

Prevalence of Glaucoma Among Adults Residing in Yaba, Mainland L.G.A. Lagos State

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Abstract-

Background:

Glaucoma has been aptly described as the "silent thief of sight" because it causes irreversible vision loss often without warning symptoms until substantial optic nerve damage has occurred [11],[10]. Despite being a preventable cause of blindness with early diagnosis and intervention, glaucoma continues to inflict a heavy burden on individuals, families, and health systems worldwide. The study assessed the prevalence of glaucoma among adults residing in Yaba Mainland Local Government Area of Lagos State, Nigeria. To guide the study, Two objective/research question and one hypothesis was formulated.

Methods: The study also utilized a descriptive cross-sectional study design. The population comprised of adults aged 18 years and above. They were three hundred and twenty-eight (328) in number. An adapted questionnaire was the main source of data generation. Statistical Package for the Social Sciences (SPSS) was used in the analysis of the data gotten from the study and was expressed in percentages, frequencies, tables and charts. Chi square test tool was used to test the hypothesis ($p=0.05$).

Results: The results revealed a glaucoma prevalence of 30.5% among the respondents. Key Findings showed that no significant associations were found between glaucoma and demographic factors such as gender or age. In hypothesis testing, for H_0 the p -value for the chi-square test of independence was $0.737 > 0.05$ we therefore uphold the null hypothesis.

Conclusion: This provides valuable insights into the burden of glaucoma in this specific urban setting and highlight key Prevalence factors that could inform targeted interventions and public health strategies aimed at early detection, management, and prevention of glaucoma in the population.

Keywords: Glaucoma, Prevalence, Adults, Yaba, Lagos State, Nigeria, Public Health, Awareness.

I. BACKGROUND

Glaucoma widely recognized as one of the leading causes of irreversible blindness worldwide is a multifactorial and progressive optic neuropathy that remains one of the leading causes of irreversible blindness globally [11][10]. Characterized by the gradual degeneration of retinal ganglion cells and corresponding visual field loss, glaucoma exerts a profound burden not only on individuals but also on healthcare systems and economies, especially in developing countries. Contemporary understanding has increasingly recognized glaucoma as a neurodegenerative disorder with systemic manifestations and associations with other neurodegenerative diseases, such as Alzheimer's and Parkinson's disease [6]. The disease encompasses a spectrum of conditions that share common features of optic nerve head damage and visual field loss, often, but not always, associated with elevated intraocular pressure (IOP). Although intraocular pressure remains a primary risk factor, glaucoma can manifest even within normal IOP ranges, indicating the multifactorial nature of the disease [11].

At the cellular level, glaucoma is understood to involve the apoptotic death of retinal ganglion cells (RGCs), axonal degeneration, and remodeling of the optic nerve head, especially the lamina cribrosa. These changes are not merely the consequence of mechanical stress from elevated IOP but also of neuroinflammatory responses, oxidative stress, mitochondrial dysfunction, and impaired axoplasmic flow [13]. These pathological mechanisms contribute to the irreversible nature of glaucomatous damage, as RGCs, once lost, cannot regenerate under natural conditions. Besides from this pathological mechanisms, Genetic predisposition plays a significant role in glaucoma, with various genes identified as risk factors. Notably, variants in the MYOC, OPTN, CAV1/CAV2, and TMCO1 genes have been associated with different forms of glaucoma, including primary open-angle glaucoma

(POAG), the most prevalent type [12]. Advances in genome-wide association studies (GWAS) have further illuminated the polygenic nature of the disease and paved the way for genetic risk scores that may improve early detection and personalized management.

As of 2020, glaucoma was estimated to affect over 76 million individuals worldwide, a figure projected to rise to 111.8 million by 2040 if current trends persist [10]. In Nigeria, glaucoma accounts for approximately 16.7% of all blindness cases, but true figures are likely underestimated due to significant underreporting and poor health-seeking behaviour [1]. Despite significant advances in diagnostic technologies and therapeutic interventions, glaucoma continues to present unique challenges due to its asymptomatic nature in early stages, making timely detection difficult [3]. By the time patients experience noticeable symptoms, significant and irreversible optic nerve damage has often already occurred [7].

In Sub-Saharan Africa, including Nigeria, the burden of glaucoma is particularly severe. Primary Open-Angle Glaucoma (POAG) is the predominant form, often presenting earlier and progressing more aggressively than in other parts of the world [8]. According to [1], glaucoma accounts for approximately 16.7% of all cases of blindness in Nigeria. Contributing factors include genetic predisposition, poor awareness, late presentation, inadequate screening programs, and limited access to specialized eye care [9].

Yaba, situated within the bustling Mainland Local Government Area (LGA) of Lagos State, epitomizes the intersection between rapid urbanization and emerging health challenges. As a vibrant hub for commerce, education, and technology, Yaba attracts a diverse adult population characterized by varying levels of socio-economic status, lifestyle behaviors, and healthcare-seeking patterns. These dynamic urban factors have significant implications for the ocular health of residents [5]. This study is an excerpt from a larger study.

II. METHODS

Study area

This study was conducted at Yaba in Lagos state. Yaba is often regarded as the “Heartbeat of Lagos

Mainland”. It is one of the most popular suburbs located in Lagos Mainland Local Government Area. Major areas in Yaba Local Council Development Area (YLCDA) include Makoko Community, Akoka, Sabo, Ebute Metta, Jibowu, Herbert Macaulay Way, Commercial Avenue, Alagomeji, Tejuosho. According to the NPC 2006 the YABA local council development area (LCDA) was not enumerated as a standalone unit in the 2006 census; it fell under the Lagos Mainland Local Government Area (LGA). According to the NPC’s 2006 results, Lagos Mainland LGA had a population of 317,720 as of the march 21-27, 2006 enumeration.

Study design and sampling

The design of the study was a cross-sectional study that was carried out among adults in Yaba L.G.A Lagos state. This design was considered appropriate because it focused on existing characteristics of a particular group in order to satisfy the curiosity and the desire for better understanding of the consequence of glaucoma in older male and female. The respondents were asked the same questions concerning same circumstances which prevail in the study area. Information was gathered by means of questionnaire in order to obtain answers to the same questions from a large number of respondents to enable the researcher to describe the study objectives by comparing and relating the characteristics found in the study areas. A multi-stage sampling method technique was adopted for this study and 328 participants were recruited for this study upon their consent.

Data collection

A structured questionnaire containing open-ended and closed-ended questions was developed and used for data collection. The questionnaire was titled "prevalence of glaucoma among adult residing in Yaba mainland L.G.A Lagos state" which was built on previously used instrument from similar surveys among adult in Nigeria. All questions were written in simple English to avoid ambiguity and misinterpretation. This structured approach ensures that the data collected was comprehensive and addresses all relevant aspects of Glaucoma.

Data analysis

Statistical data analysis was performed using IBM SPSS version 27.0, a powerful and reliable statistical software. At preliminary analysis, descriptive method was used to describe the distributional

characteristics of the data. These include distribution tables and charts, which were all expressed as the percentage of the distribution. Chi-square test method was conducted to test for associated risk factors to glaucoma P-value less than 0.05 was considered statistically significant.

III. RESULTS

Socio-demographic characteristics

From Table 1, the age distribution of respondents shows that the largest proportion falls within the 50-59 age group, representing 85 (25.9%) of the respondent. Respondents aged 60-69, representing 84 (25.6%), 70+ representing 59 (18.0%), respondents aged 40-49, representing 55 (16.8%), respondents aged 30-39, representing 29 (8.8%) and those below 30 years representing 16 (4.9%)

Regarding gender, a majority of the respondents 199 (60.7%) are female, while 129 (39.3%) were male. Regarding marital status, 31 (9.5%) were single, a majority of the respondents 232 (70.7%) were married, while 3 (0.9%) are separated while 62 (18.9%) are widowed.

The educational attainment of respondents shows that the majority have tertiary education 158 (48.2%), followed by those with secondary education 90 (27.4%). A smaller proportion has primary education 49 (14.9%), and 31 (9.5%) of respondents have no formal education.

The occupation of respondents showed that 24 (7.3%) were professional, 62 (18.9%) were skilled workers, 140 (42.7%) unskilled workers, 19 (5.8%) were student and 83 (25.3%) were unemployed.

Table 1: Demographic characteristics of the respondents

Demographic Characteristics	Frequency (n=328)	Percentage (%)
Age		
< 30	16	4.9
30 – 39	29	8.8
40 – 49	55	16.8
50 – 59	85	25.9
60 – 69	84	25.6
70+	59	18.0
Gender		
Male	129	39.3
Female	199	60.7
Marital status		
Single	31	9.5
Married	232	70.7
Separated	3	0.9
Widowed	62	18.9
Educational attainment		
No formal	31	9.5
Primary	49	14.9
Secondary	90	27.4
Tertiary	158	48.2
Occupation		
Professional	24	7.3
Skilled worker	62	18.9
Unskilled worker	140	42.7
Student	19	5.8
Unemployed	83	25.3

2 Prevalence of Glaucoma and pattern of Visual acuity of Participants

Among the respondents, 100 individuals (30.5 %) were diagnosed with glaucoma, while 228 (69.5 %)

showed no evidence of the disease. In terms of distance visual acuity, the majority—240 participants (73.2 %)—achieved between 6/6 and 6/18. Thirty-four participants (10.4 %) fell between

< 6/18 and 6/60, 19 (5.8 %) between 6/60 and 3/60, 13 (4.0 %) between < 3/60 and 1/60, and 11 each (3.4 %) registered hand motion (HM) or no perception of light (NPL). At near vision testing, 29 participants (8.8 %) read N5, 47 (14.3 %) N6, 84 (25.6 %) N8, 55 (16.8 %) N10, 6 (1.8 %) N18, 78 (23.8 %) N24, and 29 (8.8 %) N48. Lens examination revealed clear lenses in 228 individuals (69.5 %), opacities in 93 (28.4 %), and pseudophakia in 7 (2.1 %). The cup-

disc ratio was < 0.7 in 94 participants (28.7 %) and $\geq$ 0.7 in 234 (71.3 %). A history of poor vision was reported by 51 respondents (15.5 %), and 82 participants (25.0 %) were current spectacle wearers. Finally, 65 individuals (19.8 %) had undergone previous ocular surgery while 263 individuals (80.2%) reported not to have undergone ocular Surgery.

Table 2: Prevalence of Glaucoma and pattern of visual acuity of participants

Ocular status and history of respondents	Frequency (n=328)	Percentage (%)
Glaucoma Status		
Present	100	30.5
Absent	228	69.5
Visual acuity		
6/6 – 6/18	240	73.2
< 6/18 – 6/60	34	10.4
6/60 – 3/60	19	5.8
< 3/60 – 1/60	13	4.0
HM	11	3.4
NPL	11	3.4
Near Vision		
N5	29	8.8
N6	47	14.3
N8	84	25.6
N10	55	16.8
N18	6	1.8
N24	78	23.8
N48	29	8.8
Lens		
Clear	228	69.5
Opacity	93	28.4
Pseudophakia	7	2.1
Cup-disc Ratio		
<7	94	28.7
>7	234	71.3
History of poor vision		
Yes	51	15.5
No	277	84.5
Use Spectacle		
Yes	82	25.0
No	246	75.0
History of previous surgery		
Yes	65	19.8
No	263	80.2

Table 3: Association Between the Prevalence of Glaucoma and Demographic Factors Among Adult Residents in Yaba, Mainland L.G.A. Lagos State.

Demographic Factors	Glaucoma Present (%)	Glaucoma Absent (%)	Total (%)	χ^2	Df	P	Decision
Gender							
Male	36	40.8	39.3	0.668	1	0.414	NS
Female	64	59.2	60.7				
Age Group							
Less than 30 yrs	6	4.4	4.9	2.762	5	0.737	NS
30–39 yrs	7	9.6	8.8				
40–49 yrs	17	16.7	16.8				
50–59 yrs	28	25	25.9				
60–69 yrs	28	24.6	25.6				
70+ yrs	14	19.7	18				

SS = Statistically Significant at $p < 0.05$

NS = Not Significant

3: Association Between the Prevalence of Glaucoma and Demographic Factors Among Adult Residents in Yaba, Mainland L.G.A. Lagos State.

From Table 3 no statistically significant association was found between glaucoma and demographic variables such as gender ($p = 0.414$) and age group ($p = 0.737$). This suggests that the prevalence of glaucoma in this study population is not significantly influenced by age or sex distribution. Although glaucoma prevalence was slightly higher among females (64.0%) compared to males (36.0%), yet this difference was not statistically significant ($\chi^2 = 0.668$, $p = 0.414$).

Similarly, the distribution across age groups showed that glaucoma cases peaked at 28.0% in both the 50–59 and 60–69 year groups. However, these differences did not reach statistical significance ($\chi^2 = 2.762$, $p = 0.737$).

We therefore accept the null hypothesis.

IV. DISCUSSION

Glaucoma is the leading cause of irreversible blindness in Nigeria and poor awareness and late presentation are often major impediments to adequate management and prevention of blindness from the condition.

Based on this study, the result showed that the level of prevalence of Glaucoma was 30.5% among the respondents and this is moderately high compared to the cross-sectional study conducted by [2] Increasing age, level of education, procurement of glasses from

friends/relatives/roadside, using eyes drop not prescribed, history of previous eyes injury and family history of glaucoma were factors identified as having significant relationship with glaucoma. This means that Glaucoma is prevalent in the community (10.7%). However, level of awareness about the disease (36%) was low.

This result was not consistent with a meta-analysis study conducted by [4] to estimate glaucoma and vision-affecting glaucoma prevalence by demographic factors and US state and county for the Centers for Disease Control and Prevention's Vision and Eye Health Surveillance System (VEHSS). The meta-analysis used data from the National Health and Nutrition Examination Survey (2005-2008), Medicare fee-for-service claims (2019), IBM Market Scan commercial insurance claims (2016), population-based studies of eye disease (1985-2003), and 2022 population estimates from the US Census Bureau. PubMed was searched for population-based studies of glaucoma prevalence published between 1991 and 2016. Bayesian meta-regression methods were used to estimate the prevalence of glaucoma and vision-affecting glaucoma stratified by age, undifferentiated sex/gender (a measure that captures an unclear mix of aspects of sex and or gender), race and ethnicity, and US county and state. Prevalence of any type of glaucoma (open or closed angle) among people 18 years or older and vision-affecting glaucoma, defined as glaucoma and a visual field abnormality. The results showed that for 2022, an estimated 4.22 million people (95% uncertainty interval [UI], 3.46 million to 5.23 million) in the US

were living with glaucoma, with a prevalence of 1.62% (UI, 1.33%-2.00%) among people 18 years or older and 2.56% (UI, 2.10%-3.16%) among people 40 years or older. An estimated 1.49 million people (UI, 1.17 million to 1.90 million) were living with vision-affecting glaucoma, with a prevalence of 0.57% (UI, 0.45%-0.73%) among people 18 years or older and 0.91% (UI, 0.71%-1.16%) among people 40 years or older.

Prevalence of glaucoma among people 18 years or older ranged from 1.11% (UI, 0.89%-1.40%) in Utah to 1.95% (UI, 1.57%-2.39%) in Mississippi. Black adults had a prevalence of 3.15% (UI, 2.32%-4.09%) compared with 1.42% (UI, 1.10%-1.85%) among White adults; adults in the Hispanic and all other racial and ethnic categories combined had a prevalence of 1.56% (UI, 1.13%-2.06%). This meta-analysis found that an estimated 2.56% of people 40 years or older have glaucoma, slightly more than estimated by previous studies. Black individuals are disproportionately affected. Prevalence estimates at the state and county level can help guide public health planning.

CONCLUSION

Based on the findings of this study, it can be concluded that the study has contributed to knowledge by showing that a relatively fair number of the respondents, 100 individuals (30.5 %) were diagnosed with glaucoma which goes on to show the prevalence of Glaucoma also there was a generally high level of awareness (n=289 88.1%) of glaucoma among participants in this study which goes to show that there is a high level of awareness. Thus, results from this study highlights the importance of effective regular eye test and medical checkup that is necessary to avoid getting to a complicated stage.

RECOMMENDATIONS

Based on the results of this study, the following recommendations were made:

1. The government should strengthen population-based survey programs: government should consider conducting periodic population-based surveys to determine glaucoma prevalence and risk factors in specific regions of the country.
2. Expanding the reach of awareness campaigns: since the study demonstrated positive awareness level, raising more awareness about the condition

would only go on to promote early detection and treatment and hence the government or other concerned health agencies should consider scaling up the awareness campaigns to reach a larger number of adults by collaborating with relevant stakeholders, such as the Ministry of Education, to integrate proper education or establish partnerships with local organizations to expand the awareness reach.

3. There is need for Continuous training and capacity building: Providing ongoing training and support for peer educators to ensure they stay updated on HIV/AIDS knowledge, prevention strategies, and effective teaching techniques. Offer refresher courses and opportunities for peer educators to share their experiences and learn from one another.

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