



## RESEARCH ARTICLE

### GENDER DIFFERENCE IN INTRA-OCULAR PRESSURE AMONG PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA IN BENIN CITY, NIGERIA

Dr. Aghafekokhian Bose Osaiyuwu, \*Dr. Genesis Daniel Edokpa and Dr. Rex Egharevba

University of Benin, Benin City, Nigeria

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#### ABSTRACT

**Background:** In large continental regions such as Africa, there are insufficient studies to entirely represent gender difference in intra-ocular pressure (IOP). **Objective:** The purpose of this study was to determine if there is any significant difference in IOP of males and females newly diagnosed with glaucoma at a tertiary eye unit in Nigeria. **Method:** This research was done as a retrospective study carried out at the Optometry/Ophthalmology Department, Stella Obasanjo Women and Children Hospital, Benin city, Nigeria. The sample population consisted of cases (166 eyes presenting with Primary Open Angle Glaucoma [POAG]) seen between 2011 and 2013. **Results:** The mean IOP value was 21.11mmHg  $\pm$  0.60, with a range of 10.5mmHg to 45.9mmHg. Glaucomatous males had a significantly higher IOP (23.7mmHg  $\pm$  0.99) than glaucomatous females (18.8mmHg  $\pm$  0.61) (Mann-Whitney U,  $p < 0.001$ ). Although a higher number of female cases (86, 51.81%) were seen compared to males (80, 48.19%), there was no significant difference in glaucoma status between males and females,  $p = 0.66$ . **Conclusion:** Since elevated IOP is the single best indicator of developing POAG, the men in this study were more likely than women to begin the continuing optic neuropathy.

**Key words:** Intra-ocular pressure, Primary Open Angle Glaucoma, Gender

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#### INTRODUCTION

Glaucoma is an important cause of visual impairment, estimated to be responsible for 8% of blindness round the world. It is also a major cause of blindness in Africa (Jackson *et al.*, 2014). It is an optic neuropathy with characteristic optic disc changes and visual field defect. The most common form of glaucoma in Nigeria is Primary Open Angle Glaucoma (POAG) which is typically symptomless in the early stages of the disease (Mbadugha and Onakoya, 2014). POAG is defined as 'a progressive, chronic optic neuropathy where intraocular pressure (IOP) and other currently unknown factors bring about damage and in which, in the absence of other known causes, there is characteristic acquired atrophy of the optic nerve and dissipation of retinal ganglion cells and their axons. Several risk factors (such as age, gender, family history, obesity/body mass index, use of tobacco/alcohol, systemic steroid intake, hypertension, diabetes mellitus, and thyroid disease) have been stated in literature for development and advancement of POAG (Garg *et al.*, 2014).

Intra-ocular pressure is measured as part of the routine to diagnose, grade and monitor the progression of glaucoma (Iyamu and Osuobeni, 2014). Diagnosis of POAG is determined by structural changes in the optic nerve and damage to the visual fields which are determined by both the level of IOP and the optic nerve axon vulnerability to injury (Francis *et al.*, 2014). From a clinical perspective, high IOP is a major risk factor for glaucoma, and it is the only proven treatable risk factor (Yassin and Al-Tamimi, 2016). Extensive publications on gender dissimilarity in general health exist in the literature (Azodo and Unamatokpa, 2012). In published IOP data gathered from assumed non-glaucomatous adult subjects, some investigators failed to find any sex difference in intraocular pressure (IOP) levels (Qureshi, 1997; Iyamu and Osuobeni, 2012; Yassin and Al-Tamimi, 2016) while some have observed a statistically significant difference between the mean IOP in males and IOP in females ( $p < 0.05$ ) (Jeelani, *et al.*, 2014). For example, in a Korean study, Cho *et al.*, 2011, showed that males were more frequent than females in ocular hypertensive patients.

\*Corresponding author: Dr. Genesis Daniel Edokpa,  
University of Benin, Benin City, Nigeria.

In some meta-analytic and systematic investigations to pinpoint factors that predict POAG and extrapolate the number

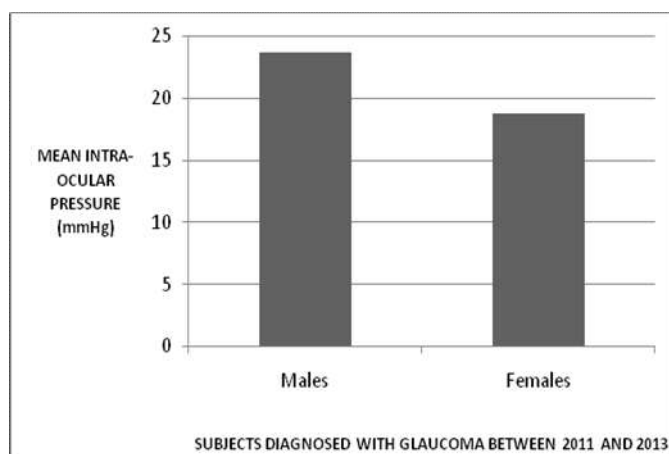
of affected people in the future, there were not enough studies to completely typify in large continental regions such as Africa, the gender in IOP (Rudnicka et al., 2006; Tham et al., 2014; Kapetanakis et al., 2015). The purpose of this study was to determine if there is any significant difference in IOP of males and females newly diagnosed with glaucoma at a tertiary eye unit in Nigeria. This was a retrospective study of new patients who presented at the eye clinic of a Hospital over a 3-year period.

## MATERIALS AND METHODS

This research was done as a retrospective study carried out at the Optometry/Ophthalmology Department, Stella Obasanjo Women and Children Hospital, Benin city, Nigeria. The sample population consisted of cases (166 eyes presenting with POAG) seen between 2011 and 2013. Due to the fact that glaucomatous changes and IOP are often found asymmetrically, the study focused on eyes rather than individuals. Patients within the ages 10 years - 85 years of either gender were included in this study. Patients were identified as glaucomatous based on funduscopy, tonometric and perimetric findings. Patients with secondary glaucoma and macular diseases were excluded from the study. Data was collected based on availability from the case files of suitable patients. This included patient registration number, age, gender, visual acuity, cup to disc ratio, intraocular pressure and visual field test result. The relevant data worked with were patient's age, gender and intraocular pressure. The data was analyzed using descriptive statistics with the SPSS 22 statistical tool. The significance level was set at  $p < 0.05$ .

## RESULTS

The mean age for this study was 42.85 years  $\pm$  1.067. The age range was 10 years to 85 years. There was no significant difference in glaucoma status between males and females,  $p = 0.66$ , although a higher number of female cases (86, 51.81%) were seen compared to male's (80, 48.19%). The mean IOP for the glaucomatous population was 21.11mmHg  $\pm$  0.60, with a range of 10.5mmHg to 45.9mmHg. Glaucomatous males had a significantly higher mean IOP (23.7mmHg  $\pm$ 0.99) than their female peers (18.8mmHg  $\pm$ 0.61) Mann-Whitney U,  $p < 0.001$ (Figure 1).



**Figure 1. Males diagnosed with glaucoma had a significantly higher mean IOP (23.7mmHg  $\pm$ 0.99) than their female counterparts (18.8mmHg  $\pm$ 0.61) (Mann-Whitney U,  $p < 0.001$ )**

## DISCUSSION

Our results show that in the glaucomatous cases seen between 2011 and 2013, males had a significantly higher IOP (23.7mmHg  $\pm$ 0.99) than females (18.8mmHg  $\pm$ 0.61) (Mann-Whitney U,  $p < 0.001$ ). In published IOP data garnered from assumed non-glaucomatous adult subjects, some investigators did not find any sex difference in intraocular pressure (IOP) levels (Qureshi, 1997; Iyamu and Osuobeni, 2012; Yassin and Al-Tamimi, 2016) while some found a statistically significant difference between the mean IOP in males and IOP in females ( $p < 0.05$ ) (Jeelani, et al., 2014). A Korean study showed that males were more common than females in ocular hypertensive patients (Cho et al., 2011). High ocular pressure is known to be associated with certain health risks which are more common in men. These include cardiovascular diseases and other issues such as hypertension, pulse rate, diabetes, obesity, alcohol use, smoking waist circumference, triglycerides and fasting blood glucose (Cho et al., 2011; Faeze et al., 2016). Men also possess certain behaviors associated with increased IOP. They tend to be less risk averse than young women, making them eat less healthful diet and more likely to take part in excessive alcohol consumption (Matthews, 2015). In the light of these, in the present study, the glaucomatous males might have had a higher mean IOP than their female counterparts due to health risks, some of which may be traced back to behavior.

Glaucoma can be described as a continuing optic neuropathy with characteristic structural and functional destruction (Jeelani et al., 2014). From a clinical aspect, high intraocular pressure (IOP) is a crucial risk factor for glaucoma, and it is the only proven treatable risk factor (Yassin and Al-Tamimi, 2016). Raised intra-ocular pressure is the one leading indicator of developing that potentially blinding disease (Gordon et al., 2002; and Miglior, 2007). Since the men diagnosed with glaucoma had a significantly higher mean IOP than their female counterparts, the risk of POAG may have unfolded higher in the black men (Gordon et al., 2002; Rudnicka et al., 2006; Tham et al., 2014; Kapetanakis et al., 2015). This means that the Nigerian men were more likely than women to begin optic nerve or visual field damage, developing that potentially blinding disease that accompanies POAG. It also means that the morbidity associated with glaucoma as seen in other causes of blindness in terms of reduced productivity and poor quality of life will affect men more. This finding will be of use to investigations to come and healthcare designing such as treatment, rehabilitation, and interconnected general health programmes.

Some limitations of study include working with existing diagnosis which may have been wrong due to human error or lack of complete diagnostic equipment. Furthermore, some values may have been the reading after the patient had commenced taking IOP lowering medication, so the IOP would be artificially low.

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