Original Article

Knowledge and prevalence of glaucoma in Ezinihitte Mbaise Local Government Area Imo State. Nigeria

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ABSTRACT

Glaucoma is a group of progressive optic neuropathies characterized by the degeneration of retinal ganglion cells and retinal nerve fiber layers, resulting in structural changes to the optic nerve head and eventual vision loss. Globally, approximately 1.6 billion people are visually impaired, with an estimated 45 million affected by blindness—87% of whom reside in developing countries such as Nigeria. This study assessed the knowledge level and prevalence of glaucoma in Ezinihitte Mbaise Local Government Area of Imo State, Nigeria.

A community-based cross-sectional design was employed. Five (5) out of the 15 autonomous communities in Ezinihitte Mbaise L.G.A were randomly selected. From a total adult population of 94,005 individuals aged 30 years and above, 130 consenting participants were selected from each of the five communities, yielding a total sample size of 650. Data collection involved a structured questionnaire to assess sociodemographic characteristics and knowledge of glaucoma. Clinical screening included Visual Acuity testing, Tonometry, and Ophthalmoscopy for glaucoma detection. Data were analyzed at a 0.05 level of significance. Among the 650 participants who screened, 52 individuals (8.0%) tested positive for glaucoma. The study found a statistically significant inverse relationship between the level of glaucoma knowledge and glaucoma prevalence ($P < 0.05$). Additionally, age showed a significant association with glaucoma prevalence ($P < 0.05$). The findings underscore the need for sustained public health awareness and education campaigns to promote early detection and reduce the burden of glaucoma in rural communities.

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INTRODUCTION

Glaucoma is a chronic, progressive, and degenerative disorder of the optic nerve that results in irreversible vision loss. It is characterized by structural damage to the optic nerve and corresponding visual field defects. This is evidence according to Suman *et al*. [1] that Glaucoma refers to a heterogeneous group of diseases characterized by progressive optic

neuropathy, leading to visual field defects and irreversible blindness. It is the leading cause of irreversible blindness worldwide. Globally, glaucoma is the second leading cause of blindness after cataract and the foremost cause of irreversible blindness. According to the World Health Organization [12], approximately 1.6 billion people in developing countries are visually impaired. Quigley & Bromine [6] estimated that 60.5 million people worldwide have glaucoma, with 8.4 million already blind due to the disease.

Despite the severity of glaucoma, early detection and prompt intervention can significantly reduce the risk of blindness [15]. Unfortunately, diagnosis is often delayed, as glaucoma is asymptomatic in its early stages and many individuals remain unaware of its presence until advanced damage has occurred. Public education and increased awareness are essential components in reducing the burden of glaucoma, especially in regions with limited access to healthcare services[8].

In Nigeria and other developing countries, up to 90% of individuals with glaucoma remain undiagnosed. Reports by Federal Ministry of Health and Social Welfare Nigeria [13] that Primary Open-Angle Glaucoma (POAG), the most common form of the disease, affects approximately 2.4 million people annually, predominantly among individuals over the age of 40. Africa bears a disproportionate burden, with the highest global prevalence of POAG at 4.2% [7]. This is especially concerning in rural areas where health literacy is low, and access to regular eye care is limited.The situation in Nigeria reflects these global and regional trends. According to studies, the prevalence of glaucoma among individuals aged 40–80

is 3.54% globally, and in Africa, this figure is even higher. Between 1998 and 2006, a national study aimed at assessing Nigeria's progress towards WHO's "Vision 2020: The Right to Sight" initiative found that many glaucoma cases remained undiagnosed, and the prevalence of the disease was grossly underestimated.

In Ezinihitte Mbaise Local Government Area of Imo State—like many rural communities in Nigeria there is limited empirical data on the actual prevalence of glaucoma and the population's level of knowledge about the disease. This lack of information poses a challenge to effective prevention, early detection, and management strategies. Given that 75% of glaucoma cases occur in the developing world, and that a significant portion of affected individuals remain undiagnosed due to poor awareness, it becomes imperative to assess both the knowledge and the prevalence of glaucoma at the local level. This study, therefore, seeks to evaluate the knowledge and prevalence of glaucoma in Ezinihitte Mbaise LGA, Imo State.

MATERIALS AND METHODS

The study was conducted in Ezinihitte Mbaise Local Government Area (LGA) of Imo State, Nigeria. Ezinihitte Mbaise is located between longitudes 6°56′E and 7°28′E, and latitudes 5°40′N and 5°10′N. The LGA is bordered to the north by Obowo LGA, to the northwest by AhiazuMbaise LGA, to the west and south by AbohMbaise LGA, and to the east by Abia State, Nigeria.

Study Design

The study was a community-based observational survey. The instruments used included a structured questionnaire and standard ophthalmological tools such as a visual acuity chart, tonometer, and ophthalmoscope. Ezinihitte Mbaise LGA comprises 15 autonomous communities, with a total population of 188,444. A simple random sampling method was used to select 5 out of the 15 communities for the study. These communities were Onicha, Eziudo, Obizi, Okpofe, and Ife. The working population was estimated at 94,005. The required sample size for the study was 650, calculated using Parson's formula. The study targeted individuals aged 30 years and above.

Data Collection

SnellenChart: The Snellen chart was used to determine visual acuity. At a distance of 6 meters, subjects were asked to read from the chart. The results of these visual acuities are recorded and documented for visual activity analysis.

ShortzTonometerTheShortz tonometer, a manually operated tonometer, was used to measure intraocular pressure (IOP) for glaucoma screening. During the procedure, subjects were either asked to sit and tilt their heads backward while looking upward, or to lie flat on their backs. The eye was first anesthetized using a local anesthetic, such as Amitocaine eye drops, to minimize movement. The researcher then gently invented the subject's cornea. Normal IOP readings range between 17.3 and 20.0 mmHg. Are IOP values across different age groups shown in Table 4.

Ophthalmoscope: The ophthalmoscope is an instrument used by eye specialists for ocular diagnosis. During the examination, the subject was seated and instructed to look straight ahead, maintaining a fixed gaze. The researcher stood close to the subject and held the ophthalmoscope in the right hand. The cup-to-disc (C/D) ratio, which ranges from 0.1 to 1.0, was assessed. Optic disc ratios recorded for subjects across various age groups are presented in Table 5.

Data Analysis

Data was analyzed in accordance with the objectives of the study using **Minitab version 17**. Descriptive statistics, including percentages and bar charts, were employed to summarize the findings. Inferential analysis was carried out using **p-values**, with a significance level set at $p < 0.05$.

Ethical Consideration and Informed Consent

Ethical approval for this research was obtained from the Ethics Committee of the School of Health Technology, Federal University of Technology Owerri (FUTO), Imo State.Additionally, a letter of permission was obtained from the Local Government Headquarters and issued to the traditional rulers of the five autonomous communities where the eye screening was conducted, ensuring that the exercise was recognized as legitimate.Bothverbal and written informed consent were obtained from all participants prior to their inclusion in the study.

RESULTS

Overall Prevalence of Glaucoma Among Adults in Ezinihitte Mbaise

Out of the 650 subjects studied in Ezinihitte Mbaise, Nigeria, 52 individuals (8.0%) **tested** positive for various types of glaucoma (Figure 1). The remaining

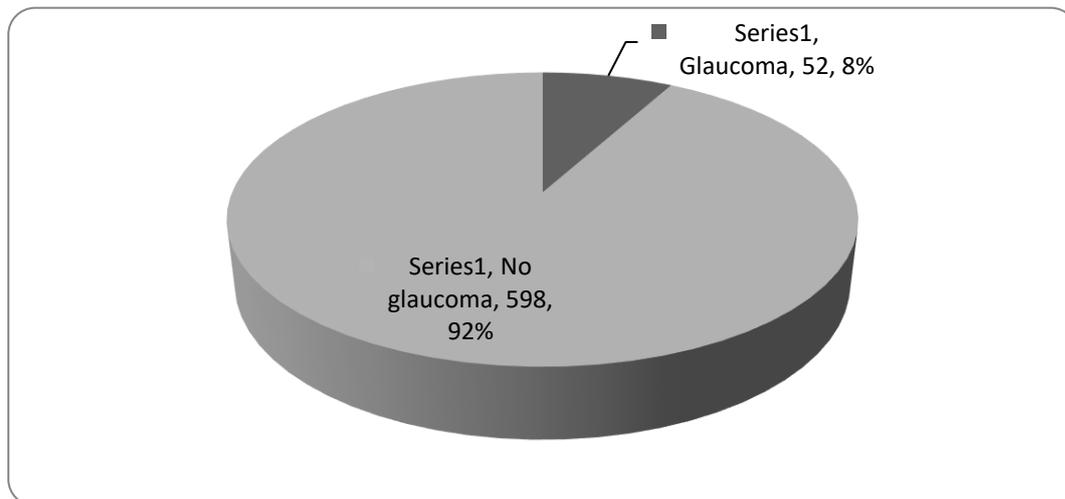598 individuals (92.0%) showed no signs of glaucoma.

Series1, Glaucoma, 52, 8%
Series1, No glaucoma, 598, 92%

Figure 1: Prevalence of Glaucoma among adults in Ezinihitte

Table (1) Prevalence of Glaucoma by Social Demographic Factors

Age	None	Yes	total	Chi-square	P-value
30-39	89(96.74%)	3(3.26%)	92(100%)		
40-49	107(97.27%)	3(2.73%)	110(100%)		
50-59	97(96.04%)	4(3.96%)	101(100%)		
60-69	109(90.83%)	11(9.17%)	120(100%)		
70-79	112(88.19%)	15(11.81%)	127(100%)		
80 +	84(84%)	16(16%)	100(100%)		
Total	598(92%)	52(8%)	650(100%)		
				20.626	0.001
Sex					
Female	266(91.72%)	24(8.28%)	290(100%)		
Male	332(92.22%)	28(9.3%)	360(100%)		
Total	598	52	650	0.016	0.900
Educational. Level					
No formal	132(89%)	16(10.81%)	148(100%)		
Primary	189(93.10%)	14(6.90%)	203(100%)		
Secondary	82(87.23%)	12(12.77%)	94(100%)		
tertiary	196(95.15%)	10(4.85%)	206(100%)		
total	599(92.01%)	52(7.99%)	650(100%)		
				7.606	0.055
Economic Status					
Above average	45(86.54%)	7(13.46%)	52(100%)		
Average	184(94.85%)	10(5.15%)	194(100%)		
Poor	369(91.34%)	35(8.66%)	404(100%)		
Total	598(92%)	52(8%)	650 (100%)		
				4.483	0.106
Major Occupation					

The prevalence of glaucoma increased progressively from the age bracket 50–59 years, with 4 cases (3.96%), reaching its highest in the 80+ age group with 16 cases (16%). The lowest prevalence was observed in the 30–39 and 40–49 age brackets, each with 3 cases (3.26%) (Table 1). Out of the 650 individuals screened, 598 (92.0%) were found to be free of glaucoma, while 52 (8.0%) tested

positive. A significant association between age and glaucoma prevalence was observed ($p<$ 0.05) (Table 1). Regarding sex, the prevalence of glaucoma was nearly evenly distributed among males and females in Ezinihitte Mbaise. The prevalence among males was 7.7% (28 out of 362), while among females it was 8.28% (24 out of 290). No significant association was found between sex and glaucoma prevalence ($p>$ 0.05) (Table 1).

Marital status showed no significant relationship with glaucoma prevalence ($p>$ 0.05). Although trends in glaucoma prevalence were noted across different educational levels, these differences were not statistically significant. The variability in prevalence by education may be influenced by varying levels of exposure and awareness about glaucoma (Table 1). Economic status was

categorized as above average, average, and poor. While certain trends were noted between glaucoma prevalence and economic status, no significant association was found ($p>$ 0.05) (Table 1). Farming, one of the major occupations in Ezinihitte LGA, had the highest glaucoma prevalence, with 19 cases (9.84%) among 193 farmers screened. However, no significant relationship was observed between occupation and glaucoma prevalence, indicating that although occupation may expose individuals to risk factors, it was not a determining factor in this study ($p>$ 0.05). Finally, the number of participants who demonstrated knowledge of glaucoma decreased with increasing age. There was a significant relationship between lack of knowledge about glaucoma and its prevalence ($p<$ 0.05).

The table provides an overview of the different types of glaucoma among the studied group in Ezinihitte Local Government Area. Open Angle Glaucoma emerges as the most common type, affecting 48.1% of the participants. This is followed by Normal Tension Glaucoma, which constitutes 23.1% of

the cases. Chronic Angle Glaucoma represents 19.2%, while Acute Angle Glaucoma is the least prevalent, accounting for just 9.6% of the cases. Overall, Open Angle Glaucoma stands out as the dominant form of the condition in this population.

Table 2: Types of Glaucoma among the Studied Group in Ezinihitte Local Government Area

	Types of Glaucoma	Frequency	Percentage
1.	Open Angle Glaucoma	25	48.075%
2.	Normal Tension Glaucoma	12	23.10%
3.	Chronic Angle Glaucoma	10	19.2%
4.	Acute Angle Glaucoma	5	9.6%

However, as individuals age, especially beyond 60 years, their visual acuity deteriorates, with the 70-79 age group showing an acuity of 6/60 and those over 80 years reaching a severe level of visual impairment, with an unaided visual

acuity of Counting Fingers (C.F.). The P-value of ≤0.05 suggests a statistically significant relationship between age, increased intraocular pressure, optic disc damage, and declining visual acuity in the studied population. This indicates

that both age and IOP play a critical role in the progression of optic nerve damage and the worsening of vision in glaucoma.

The table 3 showing frequency (f) and mean visual Acuity (A⁰) in feet/meters

Age Group (Years)	Frequency (F)	Mean visual Acuity (A^0) in feet/meter
30 – 39	150	80 (6/12)
40 – 49	100	98 (6/6)
50 – 59	115	80 (6/12)
60 – 69	200	95 (6/9)
70 – 79	50	90 (6/9)
80 – above	50	80 (6/12)

The Intra ocular pressure and optic nervel disc are the major endogenic risk factors of glaucoma in this study. The intra ocular pressure (IOP) is the most important modifiable risk factor for glaucoma and fluctuates within patients over short and long time period. Untreated eye pressure leads to glaucoma. Higher Intra ocular pressure (IOP) is strongly associated with an increased prevalence of glaucoma meaning that as Iop increases, the likelihood of having glaucoma also increases. The relationship between Intra Ocular pressure, (IOP) optical disc ratio and optic nerve is that once the (IOP) rises to abnormal level, this leads to optic nerve death, the optic disc ratio increases, the visualacuitydecreases and glaucoma emerges.

Table 4: Showing the frequency and the mean values of IOP of the different age group

Age Group (Years)	Frequency (F)	Mean IOP mmHg
30 – 39	150	8.2
40 – 49	100	20
50 – 59	115	18
60 – 69	200	20
70 – 79	50	25
80 – above	50	20

Table 5 reveals a clear association between age, intraocular pressure (IOP), optic disc damage, and visual acuity in glaucoma patients. As age and IOP increase, there is a corresponding rise in the severity of optic disc damage, as reflected in the average Cup-to-Disc Ratio (CDR). Additionally, the frequency of optic disc hemorrhage also increases with age, particularly in the older age groups. Visual acuity (V.A.) shows a marked decline as patient's age. Younger individuals in the 30-39 age group have relatively better vision, with an average unaided visual acuity of 6/9.

The table 5: shows frequency (f) and the mean values of optic ratio of the subjects

Age Group (Years)	Frequency (F)	Pallor of optic disc (0.1-1.0)
30 – 39	150	0.1
40 – 49	100	0.2
50 – 59	115	0.1
60 – 69	200	0.5
70 – 79	50	0.75
80 – above	50	0.6

DISCUSSION

This study primarily aimed to determine the prevalence of glaucoma and assess the level of knowledge about glaucoma among adults in Ezinihitte Mbaise Local Government Area, Imo State. These objectives were successfully achieved. The prevalence of glaucoma in this population was found to be 8%, which aligns closely with the reported prevalence rates of 8% and 9.6% from studies conducted in Ghana and St. Lucia, respectively [2]. However, this prevalence is notably higher than the 3.5% reported in a South African urban study [2]. The lower prevalence observed in South Africa could be attributed to the urban setting of that study, which may differ significantly in demographic and environmental factors from the rural context of Ezinihitte Mbaise.

Conversely, the prevalence found in this study was also higher than the 1.62% reported in a rural Indian population [11]. Differences in prevalence between these rural populations may be explained by varying levels of awareness and consciousness of glaucoma, as well as demographic factors such as age and race. It is well-documented that glaucoma prevalence increases with age and varies by racial groups, with higher rates observed among Black populations compared to Asians and Caucasians [5].

In this study, socio-demographic factors such as sex, education level, marital status, occupation, and economic status were not significantly associated with glaucoma prevalence. Age was the only factor found to have a statistically significant association with glaucoma, corroborating findings from previous research [4]. However, this contrasts with the study by [9], which found no age-related differences in optic disc anatomical measurements among Africans examined for Primary Open-Angle Glaucoma (POAG), a finding somewhat consistent with our results. Additionally, while sex was a significant factor in Kelly et al.'s study, it was not significant in our population. Education level did not significantly influence glaucoma prevalence in this study, although lack of education may act as a psychological barrier to adherence to glaucoma treatment. No evidence was found linking occupation with glaucoma prevalence, though certain occupations could lead to stigmatization, indirectly affecting glaucoma management efforts. Overall, knowledge about glaucoma among participants was generally poor.

This lack of awareness can lead to a loss of lives or reduced quality of life. Our findings are consistent with those of [10], who emphasized that beyond universal access to health insurance, eye health education that encourages people to seek ophthalmological care is potentially the most critical step toward preventing needless blindness. Similarly, Up to 40% of participants demonstrated inadequate knowledge of glaucoma [14], and [3] found that approximately 27% of POAG patients were unaware of their positive family history. These studies highlight that improving eye health education can encourage regular ophthalmologic check-ups, enable early glaucoma detection and reducing visual impairment, thereby preserving quality of life

Implications of the Researcher's Findings

The prevalence of glaucoma in Ezinihitte Mbaise Local Government Area was found to be 52 individuals, representing 8.0% of the total sample size of 650. This significant proportion indicates that

many residents are affected by the disease. These findings underscore the urgent need for increased awareness programs and accessible treatment services to address glaucoma effectively in this community. Early detection and education are crucial to reducing the burden of glaucoma and preventing avoidable vision loss.

CONCLUSION

This study confirms the presence of glaucoma, including various types, among adults in Ezinihitte Mbaise Local Government Area, Imo State. Given that glaucoma is primarily an age-related condition, efforts should focus on early monitoring and screening, especially among older adults. Additionally, promoting education and awareness programs on glaucoma is essential to improve knowledge, encourage timely diagnosis, and facilitate appropriate treatment interventions.

Conflict of Interest

The authors declare that there is no conflict of interest.

Declaration
Authors' Contributions

Oparaocha, E. and Okeke, C. jointly conceptualized the study. Both authors were responsible for data analysis and interpretation. Funding support and sponsorship: *Nil.* The initial draft of the manuscript was prepared and subsequently reviewed by both Oparaocha, E. and Okeke, C. All authors contributed to the development of the final manuscript and approved its submission.

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