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Sociodemographic and clinical profiles of patients with primary open angle glaucoma in Gwagwalada, Nigeria

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尼日利亚 Gwagwalada 原发性开角型青光眼患者的社会人口学和临床特征

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摘要

目的:探讨比较尼日利亚 Gwagwalada 原发性开角型青光眼(POAG)与非青光眼患者的临床社会人口学特征。

方法:横断面对比研究。共调查 235 例成年患者,其中 96 例 POAG 及 139 例非青光眼。记录患者年龄、性别、教育程度、职业、种族、青光眼家族史、眼痒、糖尿病和高血压情况。眼部检查包括视力、中央视野、杯盘比、前房角评估和眼压。

结果:平均年龄为 49.88±13.75 岁,其中男 114 例(48.5%)。POAG 患者包括 42 个种族,其中伊博人(24/96,25.0%)和约鲁巴人(20/96,20.8%)最为常见。大多数 POAG(74/96,77.1%)年龄在 40-69 岁之间。POAG(73/96,76.0%)有不同程度的视力障碍。POAG 组与非青光眼组的对比如下:青光眼阳性家族史(34/96,35.4%) *vs* (25/139,18.0%;$P=0.012$);糖尿病史(8/96,8.3%) *vs* (6/139,4.3%);高血压病史(24/96,25.0%) *vs* (28/139,20.1%);糖尿病合并高血压病史(1/96,1.0%) *vs* (4/139,2.9%;$P=0.268$);使用抗糖尿病药物者(5/96,5.2%) *vs* (7/139,5.0%);使用降压药者(24/96,25.0%) *vs* (23/139,16.5%);联合使用抗糖尿病和抗高血压药物者(4/96,4.2%) *vs* (5/139,3.6%;$P=0.328$);有眼痒症状者(18/96,18.7%) *vs* (37/139,26.6%;$P=0.328$);视力障碍[右眼(RE):51/96,53.1%;左眼(LE):60/96,62.5%] *vs* (RE:40/139,28.7%;LE:37/139,26.6%;$P=0.000$);垂直杯盘比>0.4(RE:96/96,100%;LE:96/96,100%) *vs* (RE:131/139,94.2%;LE:124/139,89.2%)(RE:$P=0.307$;LE:$P=0.006$);眼压>22 mmHg(RE:17/96,17.7%;LE:22/96,22.9%) *vs* (RE:2/139,1.4%;LE:2/139,1.4%;$P=0.006$)。大多数 POAG 患者(60/96,62.5%)正在服用抗青光眼药物,(23/96,24.0%)尚未开始用药,$P=0.000$。许多 POAG(32/96,33.3%)正在服用 β 受体阻滞剂、前列腺素抑制剂和碳酸酐酶抑制剂的联合抗青光眼药物。

结论:青光眼具有与其他眼部疾病不同的临床社会人口学特征。许多参与者肯定了青光眼的家族史,大多数青光眼参与者正在接受抗青光眼治疗。包括失明在内的视力障碍与青光眼显著相关。该研究证实,开角型青光眼与高杯盘比和高眼内压有关。

关键词:原发性开角型青光眼;尼日利亚;青光眼;社会人口学

Abstract

• AIM: To determine and compare clinico-sociodemographic profiles of primary open angle glaucoma (POAG) with non-glaucoma eye patients in Gwagwalada, Nigeria.

• METHODS: A cross-sectional comparative study. A total of 235 adult patients including 96 with POAG and 139 non-glaucoma were included. General characteristics such as age, gender, education, vocation, ethnicity, family history of glaucoma, ocular itching, diabetes mellitus, and hypertension were recorded. Ocular examinations included visual acuity, central visual field, cup disc ratio, anterior chamber angle assessment, and intraocular pressure.

• RESULTS: Mean age was 49.88 + 13.75 years and 114 (48.5%) were males. Patients with POAG comprised 42 ethnics with Igbo (24/96, 25.0%) and Yoruba (20/96, 20.8%) being most common. Most POAG (74/96, 77.1%) were in the age range 40-69. The POAG (73/96, 76.0%) had varied visual impairment. The POAG versus non-glaucoma as follows: positive family history of glaucoma (34/96, 35.4%) *vs* (25/139, 18.0%; $P=0.012$); history of diabetes mellitus (8/96, 8.3%) *vs* (6/139, 4.3%); hypertension (24/96, 25.0%) *vs* (28/139, 20.1%); combined diabetes mellitus and hypertension (1/96, 1.0%) *vs* (4/139, 2.9%; $P=0.268$); antidiabetic drugs (5/96, 5.2%) *vs* (7/139, 5.0%); antihypertensives drugs (24/96, 25.0%) *vs* (23/139, 16.5%); combined antidiabetic and antihypertensive drugs (4/96, 4.2%) *vs* (5/139, 3.6%; $P=0.328$); ocular itching (18/96, 18.7%) *vs* (37/139, 26.6%; $P=0.328$); visual impairment [right eye (RE): 51/96, 53.1%; left eye (LE):60/96, 62.5%] *vs* (RE:40/139, 28.7%; LE:37/139, 26.6%; $P=0.000$); vertical cup disc ratio >0.4 (RE: 96/96, 100.0%; LE: 96/96, 100.0%) *vs* (RE: 131/139, 94.2%; LE:124/139, 89.2%) (RE: $P=0.307$; LE: $P=0.006$); intraocular pressure > 22 mmHg (RE: 17/96, 17.7%; LE: 22/96, 22.9%) *vs* (RE: 2/139, 1.4%; LE: 2/139, 1.4%; $P=0.006$). Most POAG (60/96, 62.5%) were on antiglaucoma drugs and (23/96, 24.0%) were yet to commence medication ($P=0.000$). Many POAG (32/96, 33.3%) were on combination antiglaucoma drugs of beta blockers, prostaglandin inhibitors and carbonic anhydrase inhibitors.

• CONCLUSION: Glaucoma has distinguishing clinico-sociodemographic features from other eye conditions. Many participants affirmed family history of glaucoma, and most glaucoma participants were on antiglaucoma treatment. The visual impairment including blindness was significantly associated with glaucoma. The study affirmed open angle glaucoma was associated with high cup-disc ratio and high intra ocular pressure.

• KEYWORDS: primary open angle glaucoma; Nigeria; glaucoma; sociodemography
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INTRODUCTION

Glaucoma is a group of eye diseases with progressive loss of vision, characteristic visual field changes, optic nerve fibre damage with one of the risk factors yet only modifiable being raised intraocular pressure (IOP)[1-2]. It is a relentless degenerative eye condition of complex origin[3]. From an initial staggering 64.3 million people, aged 40-80 years, it has been projected that 111.8 million people worldwide would live with glaucoma by 2040, respectively[4].

Glaucoma is a leading cause of irreversible visual impairment globally especially in Nigeria. With a prevalence of 0.7%[5], over 150 000 Nigerians above age 40 were blinded by glaucoma and many more are in various stages of visual impairment. The prevalence of glaucoma is worrisome among some Nigerian tribes and notorious for causing blindness in working age group. Appropriate and effective glaucoma control measures are required to reduce the blindness among the individuals with glaucoma[6].

Various types of glaucoma exist and the most common being primary open angle glaucoma (POAG) with main risk factors being IOP, family history[7], black race, central cornea thickness, and increasing age[1-2]. Glaucoma has early, middle and late phasic natural history. The detection of glaucoma in its early phase, difficult though, can translate to appropriate treatment and prevention of avoidable irreversible glaucoma blindness.

Since decades, studies investigating glaucoma towards its understanding as a complex blinding eye condition and preventing the worrisome blinding end point continue. This study investigated the profile of Nigerians with and without POAG towards its better understanding and glaucoma blindness prevention.

SUBJECTS AND METHODS

Ethical Approval The approval to conduct the study was sought and obtained from UATH, Health Research Ethics Committee (HREC). Written informed consent was obtained from each participant.

Subjects This comparative cross-sectional study was a report of the sociodemographic interview and clinical examinations of 96 POAG and 139 non-glaucoma eye patients in Gwagwalada, Abuja, Nigeria. The participants were recruited among the eye patients at Department of Ophthalmology, University of Abuja Teaching Hospital (UATH) and Eye Clinic, Saint Mary's Catholic Hospital (SMCH), Gwagwalada. Whereas UATH is tertiary teaching public hospital with high eye patients load, SMCH is a catholic mission hospital that opens to all and sundry. The participants were recruited from among the eye patients attending UATH and SMCH, Gwagwalada, Abuja, Nigeria. Two groups of participants were recruited including POAG and non-glaucoma eye patients. The two groups were confirmed in the eye clinic as having POAG or non-glaucomatous eye patients. Both groups had eye examination including visual acuity, anterior chamber angle assessment, IOP, central visual field testing and funduscopy. The non-glaucoma group comprises mostly of patients diagnosed of refractive error or presbyopia aside some with allergic conjunctivitis, early lens opacity and those without any detectable ocular disorder (normal eyes).

Sample Size Determination The sample size was determined from an infinite population of patients of the UATH and SMCH Eye Clinics using Cochran formula as cited in Barlett *et al*[8]. Cochran's formula is considered especially appropriate in situations with large populations which is undefined. Cochran's formula for calculating sample size with the population information is given as:

$$n = \frac{n_o}{1 + \frac{n_o - 1}{N}} \quad (1)$$

Where: the population size (N (finite) or ∞(infinite), in this case is N = infinite (∞); patients of the UATH and SMCH Eye Clinics.

In order to determine n_o, however, Cochran (1977) provides the following formula:

$$n_o = Z^2pq/e^2 \quad (2)$$

Where: n_o is the sample size for infinite population, Z is the selected critical value of desired confidence level, p is the estimated proportion of an attribute that is present in the population, $q=1-p$, and e=the desired level of precision

Assuming the maximum variability which is equal to 50% ($P=0.5$) and taking 95% confidence level with ± 10% accuracy, the calculation for the sample size,

n_o is: $p=0.5$; $q=1-0.5=0.5$; $e=0.1$ and $Z=1.96$

$$n_o = \frac{(1.96)^2(0.5)(0.5)}{(0.1^2)} = 96.04 \approx 96$$

Then by substitution, the first equation above becomes:

$$n = \frac{96}{1 + \frac{96 - 1}{\infty}} \approx 96$$

Inclusion Criteria The inclusion criteria for the participants in the POAG group were written informed consent: adult age (at least 18 years); open anterior chamber angle by gonioscopy or Van Herick's grade 3[9], baseline central visual field (CVF) difference of 2 dB with mean deviation (MD) of ⩾6 dB or 1.5 dB in MD <6 dB in two CVF printouts done at a week interval using the automated perimeter with threshold strategy testing algorithm of 242 or 102 and target size III or V for VA of 6/60 at baseline, 3 and 6 mo considering accurate reliability indices of false positive <33%, false negative <33%, and fixation loss <20%[10], and vertical cup disc ratio (CDR) of at least 0.4, raised IOP (with or without medication), and normal IOP with medication. The inclusion criteria for the participants in the non-glaucoma group were written informed consent: adult age (at least 18 years), open anterior chamber angle (Van Herick's grade 3)[9], full perimetry on confrotation test[11] and normal IOP.

Exclusion Criteria Renal disease; liver disease; immunosuppression (HIV, chronic steroid therapy, radiotherapy), infective/contagious conditions (epidemic keratoconjunctivitis, COVID-19, Lassa fever, Ebola), non-POAG glaucoma, family history of high CDR, optic disc conditions (congenital/ traumatic atrophy, coloboma, drusen), use of lipid lowering medications, and lack of cooperation with the study processes.

Eye Clinics The details of eye patients who met the inclusion criteria during routine eye clinics were entered in the register and were informed about the research ahead of the study. Phone calls reminder were made to the patients to present on the selected day for the study. Written informed consent was sought and obtained from each participants. Thereafter, the participants were interviewed on socio-demography (age, gender, education, vocation, ethnic group, family history of glaucoma) and health symptoms (visual status, diabetes mellitus, hypertension). Subsequently, basic eye examinations including visual acuity using (Snellen chart), CDR (direct ophthalmoscopy), anterior chamber angle assessment (Van Herick's grade 3)[9], IOP (Goldmann applanation tonometer) were conducted for each participant.

Data Collection The patients who met inclusion criteria were enrolled as participants and had their information entered into the proforma in the eye clinics. The participants had interview on socio-demography particularly age, gender, education, vocation, ethnicity, family history of glaucoma, ocular itching, visual status, diabetes mellitus, and hypertension. Further, the participants had ocular examinations including visual acuity, anterior chamber angle assessment, IOP, CDR, central visual field and funduscopy. Data were entered into excel, cleaned, exported into STATA15 and analysed. Simple proportional analysis and Chi-square test were carried out. The results of Chi-square test were considered significant at $P<0.05$.

RESULTS

Demography A total of 235 participants including 96 with POAG and 139 non-glaucoma were studied. The age range was 19-85 years and 114(48.5%) were males. Most (195/235, 83.0%) had at least secondary education and 170 (72.3%) were married. Most with POAG (74/96, 77.0%) were in the age range 40-69. Of 96 POAG participants, 73 (76.0%) had varied visual impairment (symptomatic). Forty two different Nigeria ethnic groupings participated in the study with Igbo 24 (25.0%) followed by the Yoruba 20 (20.8%) being most affected by POAG (Table 1).

Family history of glaucoma among the participants There was positive family history of glaucoma in POAG (34/96, 35.4%) and non-glaucoma participants (25/139, 18.0%; $P=0.012$; Figure 1). Most (168/235, 71.5%) had no family history of glaucoma.

Diabetes mellitus and hypertension comorbidities and medication Most (162/235, 68.9%) participants had no comorbidity but POAG (33/96, 34.4%) and non-glaucoma (40/139, 28.8%) had. There was history of diabetes mellitus in POAG (8/96, 8.3%) and non-glaucoma participants (6/139, 4.3%). Same for hypertension (24/96, 25.0%) POAG and (28/139, 20.1%) non-glaucoma. There was combined comorbidities of diabetes mellitus and hypertension in (1/96, 1.0%) POAG and (4/139, 2.9%) non-glaucoma participants. ($P=0.268$; Figure 2). The drugs used include antidiabetic (5/96, 5.2%) POAG, (7/139, 5.0%) non-glaucoma; and antihypertensive (24/96, 25.0%) POAG, (23/139, 16.5%) non-glaucoma; and combined antidiabetic and antihypertensive drugs (4/96, 4.2%) POAG; (5/139, 3.6%) non-glaucoma ($P=0.328$).

History of ocular itching At least 18(18.8%) POAG and 37(26.6%) non-glaucoma often had ocular itching ($P=0.328$; Table 2). Many (87/235, 37.0%) never had ocular itching but (148/235, 63.0%) at least rarely had it.

Table 1 Socio-demography of the participants

Socio-demography	POAG (n=96)	Non-glaucoma (n=139)	P
Age ($\bar{x}\pm s$, years)			
Mean	53.70±13.15	46.05±14.00	
Median	55.00	48.00	
Range(n,%)	19-85	19-85	
<20	1 (1.0%)	1 (0.7%)	0.000
20-29	3 (3.1%)	20 (14.4%)	
30-39	8 (8.3%)	21 (15.1%)	
40-49	24 (25.0%)	32 (23.0%)	
50-59	24 (25.0%)	46 (33.1%)	
60-69	26 (27.1%)	12 (8.6%)	
>70	10 (10.4%)	7 (5.0%)	
Category (n, %)			
Symptomatic	73 (76.0%)		
Asymptomatic	23 (24.0%)		
Non-glaucoma		139 (100%)	
Gender (n, %)			
Male	59 (61.5%)	55 (39.6%)	0.001
Female	37 (38.5%)	84 (60.4%)	
Education (n, %)			
Non-formal	5 (5.2%)	8 (5.8%)	0.582
Quranic	3 (3.1%)	3 (2.2%)	
Primary	12 (12.5%)	9 (6.5%)	
Secondary	20 (20.8%)	30 (21.6%)	
Tertiary	56 (58.3%)	89 (64.0%)	
Occupation (n, %)			
Skilled	48 (52.7%)	83(61.5%)	0.309
Semi-skilled	25 (27.5%)	26 (19.3%)	
Unskilled	18 (19.8%)	26 (19.3%)	
Marital status (n, %)			
Single	7 (7.4%)	29 (21.0%)	0.014
Married	79 (83.2%)	91 (65.9%)	
Divorced	3 (3.2%)	3 (2.2%)	
Widow	6 (6.3%)	15 (10.9%)	
Religion (n, %)			
Christianity	72 (75.0%)	84 (60.4%)	0.045
Islamic	24 (25.0%)	53 (38.1%)	
Traditional	0	2 (1.4%)	
Ethnicity(n, %)			
Igbo	24 (25.0%)	23 (16.5%)	0.354
Yoruba	20 (20.8%)	24 (17.3%)	
Igala	6 (6.3%)	16 (11.5%)	
Hausa	5 (5.2%)	10 (7.2%)	
Ebira	3 (3.1%)	12 (8.6%)	
Gwari	2 (2.1%)	5 (3.6%)	
Fulani	1 (1.0%)	4 (2.9%)	
Ebira koto	1 (1.0%)	4 (2.9%)	
[a]Others	34 (35.4%)	41 (29.5%)	

POAG: Primary open angle glaucoma; [a]34 more Nigerian ethnic groupings.

History of glaucoma treatment Most (60/96, 62.5%) POAG were on antiglaucoma drugs and (23/96, 24.0%) were yet to commence medication (P=0.000). Many POAG (32/96, 33.3%) were on combination antiglaucoma drugs of beta blockers, prostaglandin inhibitors and carbonic anhydrase inhibitors (Table 3).

Table 2 Frequency of ocular itching among the participants (*n*, %)

Frequency of ocular itching	POAG (*n*=96)	Non-glaucoma (*n*=139)
Never	34 (35.4%)	53 (38.1%)
Rarely	44 (45.8%)	49 (35.3%)
Often	14 (14.6%)	23 (16.5%)
Frequently	3 (3.1%)	12 (8.6%)
Always	1 (1.0%)	2 (1.4%)

POAG: Primary open angle glaucoma.

Table 3 Glaucoma treatment received by primary open angle glaucoma patients (*n*, %)

Glaucoma treatment	POAG (*n*=96)	*P*
None	23 (24.0%)	
Not sure	5 (5.2%)	
Antiglaucoma drugs	60 (62.5%)	0.000
Glaucomasurgery	6 (6.3%)	
Combined antiglaucoma drugs and glaucoma surgery	2 (2.1%)	
Antiglaucoma drugs used	POAG (*n*=96)	
None	31 (32.3%)	
Betablocker	17 (17.7%)	
Prostaglandin analogs	3 (3.1%)	0.000
Beta blocker& Carbonic anhydrase inhibitor	12 (12.5%)	
Combined Beta blocker and prostaglandin analogs	20 (20.8%)	
Combined Beta blocker, carbonic anhydrase inhibitor and prostaglandin analogs	13 (13.5%)	

POAG: Primary open angle glaucoma.

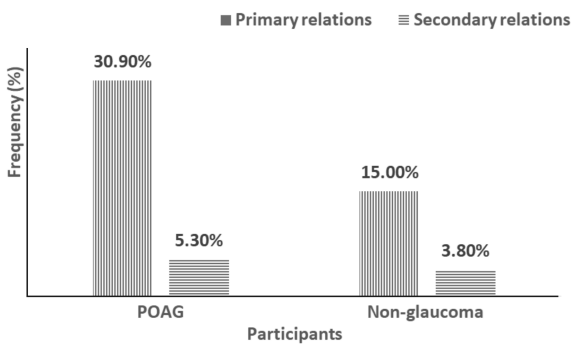

Figure 1 Comparison of the family history of glaucoma among the participants. POAG: Primary open angle glaucoma.

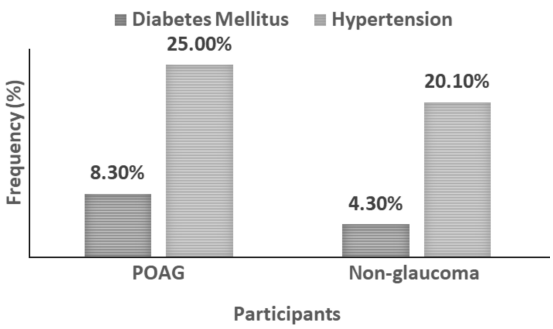

Figure 2 Comparison of the diabetic and hypertensive comorbidities among the participants. POAG: Primary open angle glaucoma.

Visual acuity The magnitude of participants with visual impairment including blindness in POAG were (RE: 51/96, 53.1%; LE: 60/96, 62.5%) and non-glaucoma (RE: 40/139, 28.8%; LE:37/139, 26.6%; *P*=0.000; Figure 3).

Cup disc ratio The magnitude of participants with at least CDR 0.4 in POAG were (RE: 96/96, 100.0%; LE: 96/96, 100.0%) and non-glaucoma (RE: 131/139, 94.2%; LE: 124/139, 89.2%) (RE: *P* = 0.307; LE: *P* = 0.006; Figure 4).

Intraocular pressure The magnitude of participants with at least 22 mmHg IOP in POAG were (RE: 17/96, 17.7%; LE: 22/96, 22.9%) and non-glaucoma (RE: 2/139, 1.4%; LE: 2/139, 1.4%; *P*=0.006; Figure 5).

DISCUSSION

The study surveyed and compared the socio-demographic and clinical profiles of eye patients with POAG and non-glaucoma in Gwagwalada, Abuja, Nigeria. The socio-demography profile determined were age, gender, education, occupation, marital status, religion, and ethnicity. Others profiles were family history of glaucoma, comorbidities (diabetes mellitus and hypertension), ocular itching, glaucoma treatment, visual impairment, CDR, and IOP.

A total of 235 participants including 96 cases with POAG and 139 non-glaucoma were studied. The age range from 19 to 85 years (mean 53.70±13.15 for POAG and 46.05±14.00 for non-glaucoma) indicated adult population. Most of the participants were mainly in the working age (40-69); POAG (74/96, 77.1%) and non-glaucoma (90/139, 64.7%; *P*=0.000). The POAG is notoriously common after age 40 year and is of concern in view of its irreversible blinding potential if not detected early and appropriate treatment instituted. When untreated, glaucoma can cause blindness that would necessarily affect the individual's quality of life and depletes the workforce[12-14].

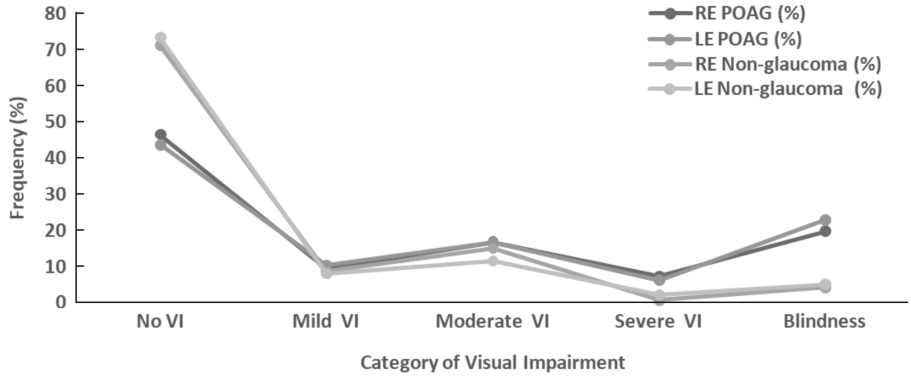

Figure 3 Distribution of the visual acuity categories among the participants. VI: Visual impairment; RE: Right eye; LE: Left eye; POAG: Primary open angle glaucoma.

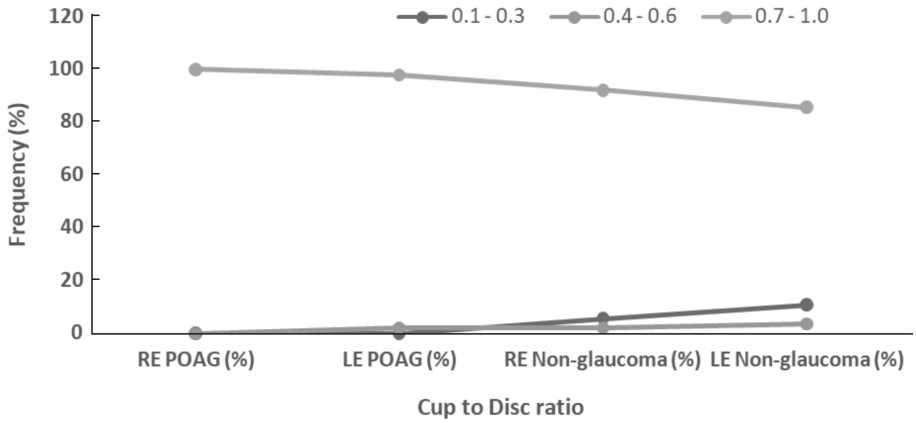

Figure 4 Distribution of the cup disc ratio categories among the participants. RE: Right eye; LE: Left eye; POAG: Primary open angle glaucoma.

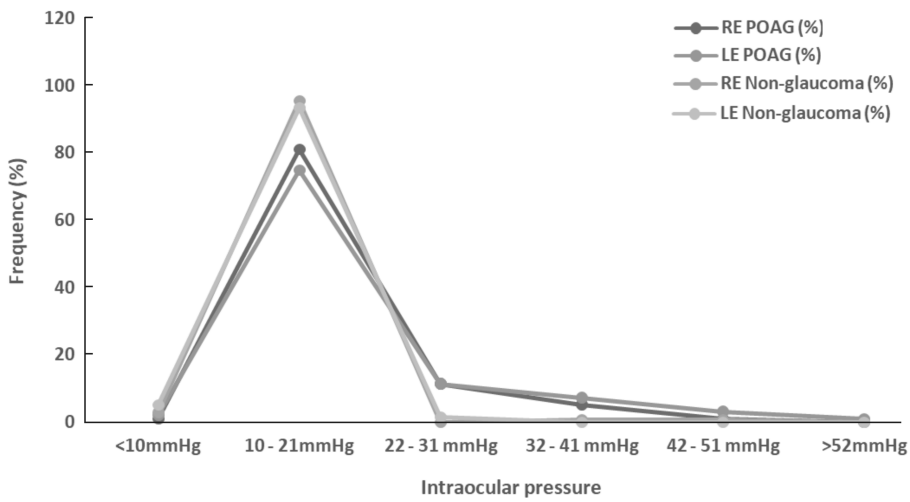

Figure 5 Distribution of the intraocular pressure categories among the participants. POAG: Primary open angle glaucoma; RE: Right eye; LE: Left eye.

Generally, gender distribution was almost equal with slight female preponderance (121/235, 51.5%) which was marked in non-glaucoma (84/139, 60.4%) and unlike in POAG (59/96, 61.5%) where male dominated ($P=0.001$). This might imply more male had POAG or were accessing glaucoma care services than their female counterparts. Most (195/235, 83.0%) had at least secondary education ($P=0.582$). This would assist in educating the patients on glaucoma and their compliance with treatment plan.

Forty two different Nigeria ethnics participated in the study with Igbo 24 (25.0%) followed by Yoruba 20 (20.8%) being most affected by POAG. Surprisingly, the Igbo and the Yoruba were more than other ethnics in the study population. Probably, it might be due to high level of health care awareness or economic capability or both culminating in high uptake of eye care services of the two ethnic groupings. Aside, some tribes have cultural attachment to traditional treatment for their ailments rather than orthodox health care due to their belief system. Regardless and remarkably, this study corroborated the high prevalence of POAG among the Igbo and the Yoruba ethnics reported in earlier studies[15]. There is need to investigate glaucoma further among the two ethnics so

as to reduce its prevalence as well as glaucoma blindness.

The study found that most (168/235, 71.5%) participants had no family history of glaucoma. However, (34/96, 35.4%) POAG and (25/139, 18.0%) non-glaucoma participants affirmed glaucoma in family relations. The family history of glaucoma is not rare as many patients admitted positive history in blood relations during routine eye clinic clerkship aside some reports on family history of glaucoma[16]. It is noteworthy that nowadays the management of glaucoma is incomplete until an individual with glaucoma is requested to inform her blood relations to get their eyes screened for glaucoma periodically for possible early detection and appropriate management. It is reported that an individual with family history of glaucoma has about 9% chance of developing glaucoma compared with the general population[17].

On the other hand, it has been reported that glaucoma can be aggravated by coexisting diabetes mellitus and hypertension[17]. Diabetes and hypertension can contribute to developing increased eye pressure and diabetes can increase the likelihood of developing glaucoma[17]. On the other hand, the interplay of blood pressure and IOP can determine the optic nerve head perfusion pressure that can lead to glaucoma. In a Korean study hypertension was associated with an increased incidence of POAG with an adjusted hazard ratio of 1.16 (95%*CI* 1.09-1.24). Patients with higher systolic blood pressure (≥140 mmHg) were more likely to have POAG compared with subjects with a systolic blood pressure <120 mmHg[18]. Notwithstanding, low blood pressure could be associated with an increased prevalence of POAG[19].

Although most (162/235, 68.9%) participants had no comorbidity, it is of concern that many (33/96, 34.4%) POAG and (40/139, 28.8%) non-glaucoma had. However, when diabetes mellitus and hypertension are appropriately treated leading to good control they may not adversely affect the outcome of glaucoma. A study suggests that antihypertensive treatment may have a preventive effect on the development of glaucoma especially postpone the onset of glaucoma for about two years[20]. Curiously, many of the participants were not on medication to control their coexisting morbidity as just a fraction of the affected were on antihypertensives (57/235, 24.3%) and antidiabetic (21/235, 8.9%) medications.

Meanwhile, most POAG participants (61/96, 63.5%) were on antiglaucoma drugs mostly combination (45/96, 46.9%) antiglaucoma drugs and (7/96, 7.3%) had glaucoma surgery. Glaucoma drainage procedure can effectively lower IOP and decrease medications for patients with open angle glaucoma. The reported antiglaucoma drugs include beta blockers, prostaglandin analogs, carbonic anhydrase inhibitor, and their fixed combinations. The antiglaucoma drugs are known to effectively reduce IOP. But it is of concern that not all POAG were on medication. Plausibly, those who had glaucoma surgery were having good IOP control and some were just diagnosed and about to commence the antiglaucoma medications. Managing glaucoma in Nigeria has notable challenges especially the inability of some patients to afford and sustain glaucoma treatment expenses[6,12]. Moreover, a spectrum of antiglaucoma medication adherence issues have been reported in some studies[10,21-22].

Furthermore, this study found that many (87/235, 37.0%) participants never had ocular itching. Even when most (148/235, 63.0%) at least rarely had it, the difference between POAG (64.8%) and non-glaucoma (61.9%) was not significant ($P=0.328$).

The magnitude of participants with visual impairment including blindness in POAG were (RE: 51/96, 53.1%; LE: 60/96, 62.5%) and non-glaucoma (RE: 40/139, 28.8%; LE: 37/139, 26.6%; $P=0.000$). It is important to note that the unaided visual acuity was used in this study. Glaucoma affects the visual function in all domains (visual field, visual acuity, colour vision, contrast sensitivity, stereoacuity) in varying degrees though and as it progresses. However, visual acuity loss and visual field defects caused by pathological raised IOP are the main features of the disease[22]. Impaired visual acuity usually suggests the glaucoma is at an advanced phase especially if no vision impaired comorbidity. Of note, visual field test is more objective in assessing visual function impairment in glaucoma but comparatively expensive than visual acuity test.

Additionally, this study affirmed high CDR was associated with POAG. The magnitude of participants with at least CDR 0.4 in POAG was (96/96, 100.0%). There was significance difference between CDR of LE in POAG (96/96, 100.0%) and non-glaucoma (124/139, 89.2%; $P=0.006$). Notwithstanding, when compared, the RE CDR of POAG (96/96, 100.0%) and non-glaucoma (131/139, 94.2%) was not significant ($P=0.307$).

Similarly, the study affirmed high IOP was associated with POAG. The magnitude of participants with at least 22 mmHg IOP in POAG were (RE: 17/96, 17.7%; LE: 22/96, 22.9%) and non-glaucoma (RE: 2/139, 1.4%; LE: 2/139, 1.4%; $P=0.006$). Moreover, the number of POAG participants with high IOP would have been more were some of them not already on antiglaucoma medications. It was possible the high IOP among four non-glaucoma participants could suggest ocular hypertension and if such high IOP was sustained over time could lead to glaucoma. On the other hand, the IOP might be one off finding that plausibly caused by extraneous factors either observer or the participants.

Glaucoma has distinguishing clinico-sociodemographic features from other eye conditions. Many participants affirmed family history of glaucoma. Most glaucoma participants were on antiglaucoma treatment. Glaucoma was not associated with the ocular itching. The visual impairment including blindness was significantly associated with glaucoma. The study affirmed open angle glaucoma was associated with high cup-disc ratio and high intra ocular pressure.

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