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Baseline Presentation and Ocular Parameters of Primary Open Angle Glaucoma Patients Attending a Tertiary Eye Clinic in South-Western Nigeria

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ABSTRACT

Purpose: To analyze the baseline presentation and ocular parameters of Primary Open Angle Glaucoma patients attending a Tertiary eye clinic in South-Western Nigeria.

Materials and Methods: The case records of Primary Open Angle Glaucoma patients aged 40 years and above who were diagnosed at the glaucoma clinic of Ekiti State University Teaching Hospital from April 2024 to September 2024 were retrieved and analyzed for the study.

The data obtained were coded and analyzed using Statistical Package for Social Sciences.

Findings: One hundred and ten primary open angle glaucoma patients aged forty years and above were analyzed for the study. They comprised of 56 males (50.9%) and 54 females (49.1%), Age range 40-94 years, mean 67 SD± 11 years.

Majority of the eyes 155(70.5%) had a presenting visual acuity (PVA) of ≤ 6/18 at diagnosis, 12.7% of which did not have mobility vision with a PVA of HM or less while 5.9% of the eyes could not perceive light in either or both eyes. The mean intraocular pressure was 28±6mmHg at diagnosis while the mean cup disc ratio(CDR) was 0.8.

Ninety-nine patients (90.0%) presented due to visual problems of which 8 (7.2%) had outright loss of vision. The remaining 10.0% had non-visual complaints of either tearing or itching.

Implications to Theory, Practice and Policy: Majority of the patients seen in this study already had significant visual loss coupled with advanced clinical parameters diagnostic of POAG at presentation. Therefore, periodic eye screening for early case detection of POAG and routine screening of all adult patients that attend any eye care facility is highly recommended to ensure early diagnosis and prompt management in order to reduce the magnitude of blindness from the disease. Also there is need for advocacy for subsidized care by Government and other Non- Governmental agencies for Glaucoma in the environment to guarantee more access to Eye care by indigent patients.

Keywords: *Glaucoma Presentation, Intraocular Pressure, Visual Loss, Irreversible Blindness.*

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INTRODUCTION

Glaucoma is a blinding disease of the optic nerve with characteristic visual field defects with or without raised intraocular pressure resulting in progressive visual loss due to damage to the retinal ganglion cells. The type of blindness that results from untreated glaucoma is usually profound and irreversible.

It is the second leading cause of blindness worldwide accounting for 8% of the estimated 39 million blind people in the world.[1] In Africa, it accounts for 15% of blindness and has the highest prevalence of blindness relative to other regions in the world[2]; it is also the second leading cause of blindness in Nigeria.[3]

The Nigeria National Blindness and Visual impairment survey reported glaucoma related blindness prevalence of 0.7% (95% confidence interval [CI] 0.55-0.88%)[4]. In a study on an indigenous population in south Western Nigeria, Ashaye et al[5] reported a prevalence of 7.3% for all the glaucoma while POAG constituted 6.2%.

Another similar study in a metropolitan city in South Western Nigeria by Adekoya et al[6] reported 25.3% among all their newly registered patients within a period of 4weeks, this demonstrates the enormous level of the disease.

There are various types of glaucoma depending on the classification used. It can be primary or secondary depending on the presence or absence of an antecedent cause; it can also be open angle or closed angle depending on the state of the angle of the anterior chamber of the eye through which aqueous fluid drains out. The other classification is based on age of onset, such as congenital, juvenile, developmental and adult types.

Primary open-angle glaucoma (POAG) is the most common type of glaucoma in Africa,[7-9] and also in Nigeria[10&11] It is seen mostly among adults of age forty years and above; it is usually a bilateral disease with some degree of asymmetry. The onset is usually insidious with substantial damage to the optic nerve with associated visual loss by the time the patient presents for treatment when the vision can no longer be restored but rather maintained.

Most previous studies on glaucoma have dwelt much more on the prevalence, risk factors and awareness[5,11-14] and few on the baseline clinical presentation of it.[15&16]

Considering the insidious nature of POAG, there is need for a high level of suspicion for early diagnosis, it is therefore of interest to the Authors to determine the baseline presentation of it so as to serve as a guide for screening purposes and early case detection of the disease.

This study therefore aims to analyze the presentation and baseline ocular parameters of POAG among patients attending the eye clinic of Ekiti State University Teaching Hospital and use the result obtained as screening guide for early diagnosis and prompt management in other to minimize the magnitude of blindness from the disease in the environment.

MATERIALS AND METHOD

This is a retrospective study of the case records of POAG patients aged 40 years and above that attended the glaucoma clinic of Ekiti State University Teaching Hospital (EKSUTH) from April 2024 to September 2024. The bio-data, gender, educational level and other relevant demographic

data about the patients as documented in their case notes were extracted using the protocol data sheet designed for the study.

Also, their initial complaints and duration, baseline ocular parameters that established the diagnosis of the disease were extracted, these include their best corrected visual acuity, detailed anterior segment evaluation, pupillary size and reaction, optic disc assessment, cup-disc ratio, gonioscopic findings and their intraocular pressures. Patients with incomplete baseline documentation and other notable visually disabling co-morbidity such as central cornea opacity, visually disabling cataract, age related macular degeneration and other significant posterior segment pathology were excluded from the study.

Data analysis: The data obtained were coded and analyzed using Statistical Package for Social Sciences (SPSS) Version 21; the descriptive analysis of all the relevant data are presented in form of texts and tables.

Ethical considerations: Approval for the study was obtained from the research and ethical committee of Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti.

FINDINGS

One hundred and ten primary open angle glaucoma patients aged forty years and above were analyzed for the study. Their socio- demographic characteristics are as illustrated in table 1. They comprised of 56 males (50.9%) and 54 females (49.1%). Their age ranged from 40-94 years with a mean of 67 SD$\pm$ 11 years. The greatest proportion were within the age group 71-80 years (29.1%) closely followed by 61-70 years (26.4%)

The greatest proportion were married (88.2%) while the remaining were either widowed or divorced. Majority of the patients (85.5%) had formal education at various levels while the remaining 14.5% did not. The greatest proportion of the patients were retirees 43 (39.1%), there were equal proportion of civil servants and traders 30 (21.8%). Others were Farmers, Traders, Clergymen and Artisan.

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Table 1: Socio-Demographic Characteristics of 110 Glaucoma Patients

Variables	Number	Percentage%
Age-Group		
40-50years	11	10.0
51-60years	23	20.9
61-70years	29	26.4
71-80years	**32**	**29.1**
81-90years	13	11.8
>90years	2	1.8
Sex		
Male	**56**	**50.9**
Female	54	49.1
Marital Status		
Married	**97**	**88.2**
Widow	2	1.8
Divorced	11	10.0
Educational Status		
None	16	14.5
1^0	16	14.5
2^0	26	23.6
3^0	**52**	**47.3**
Occupation		
Civil servant	24	21.8
Farmer	11	10.0
Trader	24	21.8
Clergy	2	1.8
Retiree	**43**	**39.1**
Artisan	6	5.5

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Table 2 shows the presenting visual acuity (PVA) of the 220eyes of 110 patients; of these, 120 eyes (54.5%) had a presenting visual acuity of < 6/18 while the remaining 100 eyes (45S.5%) had a PVA of > 6/18. Of these 54.5% eyes with PVA < 6/18, 16.8% had it in their better eye, 30% in their worse eye and 7.2% in both eyes, 12.7% did not have mobility vision with a PVA of HM or less while 5.9% could not perceive light in either or both eyes. A fairly good number of the eyes, sixty- five (29.6%) had a PVA of 6/12 or better and only 1.3% eyes had a PVA of 6/6.

Table 2: Visual Acuity of 220eyes of 110 Glaucoma Patients

Visual Acuity	V_b	V_w	V_e	Total n (%)
6/6	3	-	-	3 (1.3)
6/9	11	2	22	35 (15.9)
6/12	12	5	10	27 (12.3)
6/18	15	4	16	35 (15.9)
6/24	12	9	2	23 (10.5)
6/36	9	10	2	21 (9.6)
6/60	9	11	-	20 (9.1)
CF	5	13	10	28 (12.7)
HM	2	8	-	10 (4.6)
LP	-	5	-	5 (2.2)
NLP	-	11	2	13 (5.9)
Total	**78**	**78**	**64**	**220(100.0)**

V_b = Vision in Better eye, V_w = Vision in Worse eye, V_e = Equal vision in both eyes, n = % distribution of visual acuity of the 220eyes.

Table 3 shows the intraocular pressure (IOP) of the 220 eyes, the mean intraocular pressure was 28±6mmHg at diagnosis. The IOP in the better eye ranged from 22mmHg to 26mmHg in 32 eyes while 34 eyes had IOP ranging from 27mmHg to 41mmHg. Twenty- six eyes had IOP ranging from 27mmHg to 31mmHg in their worse eye while the remaining 28 eyes had IOP ranging from32 to 44mmHg. Forty-five eyes had equal IOP ranging from 22 to 26mmHg while the remaining 38 eyes had IOP range of 32 to 44mmHg, only 8 out of the 220 eyes (3.6%) had IOP of 21mmHg or less while 7eyes (3.1%) had IOP range of 42 to 44mmHg.

Table 3: Distribution of Intraocular Pressure of 220 Eyes of 110 Patients

Intraocular Pressure(mmHg)	P_b	P_w	P_e	Total n (%)
≤ 21	-	-	8	8 (3.6)
22-26	32	9	45	86 (39.1)
27-31	21	26	26	73 (33.2)
32-36	9	17	8	34 (15.5)
37-41	4	6	2	12 (5.5)
42-46	-	5	2	7 (3.1)
> 46	-	-	-	0.0
Total	**66**	**63**	**91**	**220(100.0)**

P_b = Pressure in Better eye, P_w = Pressure in Worse eye, P_e = Equal pressure in both eyes, n = % distribution of intraocular pressure of the 220eyes.

Table 4 shows the distribution of cup disc ratio (CDR) in the 220 eyes, only 6 eyes (2.7%) had CDR ratio of ≤ 0.5, majority of the eyes 71(32.3%) had CDR of 0.8 while 41(18.6%) had 0.9 and 40 (18.2%) had a CDR of 1.0.

Table 4: Distribution of Cup Disc Ratio of 220 Eyes of 110 Patients

Cup Disc ratio	*Cd_b*	*Cd_w*	*Cd_e*	*Total n (%)*
≤ 0.5	2	-	4	6 (2.7)
0.6	9	1	8	18 (8.3)
0.7	17	7	20	44 (20)
0.8	12	15	44	71 (32.3)
0.9	11	14	16	41 (18.6)
1.0	-	14	26	40 (18.2)
Total	**51**	**51**	**118**	**220 (100.0)**

Cd_b = Cup disc ratio in better eye, Cd_w = Cup disc ratio in worse eye, Cd_e = Equal Cup disc ratio in both eyes, n = % distribution of cup disc ratio of the 220eyes.

Table 5 shows the common complaints given by the 110 Patients at presentation, ninety-nine of them (90.0%) presented due to visual complaints of which 38.2% had poor vision, 40.0% had blurred vision, 4.6% had difficulty with reading and 7.2% had outright loss of vision. The remaining 10.0% had non-visual complaints of either tearing or itching.

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Table 5: Distribution of Complaints at Diagnosis by the 110 Glaucoma Patients

Complaint	*Frequency*	*Percentage%*
Poor vision	42	38.2
Blurring of vision	44	40.0
Difficulty with reading	5	4.6
Itching/ Tearing	11	10.0
Loss of Vision	8	7.2
Total	**110**	**100.0**

DISCUSSION

The visual prognosis in primary open angle glaucoma depends largely on early presentation and prompt management. In this study, 54.5% of the eyes had visual impairment with presenting visual acuity (PVA) of less than 6/18 while the remaining 45.5% had PVA of 6/18 or better, of these 54,5% with PVA of <6/18, 16.8% had it in their better eye, 30% in their worse eye and 7.2% in both eyes, this is worse than the 35.5% that had PVA of <6/18 in their better eye reported by Adekoya et al[17] working also in the same region. This might be due to the fact that this study was conducted in a semi-urban environment with low-income earners, that makes patients to access eye care late whereas the other study was conducted in an urban metropolitan city with high income earners that enables the patients to access eye care services readily. Moreover, people in the environment still seek spiritual help for healing purposes and utilize orthodox Medicare as the last result.

Twenty–eight eyes (12.7%) in this study did not have mobility vision at presentation with PVA of ≤ HM, out of which thirteen (5.9%) could not even perceive light, this is quite enormous when one considers that such visual loss would not be restored with management. This 12.7% is quite low when compared with the 47% reported by Abdul et al[18] working in Northern Nigeria and 43% reported by Kayange et al[15] working in Malawi. A much lower percentage of 24% and 29% were reported respectively by Gyasi et al[16] and Buhrmann et al[8] working in some other African countries but it is similar to the17.7% reported by Enoch et al[19] working in another State in Southern Nigeria and the16.2% that was reported by Seth et al[20] in India. This disparity might be due to the regional variation in the environment where the studies were conducted coupled with some local beliefs about eye diseases that restrains them from accessing orthodox Eye care facility on time asides from financial incapability.

On the other hand, this is contrary to the PVA of 6/12 or better that was reported in 91% of patients studied in United Kingdom by Sharma et al.[21] This remarkable difference might be due to the fact that POAG is predominant among Blacks especially of African descent[7-9]. Also most people do not do routine eye check in most low income Countries unless they have complaints about their eyes, nevertheless a substantial number of the eyes in this study 100 (45.5%) had good PVA of

6/18 or better at presentation but one has to bear it in mind that visual acuity is not a reliable index of visual loss in glaucoma. Their central visual field assessment would have been the best option but the patients did not have it done at presentation because they were not financially prepared for it. For instance, in the study by Enoch et al[19] 17.7% of their POAG patients were blind based on visual acuity criteria while 51.5% were blind based on visual field criteria.

The other baseline parameter analyzed in this study was their Intraocular pressure (IOP), the mean Intraocular pressure observed was 28±6mmHg. This is quite low when compared with the mean IOP reported in some other studies.[15,16 &18.] Kayange et al [15] reported a mean IOP of 33.5mmHg, Gyasi et al[16] reported 33.9mmHg while Abdul et al[18] reported 31.9mmHg. On the other hand, Olawoye et al[10] reported a lower mean IOP of 23mmHg, which might be due to the fact that their study included all the various types of glaucoma seen especially Normal tension glaucoma while this study only focused on POAG patients. Aside IOP, there are some other risk factors that determine visual loss in POAG, such as high myopia, increasing age, genetic predisposition and central cornea thickness.

Majority of the eyes in this study (69.1%) had high CDR of ≥ 0.8, of which 32.3% had 0.8, 18.6% had CDR of 0.9 while the remaining 18.2% had 1.0. Only six eyes (2.7%) had CDR of ≤ 0.5 at presentation, this showed that majority of the patients already had substantial damage to their optic nerve head at presentation. The CDR observed in this study is similar to the one reported by Kayange at al[15] whereby 79% of their patients had a CDR of ≥0.8.

Gyasi et al[16] and Abdul et al[18] reported a mean CDR of 0.83 and 0.8 respectively. On the other hand, only 48.5% of the patients studied by Olawoye et al[10] had a CDR of ≥0.9, this lower percentage may be due to the fact that their patients included other various types of glaucoma aside from POAG like Angle closure glaucoma most of which will be symptomatic; as such they would have presented before substantial damage is done to the optic nerve head.

All the patients seen in this study presented because they had complaints, ninety-nine of them (90.0%) presented due to visual complaints while the remaining 10.0% had non-visual complaints of either tearing or itching. Majority of those that had visual complaints had complaints of blurring or poor vision while 8 of them (7.2%) had outright loss of vision, similarly 70% of the patients seen by Abdul et al[18] also presented because they had symptoms with many of them already blinded at presentation.

There were almost equal proportion of males and females in this study, this is quite different from some other similar studies that reported male preponderance[15,16,21 & 22]. This might be due to the fact that POAG is a disease that affects both male and female in equal proportions and the male preponderance in these other studies might be due to financial reasons because more males are more financially empowered and will be able to afford hospital services than the females.

The mean age of the patients at presentation in this study was 67years, this is higher than the 54.5years reported by Kayange et al[15] and 58.3years reported by Olawoye et al[10] among the POAG subgroup in their study. This might be due to the fact that their studies included patients aged 18years and above while this study included only patients aged 40 years and above.

CONCLUSION AND RECOMMENDATIONS

Majority of the patients seen in this study already had significant visual loss coupled with advanced clinical parameters diagnostic of POAG such as characteristic optic nerve head damage and high intraocular pressures at presentation. Therefore, there is need for more advocacy for periodic eye screening using all these aforementioned baseline and ocular parameters as a guide for early case detection and institution of prompt management in order to reduce the magnitude of blindness from the disease. Also subsidizing Glaucoma care in the environment will guarantee more access to Eye care by indigent patients.

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