Original Research Article

GLAUCOMA SCREENING AMONG RELATIVES OF GLAUCOMA PATIENTS IN ANAMBRA STATE, NIGERIA

ABSTRACT

AIM: To determine the awareness, attitude, and practice of glaucoma screening among adult first degree relatives of glaucoma patients in Anambra State, Nigeria.

STUDY DESIGN: A prospective, descriptive, cross-sectional survey

PLACE OF STUDY: Eye clinics and community eye care out-reaches that offer primary, secondary, and tertiary eye care services to people within Anambra state, Nigeria.

METHODS: A pretested, interviewer-administered questionnaire was used to obtain information such as sociodemographic data, awareness and knowledge of glaucoma and the frequency of practice of glaucoma screening. These were analyzed using descriptive and inferential statistics (Chi square test and logistic regression) where applicable. Level of significance was set at a p-value <0.05.

Results: A total of 186 first degree relatives (FDRs) of glaucoma patients participated, 120 (59.1%) were females, M: F = 1:1.4 and a mean age 43.87 years ± 14.62 SD. Almost half had a secondary level of education and were traders.

Majority (83.9%) and 39.8% have heard of glaucoma and glaucoma screening respectively in the past. However, only 23.7% have been screened for glaucoma. The main reasons respondents gave why they did not screen for glaucoma include 'not necessary', 'no time' and '

not affordable. There was a significant negative relationship between unemployment and poor glaucoma screening practice p=0.007.

Conclusion: This study showed a generally poor knowledge, attitude and practices towards glaucoma screening in the study population. Stakeholders need to intensify efforts to make people understand glaucoma risk factors and appreciate the need to have glaucoma screening in their environments.

Keywords: *Adults, Glaucoma, Nigeria, Screening.*

INTRODUCTION

Glaucoma remains a public health issue, being the second commonest cause of blindness worldwide and the most common cause of avoidable irreversible blindness [1]. Worse still, glaucoma blindness is irreversible and glaucoma blindness burden is highest in low and middle-income countries [2]. Nearly 80 million people are estimated to have glaucoma currently, and about 11 million people are estimated to be blind from glaucoma worldwide and these figures are projected to rise in the coming years due to the increasing aging population [3]. About 50-90% of people living with glaucoma are unaware of the condition owing to the initial asymptomatic nature of the disease (especially primary open angle glaucoma – POAG) [4-6]. This has earned POAG the infamous reputation of “The Silent Thief of Sight” [6]. There are 2 types of glaucoma namely open angle and closed angle glaucoma. Open angle glaucoma is usually asymptomatic, mostly under-diagnosed and carries a huge economic burden while also reducing the quality of life [7]. However, sudden dimness of vision and blindness especially with the angle closure type can occur with consequent psychological effects [8,9]. Hence early detection and treatment is key to preserving vision in glaucoma.

Several risk factors for development of glaucoma blindness have been identified [8]. These include high initial intraocular pressure (IOP), bilateral disease, black race, old age, family history of glaucoma, poor treatment compliance, non-availability of glaucoma services, poverty, late diagnosis/late referral, religious beliefs, sociocultural practices, poor awareness, and poor knowledge of glaucoma [9-12]. Glaucoma presents earlier and progresses more rapidly among blacks [13].

Nigeria has a large burden of glaucoma, estimated to affect 1.2 million people aged 40 years and above, causing blindness in 150,000 people [14,15]. The Igbo tribe of Nigeria have a higher risk of developing open angle glaucoma and glaucoma blindness compared to other ethnic groups [9]. While late diagnosis as well as late presentation are established risk factors for glaucoma blindness in Nigeria, glaucoma screening, early detection and treatment, improved awareness and knowledge of glaucoma, enhanced access to glaucoma services [16,17]. Glaucoma health education among glaucoma relatives is a successful strategy employed in reducing the burden of glaucoma blindness in sub-Saharan Africa [18,19]. Glaucoma patients also form a large proportion of outpatient eye clinic visits and eye care outreaches in Nigeria [20-22]. Glaucoma has strong familial tendency, and direct relatives of glaucoma patients have a very high risk of developing glaucoma which necessitates periodic glaucoma screening [23,24].

Though desirable, owing to the scarce nature of health resources, it is not cost effective to completely screen the population for glaucoma. Screening can be tailored towards identifying and concentrating on high-risk groups in the population, and this is considered more cost effective [25]. Family history, especially among first degree relatives (FDRs) may be considered the single most important risk factor for OAG or POAG. About 50-60% of POAG patients have a family history, and this risk is increased by about 9-fold among FDRs (siblings, parents, and children) [23,26]. It has been reported that there is a 22% lifetime risk of glaucoma among FDRs of glaucoma patients compared to the 2.3% among FDR of normal controls and the prevalence of glaucoma is 10.4% and 0.7% respectively among siblings of glaucoma patients compared to siblings of glaucoma patients [27].

Family history of glaucoma is an important key to identifying at-risk individuals although relying on history alone is not completely reliable since more than half of people with glaucoma are not aware of the

condition, while many may not inform their relatives of the diagnosis [23]. Screening of FDRs of glaucoma (especially POAG) patients is becoming a popular tool for early detection of glaucoma among this high-risk population. It is considered the most cost-effective method of reducing the burden of undiagnosed glaucoma, late presentation, and avoidable blindness from glaucoma.

The aim of this study is to determine the awareness, attitude, and practice of glaucoma screening FDRs of POAG patients in Anambra State, Nigeria. Data generated from this study will contribute to evidence needed to scaleup advocacy for screening FDRs of glaucoma patients in Nigeria.

MATERIALS AND METHODS

Study design: A cross-sectional prospective study**.**

Study population: The study was conducted among first degree relatives of glaucoma patients accompanying them to outpatient eye clinics and community eye care outreaches that offer primary, secondary, and tertiary eye care services to people within Anambra state, Nigeria.

Study site: Eye clinics and community eye care out-reaches that offer primary, secondary, and tertiary eye care services to people within Anambra state, Nigeria.

Inclusion criteria: Consenting FDRs of POAG patients at the various service points were recruited.

Exclusion criteria: FDRs of POAG patients less than 18 years and those whose were not patient enough to wait for the interview and those who did not consent.

Sample technique: Convenience sampling technique was used. Consenting adult FDRs of alternate POAG patients who attended the clinic were recruited over a three-month period. Any alternate patient's relative who declined participating was allowed to go and the next available FDR was recruited, the process continued in an alternate pattern until the end of the stipulated data collection period.

Study outcome measures: To determine the awareness, attitude and practice of glaucoma screening among relatives of glaucoma patients in Anambra State Nigeria.

Procedures involved: A pretested semi structured questionnaire was administered to consenting patient relatives. Information like age, marital status, and place of residence, educational level, occupation, awareness, knowledge and practice of glaucoma screening. Questions related to the risk factor of glaucoma and barriers to screening were collected and analyzed.

Data Processing and Statistical Analysis

All collected data was entered and cleaned by Microsoft Excel spreadsheet. The cleaned data was exported to SPSS version 26.0 statistical software IBM Corporation for analysis. Continuous variables were presented using mean, median and standard deviation, while categorical variables were described by frequency and proportion; and presented using tables and figures. Chi square test and Fisher exact test were performed where applicable. A p-value of < 0.05 will be considered statistically significant. Significant variables were subjected to multivariate analysis (logistic regression) to test for statistical relationship of the variable of interest with the sociodemographic variables.

Ethical consideration

The study protocol was approved by the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital Ethics Committee with reference number COOUTH/CMAC/ETH.C/VOL.1/FN:04/295 and the study was conducted in accordance with the Helsinki declaration. Confidentiality of respondents was ensured by making the questionnaire anonymous and they were all informed of their liberty to discontinue with the study anytime they felt uncomfortable with the process.

RESULT

A total of 186 people responded to the questionnaires, 110 (59.1%) were females while 76 (40.9%) were males with a male female ratio (M: F) of 1:1.4. The mean age of the population was 43.87 years ± 14.62 SD and an age range of 21 – 87 years. A greater proportion have at least a secondary level of education

(45.2%) and traders by occupation (45.7%). Details of the socio-demographic characteristic are seen in table 1.

Table 1: Socio-demographic characteristics

Variable	Frequency	Percentage
Age		
Mean ±SD = 43.87 ± 14.62		
Age Group		
20-34yrs	53	28.5
35-49yrs	70	37.6
50-64yrs	46	24.7
≥65yrs	17	9.1
Gender		
Female	110	59.1
Male	76	40.9
Tribe		
Igbo	182	97.8
Ijaw	1	0.5
Yoruba	3	1.6
Level of Education		
None	1	0.5
Primary Education	19	10.2
Secondary Education	84	45.2
Tertiary Education	75	40.3
Postgraduate	7	3.8
Place of Residence		

Rural	71	38.2
Urban	115	61.8
Marital Status		
Single	39	21.0
Married	143	76.9
Divorced	2	1.1
Widowed	2	1.1
Occupation		
Artisan	13	7.0
Trader	85	45.7
Student	13	7.0
Health Worker	9	4.8
Unemployed	19	10.2
Others	47	25.3

From figure 1, majority of the respondents (83.9%) have heard of glaucoma

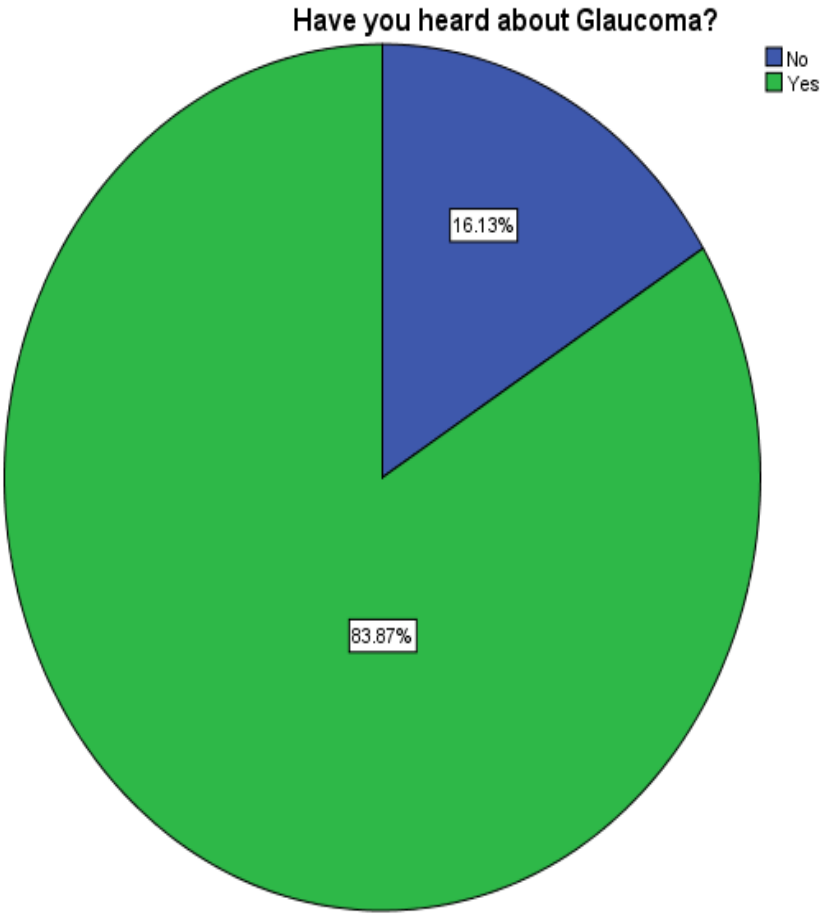

Fig 1: Proportion of respondents aware of glaucoma.

Table 2: Awareness, attitude, and practice of glaucoma screening (n=186)

Variable	Frequency	Percentage
Have you heard about glaucoma screening?		
No	112	60.2
Yes	74	39.8
Is glaucoma screening necessary?		
No	25	13.4
Yes	161	86.6
If yes, for what purpose? (Multiple responses)		
Early Detection of Eye Diseases	152	41.1
Early Commencement of Treatment	129	34.9
As part of Routine eye check	89	24.1
Are glaucoma services available where you reside?		
No	87	46.8
Yes	58	31.2
I don't know	41	22.0
Have you undergone glaucoma screening before?		
No	142	76.3
Yes	44	23.7
If yes, how many times? (n=44)		
Once	16	36.4
Twice	11	25.0
Three times or more	17	38.6
If yes, when was the last time? (n=44)		
Less than 1 year	26	59.1
1 to 2 years ago	8	18.2
More than 2 years ago	8	18.2

20 years ago	2	4.5
Reason for last glaucoma screening? (n=44)		
As part of routine eye check	27	61.4
Visited eye clinic for some other reason	17	38.6

Majority of respondents have heard about glaucoma screening (60.2%), believe in the importance of glaucoma screening (86.6%), but only 31.2% affirmed to have the availability of glaucoma services in their area of residence, while 22% are not aware of the availability of glaucoma services.

Only 23.7% have been screened for glaucoma at least once, of which about 60% was done within the last 1 year.

Table 3: Awareness, attitude, and practice of glaucoma screening cont.

Variable	Frequency	Percentage
Why have you not screened for glaucoma? (n=142; multiple responses)		
Not Necessary	85	35.3
Not Affordable	34	14.1
No Time	49	20.3
Glaucoma screening centre not available in my locality	17	7.1
Glaucoma screening centre far from me	27	11.2
No Blindness in my family	29	12.0
Do you have any blind relative?		
No	157	84.4
Yes	29	15.6
If yes, what was the cause? (n=29)		
Diabetes	3	10.3
Eye problem	1	3.4
Glaucoma	6	20.7
I don't know	19	65.5
At what age did the person become blind? (n=29)		
Young adult	2	6.9
Elderly	21	72.4
I'm not sure	6	20.7
Can glaucoma cause blindness? (n=156)		
No	8	5.1
Yes	118	75.6
I don't know	30	19.2
If yes, what type? (n=118)		
Reversible	19	16.1

Irreversible	71	60.2
I don't know	28	23.7
Are you diabetic? (n=186)		
No	172	92.5
Yes	14	7.5
Are you hypertensive? (n=186)		
No	152	81.7
Yes	34	18.3

From table 3, 35.3% think glaucoma screening was not necessary while 20.3% affirm that they have no time for screening. Among people who have blind relatives, do not know the cause of blindness while 20.7% believe glaucoma was the cause of the blindness.

Table 4: Known risk factors and treatment of glaucoma amongst respondents with knowledge of the disease.

Variable	Frequency	Percentage
Risk factors for glaucoma (multiple responses n=171)		
Infection	23	13.5
Injury	17	9.9
Hereditary	66	38.6
High Intraocular Pressure	2	1.2
Old age	17	9.9
I Don't Know	46	26.9
Treatment modalities (multiple responses n=214)		
Eyedrop	102	47.7
Surgery	70	32.7
Laser	13	6.1
Combination	6	2.8
I Don't Know	23	10.7

Only 1.2% of the respondents believe increased IOP was a risk factor for glaucoma while 26.9% and 10.7% respectively are not aware of the risk factors and treatment options for glaucoma.

Table 5: Distribution of socio-demographic characteristics and respondents who have undergone glaucoma screening.

Variable	Screened for Glaucoma		χ2	P value
	Yes	No		
Age Group				
20-34yrs	5 (9.4)	48 (90.6)	9.565	0.023*
35-49yrs	18 (25.7)	52 (74.3)		
50-64yrs	16 (34.8)	30 (65.2)		
≥65yrs	5 (29.4)	12 (70.6)		
Gender				
Female	28 (25.5)	82 (74.5)	0.482	0.487
Male	16 (21.1)	60 (78.9)		
Ethnicity				
Igbo	41 (22.5)	141 (77.5)	7.934[F]	0.013*
Ijaw	0 (0.0)	1 (100.0)		
Yoruba	3 (100.0)	0 (0.0)		
Level of Education				
None	0 (0.0)	1 (100.0)	11.769[F]	0.011*
Primary Education	7 (36.8)	12 (63.2)		
Secondary Education	11 (13.1)	73 (86.9)		
Tertiary Education	25 (33.3)	50 (66.7)		
Postgraduate	1 (14.3)	6 (85.7)		
Place of Residence				
Rural	18 (25.4)	53 (74.6)	0.183	0.699
Urban	26 (22.6)	89 (77.4)		
Marital Status				
Single	6 (15.4)	33 (84.6)	6.757[F]	0.055

Married	36 (25.2)	107 (74.8)		
Divorced	0 (0.0)	2 (100.0)		
Widowed	2 (100.0)	0 (0.0)		
Occupation				
Artisan	3 (23.1)	10 (76.9)	14.856[F]	0.007*
Trader	14 (16.5)	71 (83.5)		
Student	2 (15.4)	11 (84.6)		
Health Worker	0 (0.0)	9 (100.0)		
Unemployed	10 (52.6)	9 (47.4)		
Others	15 (31.9)	32 (68.1)		

Increased age, ethnicity, level of education and occupation were associated with uptake of glaucoma screening.

Table 6: Binary Logistic Regression of significant socio-demographic variables

Variable		Coeff (B)	Odds Ratio (Exp(B))	95% CI		*P-value*
				Lower	Upper	
Age Group	20-34yrs	-1.298	0.273	0.049	1.514	0.137
	35-49yrs	0.207	1.230	0.307	4.933	0.770
	50-64yrs	0.862	2.368	0.568	9.883	0.237
Tribe	Igbo	-21.421	0.000	0.000	-	0.999
	Ijaw	-39.871	0.000	0.000	-	0.999
Education	None	-20.298	0.000	0.000	-	>0.999
	Primary	-0.496	0.609	0.043	8.644	0.714
	Secondary	-1.046	0.351	0.030	4.059	0.402
	Tertiary	0.078	1.081	0.093	12.505	0.950
Occupation	Artisan	0.119	1.126	0.233	5.440	0.883
	Trader	-0.390	0.677	0.250	1.836	0.443
	Student	0.495	1.641	0.228	11.811	0.623
	Health Worker	-19.735	0.000	0.000	-	0.999
	Unemployed	1.833	6.253	1.633	23.947	**0.007***

Reference categories (Age group ≥65yrs; Tribe = Yoruba; Education = Postgraduate; Occupation = Others)

Discussion

The results this study show poor awareness and attitudes towards glaucoma screening among relatives of glaucoma patients although over 80% of the respondents have heard about glaucoma. However,

despite having heard of glaucoma, about 40% completely had no knowledge of the risk factors for glaucoma.

Also, almost 40% of the respondents knew that there was a hereditary link to glaucoma. This is less than a conference report in 2013 by Smith *et al* in Mississippi [28], which showed that 53% of their respondents were aware of the hereditary link. The difference in location to the two studies may have contributed to this difference where awareness is generally expected to be higher in the US than Nigeria. However, information from some sources suggests that Mississippi and Anambra state have a near comparable adult literacy rates of 81.9% and 88.1% respectively [29, 30]. Mississippi is one of the lowest in the United States as it ranks 49th out of 50 states in the US according to the 2013 National Assessment of Educational Progress (NAEP) while Anambra has one of the highest (4th) in Nigeria [29]. It is equally important to consider this point with caution as none of the sources described the yardstick for measuring adult literacy level. This shows the need for consistent glaucoma education among the populace if there is to be any meaningful outcome in reducing the burden of glaucoma blindness, irrespective of the location. There was another study in the UK where about 77% of respondents knew about the hereditary or family link with glaucoma [31].

In this study too, there was a fairly strong knowledge that glaucoma could lead to blindness which was found in about 76% of our respondents. This was also lower than what was reported in Mississippi where 84.6% of respondents understand that glaucoma could cause blindness and 88% reported that glaucoma blindness could be prevented with early diagnosis and treatment of glaucoma [28]. Unfortunately, the index study did not elicit the role of early diagnosis and treatment of glaucoma among the respondents. Again, though variation in location may favour this difference, there appears to be no strong evidence to support this at the moment.

Although almost 90% of the respondents believe that glaucoma screening is important, only about 40% are aware of glaucoma screening and only 23.7% have undergone glaucoma screening at least once in the past (Table 2). This is quite low compared to a previous study conducted in the UK where about 80% of FDRs of glaucoma patients have undergone glaucoma screening. Possible reasons for this included better awareness of hereditary links with glaucoma and knowledge of free glaucoma screening in the

location for people of European descent and those with at least one FDR with glaucoma [31]. Unlike this study where respondents did not either consider glaucoma screening necessary (35.3%) or had no time to avail themselves for screening (20.3%), could not afford the cost of screening (14.1%), screening centre not available in/centre too far from their current location (18.2%). These reasons/barriers account for 87.9% of reasons precluding glaucoma screening among the respondents while the other 12% believe absence of blindness in their family was enough to prevent them presenting for glaucoma screening.

From table 4, Increased age, ethnicity, level of education and occupation were associated with uptake of glaucoma screening however, a regression analysis (table 5) showed a significant negative relationship between unemployment and screening of relative of glaucoma patients in the study (p=0.007*). This was strengthened by the finding that 14.1% of respondents could not afford the cost of glaucoma screening. This is almost similar to a previous study in Nigeria explored the economic burden of glaucoma in a tertiary eye clinic which showed that 14% and 19.3% of respondent respective were un sickled and unemployed and only 9.3% of the respondents of that study had access to insurance coverage and all of this 9.3% were either in the professional or skilled employment category of the study [32].

Availability of healthcare funding is an important determinant of access to healthcare. As stakeholders brainstorm to scale-up awareness of glaucoma screening and ways to prevent glaucoma blindness, it is also necessary to pay attention to funding mechanisms that will guarantee access to eye care when eventually people become enlightened about the benefits of glaucoma screening.

Some limitations of this study include the solely quantitative approach and non-inclusion of aspects of early treatment in our questionnaire. A mixed method approach may have provided better insight about the perceptions towards and barriers of glaucoma screening in the study population. Also, it will be good to explore some of the gaps of this study for future related studies. Notwithstanding these limitations did not affect the central message of this article which is one of the first on the subject matter in our environment and to some extent, sub–Saharan Africa.

Conclusion

The awareness, attitude and practices towards glaucoma screening among relative of glaucoma patients is poor as demonstrated by this study. The main barrier to glaucoma screening was the perception that it was not necessary, have no time to screen or can't afford the screening. This is important for stakeholders to step up campaigns to enlighten populations at higher risk for developing glaucoma to appreciate the need to have periodic glaucoma screening.

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