Presentation of Glaucoma Patients in National Hospital, Abuja, Nigeria.

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ABSTRACT

Aim: To determine the pattern of presentation of patients with primary open angle glaucoma

Methods: This was a prospective study which was carried out among patients with Primary open angle glaucoma at the Eye clinic of the National Hospital Abuja. All glaucoma patients presenting for the first time in the hospital eye clinic over a one year period with a diagnosis of primary open angle glaucoma were enrolled in the study. Data was obtained using interviewer administered questionnaires and ocular examination included visual acuity, gonioscopy, slit lamp examination, funduscopy, tonometry, central corneal thickness and visual fields. Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 15.

Results: A total of 152 patients were seen in the eye clinic within the study period. The male to female ratio was 1.34:1. The mean age was 51.73 years (SD ± 12.04) and the peak age incidence was in the sixth decade. The majority of patients, 109 (71.7%) had tertiary level of education while only 4.6% were illiterates. Eighty two patients (54.0%) had subjective visual loss at presentation. Twenty four (24) patients had visual impairment (15.8%) while 9 patients (5.9%) were blind at presentation. Twenty eight patients (18.4%) presented with cup to disc ratios of 0.9-1.0 while 29 patients (19.1%) had severe visual field defects. Higher levels of education, high occupational status, high monthly income, living within Abuja were significantly associated with early presentation ($P<0.01$). Seventy six patients (50.0%) accepted to have glaucoma surgery at initial presentation.

Conclusions: Glaucoma patients attending the Eye Clinic of the National Hospital, Abuja presented relatively early when compared with previous studies from other parts of Nigeria.

Key words: Glaucoma, presentation, visual fields, blindness

INTRODUCTION

It has long been reported over 3 decades ago that many glaucoma patients in Nigeria present in the advanced stages of the disease,[1,2,3] and this is despite giving a short duration of symptoms. This may be because Primary Open Angle Glaucoma (POAG) is characterised by absence of early warning symptoms and is often referred to as a 'sneak thief of sight'[4]. Using visual acuity criteria, these early studies from the Northern and Western parts of Nigeria reported that 31-40.6% of glaucoma patients were blind at presentation.[1,2,3]However, different definitions of blindness were used in these studies which tend to underestimate the rate of blindness. At the Ahmadu Bello University Teaching Hospital in Kaduna, Amoni[1] using visual acuity criteria of

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counting finger at 1 metre to define blindness, found that 34% of glaucoma patients were blind in both eyes at presentation. Olurin[3], at the University College Hospital, Ibadan, using visual acuity criteria of counting finger at 3 feet to define blindness, reported bilateral blindness in 40.6% of glaucoma patients at presentation. A more recent study from Benin City, using the WHO definition of blindness, show that 24% of patients who presented at the University of Benin Teaching Hospital were blind in both eyes and a further 23.4% were blind in one eye at presentation, using visual acuity criterion.[4] In another more recent report from the same institution, 16.8% of patients were blind at presentation using visual acuity criteria.[5] A similar study from Irrua, in Edo state, reported a blindness rate at presentation of 17.7%.[6]

Recent studies in Nigeria have used visual field criteria to evaluate glaucoma patients at presentation. The visual field analysis which is more objective even shows a more tragic picture**.** In Onitsha, Eastern Nigeria, Nwosu[7] reported that 44.2% of glaucoma patients were blind at presentation. In the South South region of Nigeria, two studies from Benin City report glaucoma blindness at presentation of 56.5%[8] and 41.6%[9] while another at Irrua reported that 51.5%[10] of glaucoma patients had bilateral blindness at presentation.

In a study of presentation patterns of glaucoma patients in Ghana, one third (34.1%) of all the patients reported bilaterally blind while half were uni-ocularly blind using visual acuity criteria.[8]Fraser[9] in a study analysing risk factors for late presentation in glaucoma found that an African Caribbean patient was estimated to be four and a half times more likely to attend with advanced field loss than a white patient of similar age, sex, IOP, and referral source. A female patient was less likely to attend later than a male patient. A patient referred with a diagnosis of glaucoma via any source other than an optometrist with the correct diagnosis is estimated to be greater than four times more likely to be a late attendee. There was a trend of increasing odds of late presentation with increasing age. A patient whose presenting IOP is 21–25 mm Hg is estimated to be a quarter less likely to attend with advanced field loss than a patient of the same ethnic origin, sex, age, referral source, but with presenting IOP of greater than 31 mm Hg.[9]People with a family history of glaucoma were estimated to be almost one third less likely to have advanced field loss as those with no family history.[10]

METHODS

All new patients presenting in the eye clinic of the National Hospital, Abuja, with a diagnosis of POAG were interviewed and examined using a predesigned questionnaire that had been pretested in a private eye clinic in Abuja. Information on age at presentation, sex, marital status, religion, geographical abode, educational and socioeconomic status was obtained using a pre-designed questionnaire. The presenting complaints and duration of symptoms, type of treatment prior to presentation, any associated systemic disease and family history of glaucoma were recorded. The patients were asked if they would accept surgery as initial treatment for their glaucoma after explaining the advantages and disadvantages of the different techniques of management of glaucoma to them. The reasons for refusal of surgery were recorded.

The visual acuity was estimated separately for each eye using Snellen's chart in a clinic room with bright illumination and in cases where the vision was too poor, the ability to count fingers at varying distances or the ability to perceive hand movement or light perception was used. The eyes were examined by direct illumination using a pen torch to exclude other associated eye disorders especially media opacities like corneal opacities and cataract as well as to determine the pupillary reactions to light. Fundoscopy was done initially with the Welch Allyn's specialist ophthalmoscope and then with the Haag-Streit Slit lamp bio microscope with the aid of a + 90 Dioptre lens. The intraocular pressure was measured using the Goldmann applanation tonometer mounted on the Haag-Streit Slit lamp bio microscope. Slit lamp

examination was also performed to assist in the exclusion of secondary causes of open angle glaucoma and other anterior segment diseases. Gonioscopy was performed using the Goldmann goniolens. Pachymetry was done to measure the central corneal thickness using the Sonomed PacScan 300P pachymeter. The central visual field was plotted using the Octopus Automated Perimeter. Perimetry was done by confrontation in those patients who could not fixate on the central target or see the test target.

INCLUSION CRITERIA

Patients were included in the study if they met the following diagnostic criteria:

(a) Typical glaucomatous excavation (cupping) and atrophy of the optic disc
(b) Glaucomatous visual field defect such as arcuate defects, nasal step, paracentral scotoma and generalised depression.
(c) Open and normal appearing angles on gonioscopy.
(d) Absence of secondary causes of open angle glaucoma.
(e) Intraocular pressures above 21mmHg by applanation tonometry were viewed with more suspicion although levels below 21mmHg were included.
In cases where the visual field analysis was not possible due to poor vision, a high intraocular pressure and pathological cupping of the optic disc were sufficient for the diagnosis.

EXCLUSION CRITERIA

Patients were excluded if they had the following:

(a) Significant media opacities such as corneal opacities and cataract.
(b) Retinal diseases which may cause visual field defects such as retinitis pigmentosa, extensive chorioretinal scars, branch retinal vein occlusion etc.
(c) Macular disease which has significantly impaired central vision.
(d) Patients who did not give consent.

Classifications

The occupation of the patients were grouped according to their social classes modified from the British registrar general's classification as follows.[11]

Class I. Higher professions e.g. Doctors, engineers, lawyers, businessmen, politicians, lecturers, entrepreneurs, management staff of institutions, etc.
Class II. Lesser professions e.g. Teachers, Nurses etc.
Class III. Skilled workers e.g. typists, clerks, technicians, carpenters, auto mechanics, etc.
Class IV. Semi-skilled workers e.g. Petty traders, machine operators, hairdressers, barbers, etc.
Class V. Unskilled workers e.g. Subsistence farmers, housewives, cleaners, messengers, etc.

Severity of the disease was classified by the criteria given by the American Academy of Ophthalmologists Preferred Practice Pattern.[12]

- Mild: characteristic optic nerve abnormalities consistent with glaucoma and a normal visual field as tested with standard automated perimetry.
- Moderate: characteristic optic nerve abnormalities consistent with glaucoma and visual field abnormalities in one hemifield and not within 5 degrees of fixation.
- Severe: characteristic optic nerve abnormalities consistent with glaucoma and visual field abnormalities in both hemifields and loss within 5 degrees of fixation in at least one hemifield.

This was slightly modified in this study due to the peculiarity of our environment where exclusion of the glaucoma patients with vision so poor that they cannot perform visual field test will exclude a high proportion. These patients were included in the severe category. Furthermore, as our facilities are not advanced enough to diagnose all pre

perimetric glaucoma, those with minimal unilateral visual field anomalies like enlargement of the blind spot/ one paracentral scotoma were placed in the mild category.

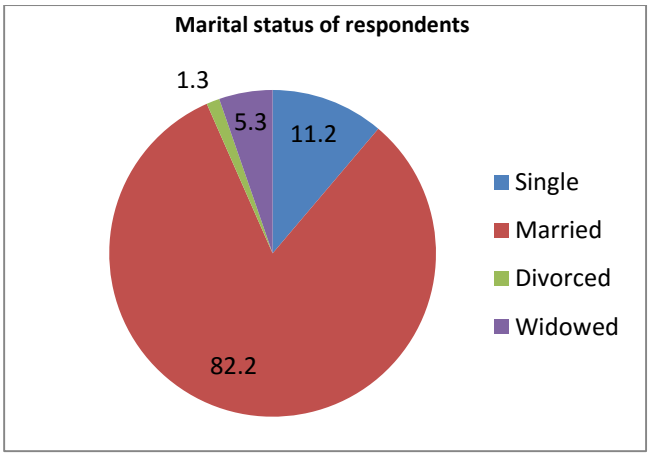
RESULTS

One hundred and fifty two patients with primary open angle glaucoma attending the Consultant Outpatient clinics of the National Hospital, Abuja, who met the inclusion criteria, were seen during the study period. Table 1 show that there were 87 males (57.24%) and 65 females (43.76%). The male to female ratio was 1.34:1. The mean age was 51.73yrs (SD ± 12.04). The mean age of the males was 52.17yrs (SD ± 12.05) and for females, the mean age was 51.14yrs (SD ± 12.09).

TABLE 1: Age and Sex distribution of respondents with Primary Open Angle Glaucoma

Age group (years)	Sex		Total N (%)
	Male N (%)	Female N (%)	
Less than 30	6 (6.1)	4 (6.2)	10 (6.6)
31-40	7 (8.0)	11 (16.9)	18 (11.8)
41-50	21(24.1)	13 (20.0)	34 (22.4)
51-60	32 (36.8)	18 (27.7)	50 (32.9)
61-70	17 (19.5)	19 (29.2)	36 (23.7)
71 and above	4 (4.6)	0	4 (2.6)
Total	87 (100)	65 (100)	152 (100)

FIGURE 1: MARITAL STATUS OF GLAUCOMA PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA



The majority of the patients, 125 (82.2%) with primary open angle glaucoma were married (Figure 1). This was followed by those who were single, 17 (11.2%), widowed, 8 (5.3%) and those who were divorced, 2 (1.3%).

The majority of patients were Christians, 109 (71.7%) while 43 (28.3%) were Muslims.

TABLE 2: Educational distribution of respondents with Primary Open Angle Glaucoma

Educational status	Frequency (N)	Percentage (%)
None	7	4.6
Primary	24	15.8
Secondary	12	7.9
Tertiary	109	71.7
Total	152	100

The majority of patients, 109 (71.7%) had tertiary level of education (Table 2).

TABLE 3: Occupation of respondents with Primary Open Angle Glaucoma

Occupation	Frequency (N)	Percentage (%)
Higher professions	52	34.2
Lesser professions	39	25.7
Skilled workers	15	9.9
Semi skilled workers	23	15.1
Unskilled workers	23	15.1
Total	152	100

The majority of the glaucoma patients were in social class I, the higher professions (doctors, engineers, lawyers, businessmen, politicians, lecturers, entrepreneurs, management staff of institutions etc) and social class II, the lesser professions (teachers, Nurses etc).

TABLE 4: Monthly Income of respondents with Primary Open Angle Glaucoma

Monthly income (₦)	Frequency (N)	Percentage (%)
Less than 50,000	65	42.7
50,000-99,000	24	15.8
100,000-149,000	32	21.1
150,000-199,000	9	5.9
200,000 and above	22	14.5
Total	152	100

The majority of patients were in the lower income group earning less than 50,000.00 monthly. The mean monthly income was ₦ 99,934.21 (SD ± 124,707.3).

TABLE 5a: Presenting complaints of respondents with Primary Open Angle Glaucoma

Presenting Complaints	Number	Percentage
Poor day vision	58	38.2
Harmattan effect	36	23.7
Ocular pain	22	14.5
Difficulty with tiny prints	18	11.8
Poor night vision	16	10.5
Itching	14	9.2
Ocular discomfort	11	7.2
Poor night & day vision	8	5.3
Headache	8	5.3
Heaviness	7	4.6
Redness	5	3.3

Many of the glaucoma patients had multiple presenting complaints (Table 5a & b). The most common presenting complaints were related to poor vision. Eighty two patients (54%) had subjective visual loss at presentation, either for day or night or both.

TABLE 5b: Other Presenting Complaints of respondents with Primary Open Angle Glaucoma

Presenting Complaints	Number	Percentage
Tearing	5	3.3
Foreign body sensation	5	3.3
Discharge	4	2.6
Eye check-up	3	2.0
Known glaucoma patient for second opinion	2	1.3
Bumping into objects	2	1.3
Flickering eye movement	1	0.7
Swelling of the eye	1	0.7
Floaters	1	0.7
Growth	1	0.7

The majority of patients presented with symptoms suggestive of glaucoma such as poor vision, harmattan effect, bumping into objects, haloes and those who already knew they had glaucoma. Forty six patients (30.26%) were discovered accidentally when they presented with other symptoms such as ocular pain, itching, headache, swelling, growth, tearing, redness, discharge, floaters, flickering eye movements, foreign body sensation, heaviness and those who came for eye checkup.

Ninety one patients (59.9%) had visited a hospital or clinic before presentation in at the National Hospital, Abuja. The remaining 61 patients (40.1%) had not visited any kind of hospital or pharmacy before presentation in the National Hospital, Abuja

TABLE 6: Visual Acuity in the Better Eye of Glaucoma Patients

Visual acuity	Frequency (N)	Percentage (%)
≥6/6	60	39.5
<6/6 ≥6/18	59	38.8
<6/18 ≥3/60	24	15.8
<3/60 ≥LP	9	5.9
NLP	0	0
Total	152	100

Twenty four patients (15.8%) had visual impairment, while 9 patients (5.9%) were blind by visual acuity criteria.

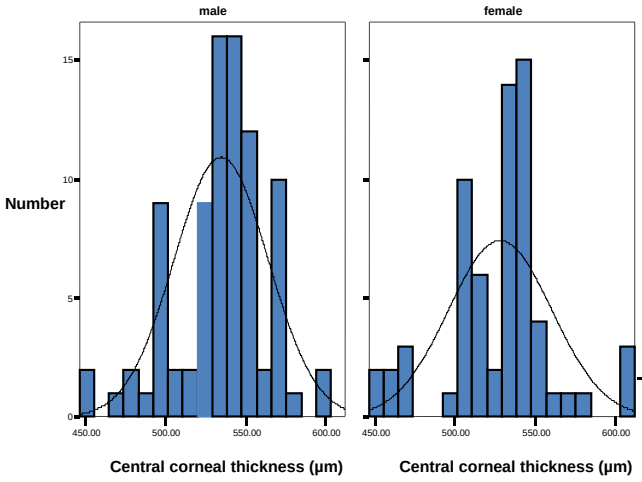
The most common associated ocular disorder was refractive error, occurring in 51 patients (33.6%). Ninety one patients (59.8%) had no other ocular abnormalities. Ten other patients (6.6%) had other minor ocular disorders such as mild allergic conjunctivitis, pterygium, bacterial conjunctivitis, vitreous floaters and occasional flickering eye movements.

TABLE 7: Cup to Disc Ratio in the Better Eye of Glaucoma Patients

Cup-Disc ratio	Frequency (N)	Percentage (%)
≤0.6	83	54.6
0.7-0.8	41	27.0
0.9-1.0	28	18.4
Total	152	100

End stage disease (C:D 0.9-1.0) was seen in 18.4% of glaucoma patients at presentation.

FIGURE 2: Central Corneal Thickness in male and female Primary Open Angle Glaucoma Patients



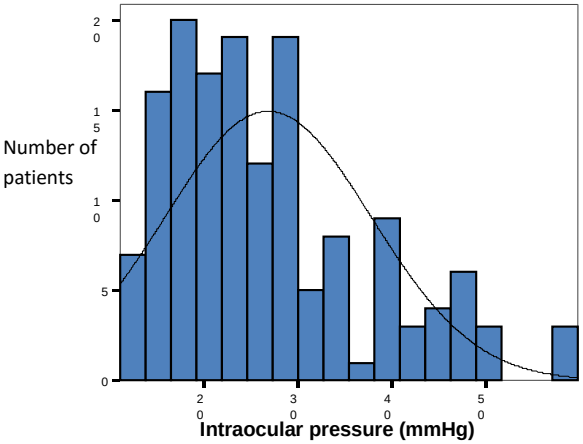
The mean central corneal thickness of the glaucoma patients was 531.67µm (SD ± 30.67). The range was 446.00µm to 612.00µm. The mean central corneal thickness of the males was 534.47µm (SD ± 29.32) and the range was 446.00µm to 600.00µm. The 95% CI was 528.21-540.73 µm. The mean central corneal thickness of females was 527.92µm (SD ± 32.22) and the range was 455.00µm to 612.00µm. The 95% CI was 519.93- 535.91 µm. The t cal was 1.306, df=150 and p value was 0.1936. There was no statistically significant difference in mean central corneal thickness between males and females.

TABLE 8: Intraocular Pressure of Patients with Primary Open Angle Glaucoma.

IOP	Frequency (N)		Percentage (%)	
	Right eye	Left eye	Right eye	Left eye
<10	0	0	0	0
10-21	60	60	39.5	39.5
22-30	50	57	32.9	37.5
31 and above	42	35	27.6	23.0
Total	152	152	100	100

The mean IOP for the right and left eyes were 26.76mmHg (SD ± 11.07) and 25.17 (SD ± 9.78) respectively. The t cal was 1.327, df =302 and the p value was 0.1855. There was no statistically significant difference between the mean IOPs of the right and left eyes.

FIGURE 3: INTRAOCULAR PRESSURE DISTRIBUTION AMONG PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA.



The number of eyes with IOPs equal to or below 21mmHg was 120 (39.47%) while those above 21mmHg was 184 (60.53%). After correction for those who have normal central corneal thickness,

the number of eyes with normal tension glaucoma was 98 (32.24%).

TABLE 9: Visual field in Better Eye of Glaucoma patients

Visual field defect	Frequency (N)	Percentage (%)
Mild	44	28.9
Moderate	79	52.0
Severe	29	19.1
Total	152	100

Forty four patients (28.9%) had mild visual field defects (pre-perimetric or isolated scotoma or enlarged blind spot), 79 (52%) had moderate defect (visual field abnormalities in one hemifield and not within 5 degrees of fixation) while severe visual field loss occurred in 29 patients (19.1%) with visual field constriction in both the superior and inferior hemifields and loss within 5 degrees of fixation in at least one hemifield. (Table9)

DISCUSSION

Several challenges exist in the management of primary open angle glaucoma and this is particularly so in developing countries. The focus of this study is on three aspects namely, late presentation, poor acceptability of surgery at the initial presentation and poor compliance with medical therapy.

There was a male preponderance in this study. This is in agreement with several other studies in Nigeria where males predominate. This may be because males being the bread winner in most families are more likely to present to hospitals. However male to female ratio of 1.34:1 seen in this study is less than the ratio of 1.8-3.0:1 seen in several other studies in Nigeria.[1,2,4,5,6,7,13,14] This may be because this study was conducted in Abuja which is the capital city of Nigeria where the general level of enlightenment may be higher.

The mean age was 51.73 years (SD ± 12.04) and the peak age incidence was in the sixth decade of life. This is slightly younger than what was reported in similar studies in Nigeria where the peak age incidence is in the seventh decade of life.[4,7,15] This may represent earlier presentation in an environment where people are more likely to be enlightened. In general, the prevalence of primary open angle glaucoma increases with age in both Black and White populations;[16-20] this is why the majority of patients (82.2%) were married in this study. However, Amoni reported a mean age of 42.8 years and a peak incidence in the third decade among the patients he studied in Kaduna, Northern Nigeria.[80] This may be partly due to differences in the study population. The age range in that study was 2.5 months to 85 years.

The overwhelming majority (82.89%) live within the FCT, hence access to the hospital may not be a very significant problem. The majority of patients (71.7%) had tertiary level of education while only 4.6% were illiterates. This implies a high level of literacy among the glaucoma patients attending the National Hospital Abuja. This is in contrast to the high level of illiteracy reported by Olurin four decades ago at Ibadan;[2] this may be because Abuja, being the Federal capital is a more cosmopolitan city than Ibadan. It may also reflect the greater awareness of the importance of education and success of free education programs which have taken place since then.

More than half (59.9%) of the patients belonged to the highest two classes but the monthly income shows that 58.5% earned less than ₦100,000.00 monthly with only 14.5% earning over ₦200,000.00 monthly. This may be because some of the patients in the higher professional classes may already be retired and earn low pensions while others who are businessmen may be suffering under the harsh economic climate which is currently prevalent. The socioeconomic status of patients in this study is however higher than what was reported in a similar study by Omoti et al in Benin City.[15] This may be because

patients in the Federal Capital City are more likely to have a higher socioeconomic class on the average compared to other cities in the country.

Several studies done in Nigeria have shown that many glaucoma patients present in the advanced stages of the disease[1,2,3,4,7] Unfortunately, by the time patients complain of subjective visual loss from glaucoma, advanced optic nerve damage has already occurred.[1,21] The absence of early warning symptoms is a major contributing factor and glaucoma is often referred to as a "sneak thief of sight".[4] In this study, 54% had subjective visual loss at presentation. This is much less than the 77.3% reported by Omoti et al in Benin City,[4] or the 84% reported by Amoni in Kaduna.[1]

Omoti et al reported that many glaucoma patients in Benin City typically present to other health care providers who are unable to diagnose the condition or to use traditional medicines long before seeing an Ophthalmologist;[4] This could contribute to delay in some patients. In sharp contrast to that study, none of the patients in this study admitted to having presented first to a chemist, pharmacy or traditional doctor. Although it is possible that some of these patients may conceal such a past history, it is possible that the higher level of enlightenment among the patients in Abuja may result in a more appropriate health seeking behaviour than elsewhere in the country. Although 59.9% of the patients had visited a hospital or clinic before presentation at the National Hospital, Abuja, only 2 patients (1.3%) had been told that they had glaucoma. Most of the patients had been on treatment for other minor ocular conditions or other acute or chronic general medical conditions. Most of them were on treatment by other medical doctors who were not ophthalmologists. Sixty six patients (43.4%) gave a history of another chronic disease and 97% of them were currently on treatment for this other disease.

In this study, 24 patients had visual impairment (15.8%) while 9 patients (5.9%) were blind at presentation using the WHO visual acuity criteria. This figure is very low when compared with previous studies from Nigeria. Olurin reported that 40.6% of glaucoma patients were blind at presentation in Ibadan using a definition of inability to count fingers at 3 feet.[3] Amoni reported that 34% of glaucoma patients were blind at presentation in Kaduna using a definition of count finger at 1 meter while 91% were blind in at least one eye at presentation..[1] Omoti et al[4] in Benin City reported that 24.7% were blind using the WHO visual acuity criteria and in a more recent study, Omoti[8] reported that 16.8% were blind at presentation using the same criteria. Enock et al in Irrua in Edo State, reported that 17.7% of glaucoma patients were blind using the WHO visual acuity criteria.[6] Lawan in Kano, in a recent study reported that 60% had visual impairment while 21% were blind at presentation, some from coexisting cataract.[13] Also, in contrast to these other studies, no patient had a vision of "no light perception" in the better eye. This may represent an earlier presentation pattern in the city of Abuja compared to these other studies. In a similar study of presentation patterns of glaucoma patients in Ghana, one third (34.1%) of all the patients were bilaterally blind while half were uni-ocularly blind using visual acuity criteria.[8]

The cup to disc ratios show that 18.4% of patients in this study presented with end stage disease with cup to disc ratios of 0.9-1.0. This is also lower than the 42.2% by Omoti et al,[4] 20.4% by Omoti[5] in a more recent study, 28.5% by Enock et al[6] or the 33% reported by Lawan.[13] Although it may be argued that the method of assessing the cup disc ratio is subjective with large inter-observer variations, the visual field analysis which is more objective even shows a more tragic picture.[22]

The visual field analysis shows that 19.1% of patients in this study had severe visual field defects which were blind using WHO visual field criteria. This is much lower than in Onitsha, Eastern Nigeria, where Nwosu[7] reported that 44.2% of glaucoma patients were blind at presentation, or in the South South region of Nigeria, where two studies from Benin City report glaucoma blindness at presentation of 56.5%[8] and 41.6%[9] while another at Irrua reported that

51.5%[6] of glaucoma patients had bilateral blindness at presentation using visual field criteria. Lawan in Kano, Northern Nigeria, using a different method of classification, reported a more tragic picture with 48% having constricted fields in the central areas and a further 18% that were unable to fixate the target.[13]

The mean IOP for the right eyes was 26.76mmHg while the mean IOP for the left eyes was 25.17 mmHg. As expected, there was no significant difference in mean IOP between the right and left eyes. This mean IOPs are less than the 31.1mmHg reported by Omoti et al[4] or the 31.1mmHg also reported by Enock et al[6] in previous studies in Nigeria. This is because of the higher number of patients with normal tension glaucoma in this study. The number of eyes with normal tension glaucoma was 98 (32.24%). This is higher than the 24.7% reported by Omoti et al[4] and the 22.6% reported by Enock et al[6] in previous studies. This may be because of better and more modern facilities now available for diagnosis of glaucoma and less reliance on IOP for diagnosis.

In conclusion, Glaucoma patients attending the Eye Clinic of the National Hospital, Abuja presented relatively early when compared with previous studies from other parts of Nigeria.

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