into three sections (A, B and C). Section A comprised the biodata – age, sex, occupation, religion, ethnic group, marital status and level of education. Section B of the questionnaire was on awareness of glaucoma and section C on knowledge on glaucoma.

Data Analysis: This was done using the Statistical Package for Social Sciences (SPSS) version 19. Frequencies and proportions were used to summarise categorical variables while mean, median and standard deviation was used for quantitative variables. Chi-square test was applied to determine statistical differences. P value was set at $p \leq 0.05$ (a p value of ≤ 0.05 was said to be significant).

Among those who were aware of glaucoma, their knowledge of glaucoma was graded using a composite score, from 0 – 7. Any correct answer of the correspondent's understanding of glaucoma was scored 1. Knowledge of two or more risk factors was scored 2. Knowledge of glaucoma leading to blindness was scored 1. Knowledge of the irreversibility of glaucoma was scored 1. Knowledge of two or more therapeutic options was scored 2. Thus, a total of 7 was realised. Correspondents who scored <2, 2-4 and 5-7 were awarded poor, fair and good knowledge respectively. Logistic regression analysis was used to identify significant predictors of use of awareness of glaucoma. A p –value < 0.05 was taken as significant. The consistency of this scoring system was tested with a Cronbach's alpha scoring scale, and a score of 0.72 was realized (which showed good consistency).

Results

A total of 430 respondents participated in the study. There were 235 (54.7%) males with mean age of 44.9 years ± 12.8 and 195 (45.3%) females with mean age 43.6 years ±13.0. The age group of 40 – 49 years had the highest number of respondents (32.8%), followed by those in the age group of 50 – 59 years (20.5%). The least number of respondents was in the age group less than 20 years (2.3%). There were more male respondents (54.7%) than female respondents (45.3%), giving a male to female ratio of 1.2:1. Bini was the predominant tribe (68.8%), followed by Esan (16%) and Urhobo (6.7%). A high proportion of the respondents were married (82.8%). Subjects with tertiary and secondary education were predominant (36% and 32.8% respectively). Christianity was the main religion (89.3%) – Table 1.

Of all the participants in the study, only 163 (38%) of the respondents had heard of glaucoma (awareness). Amongst those aware, 66 respondents (41.0%) knew from health show/talk/outreach. Others were electronic media (38.5%), print media (20.5%) and from relative/friend suffering from glaucoma (15.5%). Amongst those who were aware of glaucoma, 20.9% of the participants here knew that glaucoma was damage to the nerve of the eye due to high pressure in the eye; 23.3% knew glaucoma to be high pressure in the eye; 7.4% knew glaucoma to be damage to the back of the eye. Still amongst those who were aware of glaucoma, almost half of the respondents (46%) knew age to be a risk factor. Other risk factors correctly chosen were family history of glaucoma (36%), diabetes mellitus (18.6%) and increased intraocular pressure (18%). Only 0.6% knew that myopia is a risk factor. About a quarter of them (24.2%) believed taking garri and other cassava products was a risk factor.

The majority of those who were aware of glaucoma (108; 67.5%) knew that glaucoma could lead to blindness. Among these 108 respondents, only 36 respondents (33.3%) knew that blindness from glaucoma is irreversible. Of the 163 respondents that knew about glaucoma 122 (77.7%), 35 (22.9%) and 4 (2.5%) knew about medical, surgical and therapeutic options respectively for management of

Table 1A: Sociodemographic characteristics of respondents LGA

Characteristic	Frequency (n=430)	Percentage
Age group (years)		
Less than 20	10	2.3
20 – 29	61	14.2
30 – 39	66	15.3
40 – 49	141	32.8
50 – 59	88	20.5
60 – 69	53	12.3
70 and older	11	2.5
Sex		
Male	235	54.7
Female	195	45.3
Tribe		
Bini	296	68.8
Esan	69	16.0
Urhobo	29	6.7
Igbo	12	2.8
Etsako	11	2.6
Others*	13	3.0

Mean age =44.3years ±12.9 (range 18 to 80 years)*
Others: Owan (5), Hausa (3), Isoko (2), Akoko-Edo (1), Ijaw (1), Yoruba (1)

Table 1B: Sociodemographic characteristics of respondents LGA

Characteristic	Frequency (n=430)	Percentage
Marital Status		
Married	356	82.8
Single	57	13.3
Widowed	15	3.5
Divorced	2	.5
Education		
No Formal Education	48	11.2
Primary	86	20.0
Secondary	141	32.8
Tertiary	155	36.0
Religion		
Christianity	384	89.3
Traditional Religion	33	7.7
Islam	13	3.0

Table 2 – Knowledge of glaucoma among respondents in Ikpoba-Okha LGA

Response	Frequency	Percent
Can glaucoma lead to blindness?		
Yes	108	66.3
No	14	8.6
Don't know	41	25.1
TOTAL	163	100.0
Is blindness from glaucoma reversible?		
Yes	23	21.1
No	36	33.0
Don't know	49	45.9
TOTAL	108	100.0
Knowledge of therapeutic options for treatment*		
Medicines (Eye drops/ tablets)	122	74.9%
Surgery	35	21.5%
LASER	4	2.5%
Don't know	36	22.9%
TOTAL	197	

*Multiple responses allowed.

glaucoma (Table 2). The age group of 30-39 years had the highest level of awareness of glaucoma. This finding was statistically significant ($p< 0.001$). The female respondents were more aware of glaucoma (38.5%) than their male counterparts (37.4%). This finding was not statistically significant ($p = 0.829$). Those with tertiary level of education had more awareness of glaucoma (75.5%). This finding was statistically significant ($p< 0.001$). The singles were more aware of glaucoma, followed by the married ones. This finding was not statistically significant ($p = 0.143$). The Christians had the highest level of awareness of glaucoma. This was statistically significant ($p=0.004$). This could be due to disproportionate number of the groups in the population studied. Those that were aware were those who had heard of glaucoma (Table 3).

Knowledge of glaucoma was seen to be highest among the age group of 30 – 39 years, and it was not statistically significant ($p = 0.298$). Males also showed a better knowledge of glaucoma, and it was not statistically significant ($p = 0.825$). Those with tertiary education had the most knowledge about glaucoma, with a trend towards statistical significance ($p= 0.058$). The married respondents had the best level of knowledge of glaucoma. This finding was not statistically significant ($p = 0.517$). The Muslims had the best knowledge of glaucoma. This finding was not statistically significant ($p = 0.127$) (Table 4). Logistic regression showed that compared to those older than 45 years, younger subjects were 2.5 times more likely to be aware of glaucoma (adjusted odds ratio = 2.566, 95% confidence intervals = 1.636, 4.023; $p = 0.001$). This was statistically significant. Presence of formal education was another independent predictor of awareness of glaucoma (adjusted odds ratio = 3.579, 95% confidence intervals = 1.290, 9.901; $p = 0.014$). This was statistically significant. Religion which was significant in chi square analysis was however found to be non-significant on logistic regression (Table 5).

Table 3A: Association between socio-demographic characteristics of respondents in Ikpoba-Okha LGA and awareness of glaucoma

Characteristic	Awareness of glaucoma	
	Yes Frequency (%)	No Frequency (%)
Age group (years)		
Less than 20	1 (10.0%)	9 (90.0%)
20 – 29	29 (47.5%)	32 (52.5%)
30 – 39	39 (59.1%)	27 (40.9%)
40 – 49	54 (38.3%)	87 (61.7%)
50 – 59	33 (37.5%)	55 (62.5%)
60 – 69	7 (13.2%)	46 (86.8%)
70 and older	0 (0.0%)	11 (100.0%)
TOTAL	163	267
	χ^2=38.765, df=6, p<0.001	
Sex		
Female	75 (38.5%)	120 (61.5%)
Male	88 (37.4%)	147 (62.6%)
TOTAL	163	267
	χ^2=0.047, df=1, p=0.829	
Level of Education		
No Formal Education	5 (10.4%)	43 (89.6%)
Primary	10 (11.6%)	76 (88.4%)
Secondary	31 (22.0%)	110 (78.0%)
Tertiary	117 (75.5%)	38 (24.5%)
TOTAL	163	267
	χ^2=148.813, df=B, p<0.001	

Table 3B: Association between socio-demographic characteristics of respondents in Ikpoba-Okha LGA and awareness of glaucoma

Characteristic	Awareness of glaucoma	
	Yes Frequency (%)	No Frequency (%)
Marital Status		
Married	134 (37.6%)	222 (62.4%)
Single	26 (45.6%)	31 (54.4%)
Widowed	2 (13.3%)	13 (86.7%)
Divorced	1 (50.0%)	1 (50.0%)
TOTAL	163	267
	χ^2=5.422, df=3, p=0.143	
Religion		
Christians	155 (40.4%)	229 (59.6%)
Non-Christians	8 (17.4%)	38 (82.6%)
TOTAL	163	267
	χ^2=12.629, df=1, p=0.004, OR=3.2, CI=1.5 -7.1	

Table 4 – Association between socio-demographic characteristics of respondents in Ikpoba-Okha LGA and knowledge on glaucoma

Characteristic	Knowledge of glaucoma		
	Poor Frequency (%)	Fair Frequency (%)	Good Frequency (%)
Age group (years)			
Less than 20	0 (0.0%)	0 (0.0%)	1 (100.0%)
20 – 29	4 (13.8%)	18 (62.1%)	7 (24.1%)
30 – 39	4 (10.3%)	19 (48.7%)	16 (41.0)
40 – 49	4 (7.4%)	31 (57.4%)	19 (35.2%)
50 – 59	1 (3.0%)	21 (63.6%)	11 (33.3%)
60 – 69	0 (0.0%)	7 (100.0%)	0 (0.0%)
	χ^2=11.816, df=10, p=0.785		
Sex			
Female	7 (9.3%)	44 (58.7%)	24 (32.0%)
Male	6 (6.8%)	52 (59.1%)	30 (34.1%)
	χ^2=0.376, df=2, p=0.825		
Level of Education			
No Formal Education	0 (0.0%)	3 (60.0%)	2 (40.0%)
Primary	0 (0.0%)	10 (100%)	0 (0.0%)
Secondary	6 (19.4%)	19 (61.3%)	6 (19.4%)
Tertiary	7 (6.0%)	64 (54.7%)	46 (39.3%)
	χ^2=16.573, df=6, p=0.058		
Marital Status			
Married	10 (7.5%)	75 (56.0%)	49 (36.6%)
Single	3 (11.5%)	18 (69.2%)	5 (19.2%)
Widowed	0 (0.0%)	2 (100.0%)	0 (0.0%)
Divorced	0 (0.0%)	1 (100.0%)	0 (0.0%)
	χ^2=5.212, df=6, p=0.517		
Religion			
Christianity	13 (8.4%)	92 (59.4%)	50 (32.3%)
Islam	0 (0.0%)	1 (20.0)	4 (80.0%)
Traditional Religion	13 (8.0%)	96 (58.9%)	54 (33.1%)
	χ^2=7.167 df=4, p=0.127		

Table 5 - Logistic regression for predictors of awareness among respondents in Ikpoba-Okha LGA

Predictor	Category	B	p-value	OR	95% C.I. for OR	
					Lower	Upper
Age	45 years and above*					
	45 years and younger	0.942	0.000	2.566	1.636	4.023
Sex	Male*					
	Female	-0.044	0.835	0.957	0.633	1.448
Education	No Formal*					
	Formal	1.275	0.014	3.579	1.290	9.901
Religion	Non-Christian*					
	Christian	0.428	0.340	1.533	0.638	3.688
Marital Status	Currently/Previously Married*					
	Never Married	-0.235	0.450	0.790	0.429	1.455

*Reference category

Discussion

The findings in this study showed that 38% of the respondents were aware of glaucoma. This was higher than the level of awareness among participants in a similar study in south-east Nigeria, where the level of awareness was found to be 21.1%.[27] The higher level of education as seen among the participants of our study as compared to the one from south-east Nigeria is likely to be responsible for the disparity in level of awareness. The levels of awareness of glaucoma found in similar studies from Ethiopia and Nepal rural communities[16,28] (2.4% and 2.43% respectively) were much less as compared with that of our study. This could again be explained by the fact that the respondents from this present study were largely educated (36.0% and 32.8% of the respondents had tertiary and secondary education respectively as their highest level of education), while the respondents from the studies from Ethiopia and Nepal were largely uneducated. Also, the proximity of Eye care facilities (the ophthalmic unit in the Ugbekun Primary Health Care centre, UBTH and the Central hospital) and the ophthalmic outreaches carried out by these centres are likely to contribute to the better awareness of glaucoma among respondents of this study.

The sources of information were mainly from health show/ talk/ outreach (41%), electronic media (38.5%) and print media (20.5%). This is due to the outreach programs being conducted by ophthalmologists from UBTH and access to electronic and print media by the fairly educated population in the local government area. In this study, 15.5% had their source of information from relatives/ friends diagnosed with glaucoma. The findings were in keeping with findings from a community-based study carried out in Southern India by Krishnaiah et al.[29] The similarities could be deduced from the fact that both communities had similar socio-demographic factors. Findings were however different in another study in Southern India by Dandona et al[22] which showed that a family member/friend/relative suffering from glaucoma was the major source of information on awareness of glaucoma. It is noteworthy that the study by Dandona et al[22] was carried out in an urban community, with a vast majority of the respondents being educated.

Poor vision (42.3%), high pressure in the eye

(23.3%), damage to the nerve of the eye (20.9%) and pain in the eye (17.2%) were largely the answers the respondents who were aware of glaucoma gave as their understanding of what glaucoma is. Some of the respondents gave multiple answers. The varied responses could be explained by the varied sources of information and level of education of the respondents. The responses in this study were in contrast to the responses from the respondents in a study done by Komolafe et al30 amongst workers of the Federal Medical Centre, Owo in South West Nigeria in 2013, where 88.3% of the participants that were aware of glaucoma knew that it was an increase in eye pressure that damaged the back of the eye. This high level of understanding of glaucoma was explained by the fact that the respondents render clinical services, and are more likely to about glaucoma. On the other hand, 42.9% of the participants that knew about glaucoma from the administrative directorate correctly understood glaucoma to be an increase in eye pressure that damages the back of the eye, while 21.4% understood glaucoma as whitening that grows across the eye. The understanding of glaucoma amongst the respondents from the administrative directorate is still higher than those from this study, as the respondents from the administrative directorate from the tertiary hospital were largely educated persons.[30]

The major risk factors that were chosen by the respondents were age (46.0%), family history of glaucoma (36.0%), hypertension (25.5%), and taking garri or cassava meals (24.2%), diabetes mellitus (18.6%) and increased intraocular pressure (18.0%). It is noteworthy that of the above risk factors the respondents were allowed to give multiple answers. This was in keeping with a study carried out by Komolafe et al[30] (though an institutional study) where it was noted that 31.7% of the respondents from the administrative directorate in the Federal Medical Centre, Owo in Nigeria knew that a positive family history was a risk factor for glaucoma. These similarities could be due to the fact that the respondents from Ikpoba-Okha LGA were largely educated persons.

A high proportion of the respondents (66.3%) who were aware of glaucoma knew that it could lead to blindness. These findings were lower than the findings from a study carried out by Bodunde et al[31] in the Olabisi Onabanjo University Teaching Hospital Sagamu, Western Nigeria among glaucoma patients in Southern Nigeria which revealed that 93.9% saw glaucoma as a condition which could lead to blindness (though a hospital-based study). The disparity here is due to the fact that the study was carried out in Southern Nigeria amongst glaucoma hospital patients who would have acquired more information from interacting with their managing ophthalmologists.

Of the respondents that knew that glaucoma could lead to blindness, 33.3% knew that the blindness was irreversible, 45.4% did not know if the blindness was reversible or not while 21.3% thought that the blindness from glaucoma was reversible. This finding is at variance with the study by Bobunde et al[31] which showed that only 7.1% of the respondents that knew glaucoma could cause blindness, believed that it was reversible. This variance in knowledge could be explained by the fact that while this present study was community-based, the one by Bodunde et al[31] was a hospital-based study among glaucoma patients.

Of the respondents that knew about glaucoma 77%, 22.3%, 2.5%, knew medicines, surgery and laser respectively to be therapeutic options. Multiple answers were also required here. The findings in a study carried out by Mansouri et al[20] in Switzerland were different as 75% and 57% of respondents knew that surgery and medicines were therapeutic options.

A high number of respondents that knew about glaucoma (84.4%) indicated that they would visit the hospital for treatment for glaucoma. This was expected as a majority of the respondents who knew about glaucoma had health show/ talk / outreach (conducted by ophthalmologists), electronic and print media as their major source of knowledge, and the information of where to get treatment would likely be passed via same sources.

Age (<45yrs), Christians (though not statistically significant on regression, $p>0.05$) and those with formal education were more likely to be aware of glaucoma. This is similar to findings from South - Western Ethiopia by Tenkir et al[16] which showed that awareness was better among the respondents that had attained high school or better education. Findings were however in contrast to a study from Switzerland by Mansouri et al[20] which showed that

awareness of glaucoma was independent of age and educational status. This disparity is so as the respondents from this present study aged <45 years were more likely to have formal education than those aged >45 years, as against the population in Switzerland which was an entirely educated one. An increase in awareness of glaucoma for age was however reported by Thapa et al[28] in a study from Nepal, which is a contrast to findings from this study. This could be due to the expected increase in general knowledge with age and the fact that older people are more likely to be affected by glaucoma.

The association between knowledge of glaucoma and level of education had a trend towards statistical significance (p= 0.058). This can be explained by the fact that those respondents with formal education are able to receive information from a wider range of sources than those without formal education. Full statistical significance was not achieved in association between level of education and knowledge of glaucoma, and other socio-demographic factors did not show any relationship with knowledge of glaucoma. This is so as knowledge of glaucoma requires some depth of information, which may not be readily available to the general populace.

Further analysis using logistic regression showed that only ages less than 45 years and the presence of formal education were independent predictors of the awareness of glaucoma.

Limitations: The accuracy of information given by the respondents may be affected by recall bias.

Conclusion

This study has shown that, although better than what is seen in similar regions, the awareness of glaucoma amongst the people of Ikpoba-Okha LGA of Edo state is generally low, with unsatisfactory knowledge about the condition. Unsatisfactory attitude towards eye health has also been shown. Most of the respondents are yet to have an ophthalmic examination in spite of the series of eye outreaches and the presence of a primary healthcare centre with an ophthalmologist posted to it. Ages less than 45 years and formal education were significant determinants of the awareness of glaucoma. Hence, it is important to project the need for health education and formal education among the adults in this local government area in effective prevention of blindness.

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