Prevalence of Glaucoma Among Secondary School Teachers in Onitsha, Nigeria

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ABSTRACT

Background: Glaucoma, an optic neuropathy is the leading cause of irreversible and functional loss of vision in Nigeria. It is a disease of significant public health interest. **Aim**: To determine the prevalence of glaucoma among secondary school teachers in Onitsha North Local Government Area (LGA) Anambra state. **Methodology**: Secondary school teachers from randomly selected schools in Onitsha North LGA had their eyes examined for glaucoma using the International Society of Geographical and Epidemiological Ophthalmology (ISGEO) and the Nigerian normative data for defining glaucoma in prevalence studies. Those with evidence of glaucoma further had the following measurements: visual acuity, intraocular pressure (IOP), central corneal thickness (CCT), gonioscopy and central visual fields. **Results**: A total of 171 teachers, made up of 158(92.4%) females and 13(7.6%) males participated. The age range was 20 – 72 years, mean 45.7±10.36 years. The prevalence of glaucoma was 5.9%. The mean CCT was 529.9±26.7, mean IOP 23.3±6.9mmHg, mean vertical cup – to – disc ratio 0.73± 1.63. Gonioscopy showed 9(90%) had open angles and 2 on perimetry had an eye with advanced glaucomatous damage. Only one participant had been previously diagnosed for glaucoma. **Conclusion**: Prevalence of glaucoma among this cohort of teachers is high. Most of those participants with glaucoma were previously undiagnosed. The results of this study suggest the need for creating awareness on glaucoma and also the need for regular eye check among teachers.

Keywords: Glaucoma, Eye, Teachers.

INTRODUCTION

Glaucoma is an eye disease that causes irreversible damage to the optic nerve. The damage to the optic nerve if not properly managed, progresses to blindness. In Nigeria, patients with glaucoma usually present late at eye care facilities with advanced diseases.[1,2,3,4,5,6] Glaucoma is thus a significant public health problem, and is the leading cause of functional low vision and irreversible blindness in our environment.[6,7,8,9] Early diagnosis and treatment reduce the visual incapacitation associated with glaucoma. The urge to seek eye care is encouraged by eye disease screening programs.[10] In these screening programs, many persons oblivious of eye disease may be initially diagnosed. In the Nigeria National Blindness and Visual Impairment Survey, glaucoma had a prevalence of 5.02%.[7] Community based studies in various parts of Nigeria have documented the prevalence of glaucoma to be as high as 7.3%, 10.7% and 14.5% in Oyo, Ekiti and Enugu states respectively and as low as 2.73% in Rivers state.[11][12,13,14]

Secondary school education is an academic pursuit after one has had a primary school education. The objectives of secondary school education include provision of diverse knowledge and skills; developing entrepreneurial, technical and job specific skills; training manpower at sub-professional grades and raising morally upright and well adjusted individuals.[15] Secondary school teachers are equipped to take on the important role of transforming students into a productive and responsible members of society. Teachers thus play a pivotal role in the society. Teachers' job entails a lot of reading. Therefore good eye sight is required for optimal performance.

Glaucoma usually starts at an earlier age in people of African descent and runs a more aggressive course.[16] The Nigerian National Blindness Survey showed that people from south eastern Nigeria have increased risk of having glaucoma compared to other regions in Nigeria.[17] Glaucoma screening is recommended to reduce the incidence of glaucoma and its attendant public health threat.[18] This justifies the need to carry out screening program as a form of public health intervention for case detection of glaucoma amongst these teachers in Onitsha. The aim of this study is to determine the prevalence of glaucoma amongst secondary school teachers in Onitsha, Anambra state.

METHODOLOGY

This was a cross sectional study to determine the prevalence of glaucoma among secondary school teachers in Onitsha. This study was conducted from March to June, 2023. Permission was obtained from the school authorities of the selected schools. Written informed consent was obtained from all the teachers before an eye examination was carried out. Ethical approval was obtained from Anambra State Ministry of Health Research Ethics Committee Awka.

A list of all secondary schools in Onitsha North LGA was obtained from the education authority. The names of these schools were written on a 2 by 2 cm paper, folded, dropped and turned in a bag. An assistant who did not participate in writing names, picked out three names. The names of the schools picked were enrolled in the study. Sample size was calculated based on 95% confidence interval using Leslie-Kish formula.[19] A minimum sample size of 162 was obtained.

The eye examinations carried out on each participant were: distant visual acuity and pin hole acuity using Snellen chart at 6 meters; anterior segment examination with a pen torch, fundoscopy with Welch Allyn direct ophthalmoscope, and intraocular pressure measurements with Perkin's Mk2 tonometer.

A diagnosis of glaucoma was made using the International Society of Geographical and Epidemilogical Ophthalmology (ISGEO) [20] definition for glaucoma in population studies and the Nigerian normative data for defining glaucoma in prevalence studies.[21] The category 2 evidence for glaucoma diagnosis (advanced structural damage

with unproven visual field loss), the 99.5th percentile vertical cup disc ratio (VCDR) ≥ 0.75, and in addition VCDR asymmetry >0.2 difference at the 99.5th percentile was used.[20,21]

The participants with category 2 evidence of glaucoma had a more detailed eye examination and ancillary investigation. The additional eye examinations were slit lamp examination of anterior segment and fundus examination with 90D non-contact fundus lens. Gonioscopy was done with a 2 mirror Goldmann lens, and angles graded using the Shaffers classification.[20] Visual field testing was done with Appasamy autoperimeter- APS 901 CTS glaufield lite and swap. The Hodapp, Parish and Anderson criteria were used to interpret the perimetry results.[22] Central cornea thickness(CCT) was measured with Quantel medical compact touch pachymeter and intraocular pressure(IOP)with Goldmann aplanation tonometer.

Data collected was entered into IBM SPSS Statistics 25 and analyzed using descriptive and inferential statistics with alpha at 0.05.

RESULTS

A total of 180 teachers were enrolled for the study. However, 9 did not participate for reasons ranging from ill health amongst 3 teachers, to bereavement in one and five on vacation. Thus, 171 teachers participated. There were 158(92.4%) females and 13(7.6%) males with an age range of 20 -72 years, mean of 45.7±10.36years. The age distribution of the participants is shown in Table 1.

Table 1: Age distribution of the participants

Age range (years)	No	%
20 – 29	15	8.8
30 – 39	34	19.9
40 – 49	67	39.2
50 – 59	43	25.1
60 – 69	11	6.4
70	1	0.6
Total	**171**	**100.0**

A total of the 171 teachers had an eye examination. Ten teachers made of 4 males and 6 females were diagnosed with glaucoma using the category 2 evidence for glaucoma diagnosis. The prevalence of glaucoma in this cohort was 5.2%.Three of the participants with glaucoma were under 40 years of age. The presenting visual acuity was >6/18 in 9 of those diagnosed with glaucoma while only one had a presenting visual acuity of 6/24.

For the teachers diagnosed with glaucoma, the mean VCDR for right eyes was 0.73±1.63(range of 0.4 – 0.9) and left eyes was 0.79±0.11(range of 0.5 – 0.9). The difference in VCDR for the right and left eye was not statistically significant, with a p value of 0.1. The gender of participants did not influence the VCDR with p values of 0.2 and 0.4 for the right and left eyes respectively.

The mean IOP for the right eye was 23.3 ±6.9mmHg with a range of 15.7 – 32.40mmHg and the left eye 19.5±5.5mmHg with a range of 13.7 – 32,0mmHg. The difference in the measurements of the IOP for the right and left eyes of these participants were not statistically significant with p value of 0.2. There was also no statistically significant difference in the IOP for the right and left eyes of the male and female participants with p=0.35 for both eyes.

The mean average CCT for right eye was 529.9 ±26.7 with a range of 496 – 567microns while the mean CCT left eye was 521.4±29.6 with a range of 493 – 566 microns. The difference in measurements of average CCT for the right and left eyes of these participants were not statistically significant with p value at 0.2.The gender of

participants did not influence the average CCT with *p* values of 0.3 each for the right and left eyes.

On Gonioscopy using Shaffer's angular grade classification, seven of the participants had grade 3angels while one had Shaffer's grade 4 angles. The gonioscopy findings on one of the participants with a previous history of uveitis showed Shaffer's angular grade 3 with irregular areas of increased pigment deposits in the angles and 2 clock hours temporally of peripheral anterior synechiae. One participant had Shaffer's grade 1 angular width and small patches of tentorial peripheral anterior synechiae.

Eight of the participants had normal visual fields. Two of the participants had advanced glaucomatous damage on perimetry in an eye.

The percentage distribution of the prevalence of glaucoma types among teachers with glaucoma is shown in figure 1.

Figure 1: Percentage distribution of glaucoma types
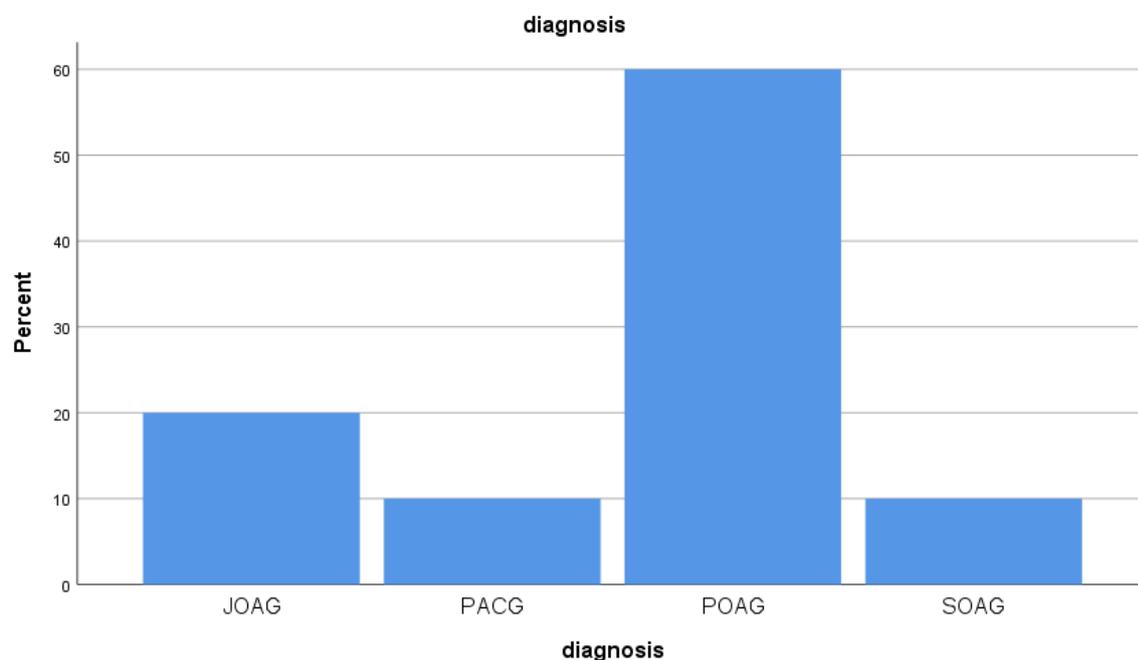
Key: *JOAG; Juvenile open angle glaucoma PACG: Primary angle closure glaucoma POAG: Primary open angle glaucoma SOAG: Secondary open angle glaucoma*

A diagnosis of juvenile open angle glaucoma was made in two (20%) of teachers with glaucoma. Six (60%) of teachers with glaucoma had primary open angle glaucoma and one (10%) each with secondary open angle glaucoma and primary angle closure glaucoma.

Only one(10%) of the participant was aware of having glaucoma prior to having this eye examination. This participant was already on treatment with beta blocker and latanoprost eye drops. All the participants diagnosed with glaucoma were referred to Guinness eye centre Onitsha for treatment and follow up.

DISCUSSION

This study suggests a high prevalence of glaucoma among teachers in Onitsha. This is quite worrisome

given that these teachers are active in the society and have students under their tutelage and care. The high prevalence of glaucoma in some community based studies in Nigeria all show that glaucoma is an eye disease of significant public health problem.[11,12,13] The Nigerian National Survey found the Igbo ethnicity as one of the risk factor for glaucoma in Nigeria.[17] The findings of this survey means that Igbos are more likely to have glaucoma when compared to other ethnic groups in Nigeria. Also, the importance of continued screening for glaucoma especially amongst teachers in this locality is further reinforced by the findings of this study as a high proportion were unaware that they had glaucoma. The Nigerian vision survey also showed that only 5.6% of participants knew they had glaucoma.[7] Many people with glaucoma are usually unaware they have this eye disease. This is because glaucoma is usually asymptomatic especially in the early stages. However late in the disease when central vision is affected, the person notices the deterioriation in vision and reduction in carrying out activities of daily livimg. This visual impairment and vision loss experienced from glaucoma is irreversible. However early detection of this eye disease through an eye examination can allow for institution of treatment aimed to halt or reduce glaucoma progression. In this study, most of the teachers had good visual acuity and were asymptomatic with pre- perimetric glaucoma and this may probably explain their non visit to any eye care facility. It is also important to highlight the importance of having proper eye examination and treatment for any eye disease to avoid development of secondary glaucomas. In this study, glaucoma was diagnosed in teachers less than 40 years of age had glaucoma. This findings further supports early screening for glaucoma amongst teachers irrespective of age is recommended.

In this study 90% of teachers with glaucoma were diagnosed for the first time. This high percentage on a group of highly educated persons is a cause for worry. Comprehensive eye examination is paramount in detecting glaucoma, institution of appropriate treatment and thus preventing irreversible visual impairment associated with this eye disease. A person with glaucoma usually seeks treatment late when the disease is advanced, the central vision is threatened with reduction in quality of life. In a previous hospital based study done by the authors in this locality, many newly diagnosed glaucoma patients presented with moderate and advanced diseases and reported a moderate quality of life.[24] The treatment of glaucoma could be either by medical with use of eye drops, laser or surgical approach. It is important to explore factors that could cause high pressures for the patient on medical treatment including adherence to medication and to also explore other treatment modalities.

Although this study used ISGEO category 2 evidence and Nigerian normative data to make diagnosis of glaucoma, it is possible that some with early diseases could have been missed. However, this study has shown that glaucoma prevalence is high among teachers and this calls for public health control strategies. Urgent interventions are needed to create awareness on glaucoma and improve eye health seeking behaviors amongst teachers. Health education to teachers on the importance of routine eye examinations to detect glaucoma and best treatment options is recommended.

Roles of authors
ACE: Principal investigator, Substantial contributions to conception, design, acquisition of data, interpretation of data; drafting and revising the article and final approval of this version to be published. SNN: Substantial contributions to conception and design, interpretation of data, revising the article critically and final approval of this version to be published.

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