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Prevalence of glaucoma in a Nigerian hospital

Stella F. Usifoh[*], Waka A. Udezi and John O. Omage[2]

[1]*Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Benin, Benin City. Nigeria.*
[2]*Pharmacy Department, Central Hospital, Benin, Benin City, Nigeria.*

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Abstract
Glaucoma is a disease that damages the optic nerve and is a major cause of vision loss throughout the world. Globally about 87% of the visually impaired are living in developing countries. The WHO global target in vision 2020 for the right to sight initiative is to reduce blindness prevalence to less than 0.5% in all countries or less than 1% in any community. This study was aimed at determining the current prevalence of glaucoma and the effect of gender and age on primary open angle glaucoma (POAG) in a Nigerian Hospital. A retrospective survey of all new patients at the eye clinic was conducted using their medical records for a period of six months. A total of 2,305 new patients visited the eye clinic for the period, out of this total 1203 (52.2%) are male and 1102 (47.81%) are female. Two hundred and seventeen (9.4%) patients were diagnosed with glaucoma out of which 115 (53%) were male while 102 (47%) were female. Primary Open Angle Glaucoma (POAG) was the most common type of glaucoma (91.24%), followed by Normal Tension Glaucoma (NTG) with a prevalence of 3.23%. No significant association was found between age or sex and types of glaucoma. PACG and Juvenile glaucoma remains relatively rare accounting for only 1.84% each in types of glaucoma. There was a monthly glaucoma prevalence increase from 10 to 26.64 % which appears to indicate that glaucoma prevalence is on the rise.

Keywords: Glaucoma; Prevalence; Intraocular pressure; Primary open angle glaucoma.

INTRODUCTION

In Nigeria, hospital based survey on the pattern of eye diseases carried out in the South-South of the Niger-Delta area of the country have indicated that glaucoma is one of the commonest eye diseases (Ajibode, 1999; Nwosu, 1994; Ayanru, 1974 and Olurin, 1973). It is a devastating and often neglected problem and a leading cause of blindness, second only to cataract. A patient is a glaucoma suspect if the intra ocular pressure (IOP) is >21mmHg, IOP difference of >4mmHg between the two eyes or there is a glaucomatous visual field defect (Kanski, 2006). The main types of glaucoma are: Secondary Glaucoma (SG), Congenital (Developmental) Glaucoma (CG), Normal-Tension Glaucoma (NTG), Primary Angle Closure Glaucoma (PACG) and Primary Open Angle Glaucoma (POAG). Primary glaucoma is those in which the elevation of IOP is not associated with any other ocular disorder. While Secondary glaucoma is those in which an ocular or non-ocular disorder alters aqueous outflow: this, in turn, results in elevation of IOP. This may be acquired or developmental and of the open-angle or angle-closure types (Kanski, 2006).

[*] Corresponding author. *E-mail*: sfusifoh@uniben.edu *Tel*: +234 (0) 8056226668
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Glaucoma in Nigeria is predominantly primary open angle glaucoma (POAG). This begins at an earlier age in black people than in Caucasians, and the disease typically advances rapidly. In the majority of cases diagnosis is made late after loss of central vision in one or both eyes (Foster and Resenikoff 2005). Previous studies in Nigeria using visual acuity criteria showed that glaucoma is responsible for 17.1- 43.3% of bilateral blindness (Ajibode, 1999, Nwosu, 1994, Ayanru, 1974 and Olurin, 1973). In general a 25% reduction of IOP from the pre-treatment level usually proves sufficient, although it is very important to emphasize that no two patients respond in the same way; treatment must be tailored to the individual, bearing in mind additional risk factors. Based on the severity of damage to the optic nerve (grade1-4), the IOP should be lowered to the following levels: Grade 1: <20mmHg, Grade 2 :< 16mmHg and Grade 3 and 4 :< 12mmHg (Kanski 2006). · Glaucoma is more common in the elderly but can develop at any age. The subtypes of pediatric glaucoma are based upon the age of onset. Congenital glaucoma is present at birth. Infantile glaucoma develops between the ages of 1-24 months. Glaucoma with onset after age 3 years is juvenile glaucoma. Most cases of pediatric glaucoma have no specific identifiable cause and are considered primary glaucoma. Secondary glaucoma is typically associated with systemic conditions (Axenfeld-Rieger syndrome, Sturge-Weber syndrome, and neurofibromatosis), medication use (steroids), trauma or previous eye surgery (cataract surgery as a child). Childhood glaucoma is relatively rare. Primary congenital/ primary infantile glaucoma occurs in approximately 1 in 10,000 births (AAPOS, 2013).

The Initial therapy is usually medical, except in advanced cases. The chosen drug should be used at its lowest concentration, as infrequently as possible, to achieve the desired effect. Presently, pressure lowering drugs are the only existing drugs for effective treatment. Monotherapy or combination of drugs that lowers IOP are used to achieve ideal target pressure; putting into consideration patient's medical health and potential side-effects of each drug. The choice of drugs is from topical miotics or cholinergic agents which improved aqueous outflow, topical adrenergic drugs that reduced aqueous secretion (inflow), systemic aqueous suppressants such as the carbonic anhydrase inhibitors (reduced inflow) and beta-blockers increased the ability to control IOP by acting vigorously as an aqueous suppressant (reducing inflow). Alpha-agonists reduce inflow as well as having some additional effect on outflow channels (McAllister, 2009; Spaeth *et al.*, 1999). Prostaglandin analogues or 'hypotensive lipids' appear to open up an alternative route of aqueous egress through the suprachoroidal space. Though they are not suitable for all forms of glaucoma, they have contributed remarkably to obtaining very low intraocular pressures and, because of this alternative mechanism, they appear to work well and enhance the effects of other topical medications (McAllister, 2009).

Eye disease constitutes one of the commonest problems presenting to the pharmacy and general practice clinic, this could have significant socioeconomic consequence. The aims of this study are to determine the prevalence of glaucoma in a Nigerian hospital and the effect of gender and age of patients on the prevalence of primary open angle glaucoma (POAG).

METHOD

The study was carried out in the Edo State owned Stella Obasanjo Women and Children Hospital (SOWCH), in Benin City. The study design is retrospective using the medical records of all new patients presenting to the eye clinic from January to June 2012. The data collected were age, sex, occupation and diagnosis. Data was coded, entered into

Microsoft excel checked for accuracy and analyzed descriptively using percentages. Graph pad Instat {version 2.05a by GraphPad. Software, Inc.} was used for inferential analysis, a P value of less than 0.05 was interpreted as significant.

RESULTS

The total population of new patients whose health records were assessed within the period was 2305, out of which males were 1203 (52.19%) and females were 1102 (47.81%). Of these, 217 patients, representing 9.4% had glaucoma which includes 115 (52.99%) males and 102 (47%) females. Primary Open Angle Glaucoma (POAG) was the most common followed by Normal Tension Glaucoma (NTG) as shown in Tables 1 and 2. Male patient were predominantly affected across the different types of glaucoma except in Juvenile Glaucoma (JG) in Table 3.

Effect of sex on primary open angle glaucoma. In table 4, out of the 217 patients diagnosed with glaucoma 107 males and 91 female had primary open angle glaucoma. Chi square analysis shows that there is no significant association between sex and other types of glaucoma, (P value = 0.3455).

Table: 1. Prevalence of Glaucoma

Glaucoma	Males; n (%)	Females; n (%)	Total; n (%)
Present	115 (4.99)	102 (4.43)	217 (9.41)
Absent	1088 (47.2)	1000 (43.38)	2088 (90.55)
Total	1203 (52.19)	1102 (47.81)	2305 (100)

Table: 2. Demographic characteristics of patients with glaucoma

Variable		Male; n (%) n = 115 (53.0)	Female; n (%) n = 102 (47.0)	Total (%) n= 217 (100)
Age	≤19	3 (2.6)	9 (8.8)	11(6.0)
	20-39	21 (18.3)	19 (18.6)	40 (20.9)
	40-59	29(25.2)	26 (25.5)	60 (29.9)
	60-79	50 (43.5)	39 (38.2)	74 (36.8)
	≥ 80	12(10.4)	9 (8.8)	15 (7.5)
Occupation	Civil servants	12 (11.8)	12 (11.8)	24 (23.6)
	Private sector worker	9 (7.8)	3 (2.9)	12 (10.7)
	Self employed	21 (18.3)	31 (30.4)	52 (48.7)
	Artisan	6 (5.2)	0 (0)	6 (5.2)
	Student	9 (7.8)	12 (11.8)	21 (19.6)
	Pensioner	29 (25.2)	26 (25.5)	55 (50.7)
	Pupil	1 (0.9)	3 (2.9)	4 (3.8)
	Unemployed	28 (24.3)	15 (14.7)	43 (49.0)

Table 3: Types of glaucoma with sex distribution

Type	Male; n (%)	Female; n (%)	Total; n (%)
Primary open angle glaucoma (POAG)	107(54.04)	91(45.96)	198 (91.24)
Primary angle closure glaucoma (PACG)	3(75.00)	1(25.00)	4 (1.84)
Juvenile glaucoma (JG)	1(25.00)	3(75.00)	4 (1.84)
Normal tension glaucoma (NTG)	1(14.29)	6(85.71)	7 (3.23)
Secondary glaucoma (SG)	3(75.00)	1(25.00)	4 (1.84)
Total	115(52.99)	102(47.00)	217 (100)

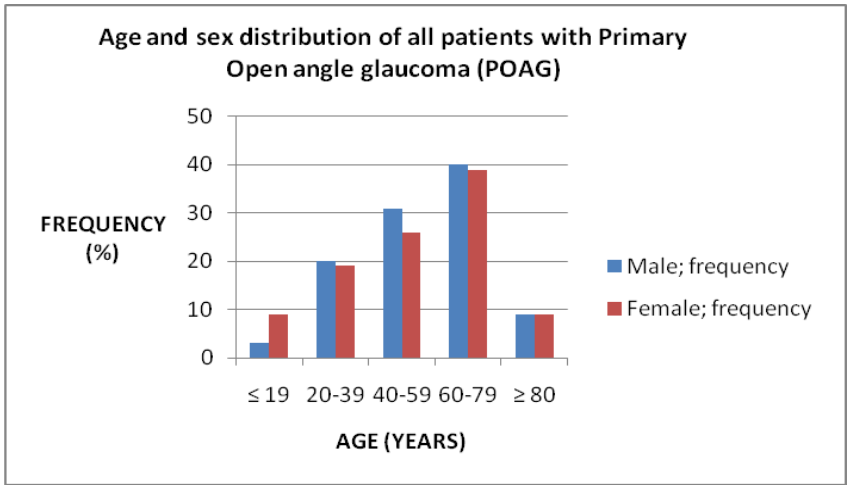

Figure 1: Age and sex distribution of all patients with Primary Open angle glaucoma (POAG) The peak incidence was seen in the sixth to seventh decade life (60-79yrs).

Table 4: Effect of sex on primary open angle glaucoma

	TYPES OF GLAUCOMA		
SEX	POAG	Other forms	TOTAL
MALE	107	8	115
FEMALE	91	11	102
TOTAL	198	19	217

Table 5: Effect of age on primary open angle glaucoma

Age years	No of patients with POAG	No of patients with other forms of glaucoma
< 60	100	10
≥ 60 years	98	9
TOTAL	198	19

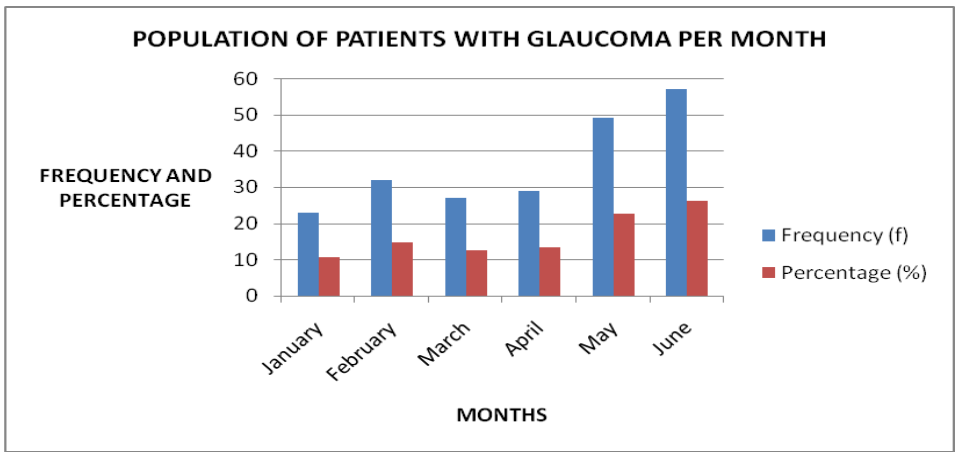

Figure 2: Population of Patients with Glaucoma per month

Figure 2 above shows a progressive increase in the population of patients that are diagnosed with glaucoma per month. There is a gradual increase from 10.6% in January to 26.27% in June.

Effect of age on primary open angle glaucoma. Patients were stratified according to age groups; those with POAG were compared with those with other types of glaucoma as shown in table 5. The P value for trend was 0.3906 and X^2 for trend was 6.050 which indicates that there is no significant liner trend between the age and the type of

glaucoma, also age and types of glaucoma are not significantly associated (P-value 1.00)

DISCUSSION

The importance of good eye health cannot be over emphasized. Most patients with eye diseases first present to the pharmacist and the general practitioner who may have limited knowledge of ophthalmic practice. Some disease conditions are treated correctly while others are either misdiagnosed or wrongly treated which may results in unwanted complications since patients may not get timely referral to an eye specialist. The pattern of glaucoma eye diseases in this study is similar to what obtain in studies carried out in tertiary and general hospitals. More male than female patients had glaucoma eye disease. In this study the prevalence rate of glaucoma is 9.4% as compared to an annual survey of 23% in 2006 (Abba, 2011) with 4876 (63%) males and 2789 (37%) females. In the study done by Abba *et al.*, the prevalence of glaucoma is higher between ages 40 years and above. The yearly distribution of glaucoma was 330 patients in 1998 representing 4% (Abba, 2011) while in the current study an average of 36 patients were diagnosed monthly which if projected for a year may increase to 432 patients, invariably indicating an increase in prevalence of glaucoma This is consistent with previous studies done in Benin-City, (Omoti, 2005) and in Lagos, (Majekodunmi, 1978) that the prevalence rate of glaucoma is increasing annually.

In the current study, Primary Open Angle Glaucoma (POAG) was the most common form of glaucoma with 91.24%. Previous studies elsewhere in Irrua and Lagos have shown that it accounts for at least 45% of all cases of glaucoma. (Omoti, 2005; Majekodunmi, 1978) compared to 73.4% of all cases obtained in Irrua Specialist Teaching Hospital, but similar to the 76.9% recently reported in Benin-City (Omoti, 2005) but higher than 55.6% rate reported in Lagos, (Majekodunmi, 1978) some decades ago. This may not only be due to better facilities now available for early diagnosis of the disorder, but also due to the positive impact of greater public awareness of the disease, causing patients to present earlier for screening. Furthermore, the positive impact of frequent free eye clinic camps, organized by different non-governmental organization, especially in rural areas cannot be over emphasized. Glaucoma suspects are usually referred to eye clinic from such eye camps. These findings with previous studies show that the onset of POAG in Africans is 1 to 2 decades earlier than in the Caucasians (Salmon *et al.*, 1993; Freund, 1968) although black population had the highest prevalence of primary open angle glaucoma (POAG) at all ages while the white population showed the steepest increase in primary open angle glaucoma prevalence with age (Leibowitz *et al.*, 1980; Tielsch, 1991; Klein, 1992). This study indicate that the sixth to seventh decade of life had the peak incidence of glaucoma, most especially primary open angle glaucoma (POAG) and was the most common form of glaucoma. Previous studies elsewhere in Sub-Saharan Africa have shown that POAG accounts for at least 45% (Herndon *et al.*, 2002; Rotchford *et al.*, 2002; Buhrmann *et al.*, 2000) of all cases of glaucoma annual study compared to 91.24% obtained in this study. Accordingly, Juvenile glaucoma is said to be rare; only 1.84 % was seen in this study.

Also given that the method of examination have changed markedly since the 1960s it is not surprising to find an increase in primary open angle glaucoma prevalence even with adjustment for age. This may reflect a true increase in prevalence of glaucoma or improved diagnostic criteria and examination techniques. The prevalence of glaucoma was lower in studies in which routine visual field tests were not performed and in which IOP was relied on as a defining

criterion for glaucoma compared with studies in which visual field tests were performed routinely and IOP did not determine the diagnosis for primary open angle glaucoma (Johnson *et al.*, 1998).

Considering glaucoma as a cause of irreversible blindness and in relation to data analysis of age and sex, it showed that people of productive age especially the males are more affected. This disability could result to huge economic loss and social consequences in Nigeria. It is estimated that 75% of the cases of blindness in developing countries would have been prevented but in situations where people are poor and live in remote locations, both prevention and treatment efforts are extremely difficult.

Analysis of the data obtained from the relationship between sex and primary open angle glaucoma was statistically not significant and therefore an association may not exist. Others have reported a higher prevalence in women and yet others have reported no gender difference in prevalence (Leibowitz *et al.*, 1980; Tielsch *et al.*, 1991; Klein *et al.*, 1992). In United Kingdom and United States of America, POAG is the most prevalent of all glaucoma affecting approximately 1 in 200 of the general population over the age of 40 years and it increases with age. It is responsible for about 12% of all cases of blind registration and it affects both sexes equally. However, in the Rotterdam population study, the prevalence was higher in males, with men having three times higher risk of having primary open angle glaucoma than women (Dielemans *et al.*, 1994).

On the effect of age on the prevalence of primary open angle glaucoma, the values obtained are not significantly associated, meaning that age has no significant effect on the prevalence of primary open angle glaucoma.

PACG occurred in only 4(1.84%) patients. This is similar to the findings in Benin (Omoti, 2005) and in Lagos, (Majekodunmi, 1978) and other parts of Africa (Rotchford *et al.*, 2003; Salmon *et al.*, 1993; Buhrmann *et al.*, 2000; Kaimbo Wa Kaimbo *et al.*, 1997) supporting earlier reports indicating that PACG is rare in Africans (Freund, 1968).

Secondary glaucoma was present in 4 patients (1.84%) with a male to female ratio of 3%; this male prepondecamia was largely due to the contribution of trauma. The low percentage of patients diagnosed with secondary glaucoma is consistent with the annual survey findings of Enoch *et al.*, 2010, where secondary glaucoma were present in 10 (5.6%) patients including 6 males and 4 females subjects. Male individuals are usually more frequently involved in traumatic conditions and violence than female. Of the 4 patients diagnosed as suffering from secondary glaucoma, 3 were male.

CONCLUSION

The prevalence of glaucoma in the six months period of this study was 9.4%. Amongst these 91.24% of them had POAG making it the most common form of glaucoma while 3.23% had NTG. No significant association was found between age or sex and types of glaucoma. PACG and Juvenile glaucoma remains relatively rare accounting for only 1.84% each in types of glaucoma. There was a monthly glaucoma prevalence increase from 10 to 26.64 % which appears to indicate that glaucoma prevalence is on the rise.

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