



Sociodemographic and Clinical Characteristics of Participants Attended Glaucoma Screening Week in Benghazi 2023

Samia A. Abdelatei Amer, Hamad K. H. A. Elzarrug, Amal A. Elfakhri

Faculty of Medicine, University of Benghazi, Benghazi, Libya
Email: samiaa.amer@uob.edu.ly

How to cite this paper: Amer, S.A.A., Elzarrug, H.K.H.A. and Elfakhri, A.A. (2025) Sociodemographic and Clinical Characteristics of Participants Attended Glaucoma Screening Week in Benghazi 2023. *Open Access Library Journal*, 12: e13035. <https://doi.org/10.4236/oalib.1113035>

Received: February 2, 2025

Accepted: March 28, 2025

Published: March 31, 2025

Copyright © 2025 by author(s) and Open Access Library Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Aim: This study is aimed at describing the socio-demographic characteristics and ocular status of participants at a screening programme during the World Glaucoma Week in Benghazi Teaching Eye Hospital-Libya in 2023. **Patients and Methods:** A cross-sectional population-based study was conducted among individuals who voluntarily sought to be screened for glaucoma and ocular conditions during the 2023 World Glaucoma Week in Benghazi-Libya. A pre-validated self/interviewer administered questionnaire was used for socio-demographic information while clinical data was obtained from an eye examination. Data so obtained was analyzed using SPSS version 25. **Results:** 367 participants were screened. Male gender was greater among the sample, with 218 males (59.4%) and 149 females (40.6%). Libyan nationality was the predominant representing 92.9% of the sample. The mean age of the sample was 57.8 years. 23 persons (6.3%) were younger than 40 years compared to 343 persons (93.7) who were forty years or more, regarding the education; Public workers constituted the majority as they constituted 37.46%, University educated participants constituted 35.8%, glaucoma was found in 43.9% of the participants. Family history of glaucoma was found in only 34.9%. The mean IOP was 16.29, 19.95 mmHg in right eyes and left eyes respectively, the median of vertical cup to disc ratio was 0.3, 0.4 for right eyes and left eyes respectively. **Conclusion:** The current study found that most of the participants were male and were in the age group of more than 40 years, and university education was predominant. Glaucoma was found in 44% of attendance, and therefore the IOP and the vertical cup to disc ratio were within the normal range in the majority of the cases.

Subject Areas

Ophthalmology

Keywords

Socio-Demographic Factors, Glaucoma, Screening

1. Introduction

Early diagnosis of glaucoma is critical to mitigating irreversible vision loss, as the disease progresses asymptotically until advanced stages. Timely detection enables interventions that preserve visual function and reduce long-term healthcare burdens through cost-effective management. However, sociodemographic disparities—including age, ethnicity, socioeconomic status, and geographic healthcare access—disproportionately delay diagnosis and treatment. Older adults, racially marginalized groups, and underserved populations face heightened risks due to barriers such as limited screening availability, health literacy gaps, and systemic inequities in care. Addressing these disparities is essential to improving outcomes, as delayed diagnosis exacerbates preventable blindness and widens health inequities. A dual focus on advancing early diagnostic tools and dismantling sociodemographic barriers underscores the intersection of clinical and public health strategies in combating glaucoma's global burden.

It has been estimated that the second most prevalent cause of blindness worldwide is glaucoma and the most prevalent cause of irreversible blindness [1] [2].

Glaucoma is a progressive chronic optic neuropathy in which intraocular pressure (IOP) and other currently known factors such as heredity, age, and gender among others contribute to the damage characterized by acquired atrophy of the optic nerve and loss of retinal ganglion cells [3].

The effective management of glaucoma depends on early presentation and diagnosis to prevent blindness [4]. The absence of pain conceals the need for regular eye examinations especially in developing countries where access to health care facilities is costly. Also, the glaucoma presentation pattern in developing countries is greatly influenced by underequipped eye care facilities, poor distribution of eye care resources, the inadequacy of skilled personnel for the eye industry, poor education and awareness, and poverty. This pattern of presentation is different from that of the developed world [5].

A large and growing body of evidence shows that socio-demographic factors such as age, race, as well as socioeconomic status (SES), such as income and education, can influence health outcomes [6] [7].

Studies have shown that increasing age is the most important predictor of blindness. However, the female sex, low educational attainment as well as low SES have also been shown to be associated with blindness [8] [9].

Rim *et al.* found that there was a substantial socio-demographic disparity in eye care utilisation in Korea, and that men with low financial income and education level were especially at risk [10].

Glaucoma is a group of diseases that cause structural damage and visual field

dysfunction, leading to progressive and irreversible vision loss [11]. It is the second leading cause of blindness globally, accounting for 8% of blindness. It is also the leading cause of irreversible blindness globally [12].

It has been reported that the lack of awareness of the disease leads to a late presentation at service delivery points [13].

World Glaucoma Week is a global joint initiative between the World Glaucoma Association (WGA) and the World Glaucoma Patient Network (WGPN), in order to raise awareness on glaucoma.

This study is aimed at finding the socio-demographic characteristics and ocular status of participants at a screening programme during the World Glaucoma Week celebration in Benghazi Teaching Eye Hospital-Libya in 2023 and, data so obtained will help form the framework for policymakers on community-based intervention programs that could be incorporated into the primary eye health care.

2. Patients and Methods

2.1. Study Design

This was a hospital-based cross-sectional descriptive study of participants who attended Glaucoma screening week in Benghazi in 2023. It sought to describe the socio-demographic characteristics and clinical profile of patients attended throughout that week.

2.2. Study Setting

This study was carried out at the premises of the out-patient ophthalmology clinic affiliated with Benghazi Teaching Eye Hospital in Benghazi-Libya in the screening week for glaucoma in 2023.

This facility is a public tertiary eye care facility with the full complement of eye care staff and unlike the public facilities that have the necessary logistics and equipment for comprehensive glaucoma care, and it is one of the most utilized facilities in Benghazi.

2.3. The Sample Size and Sampling Method

Screened 367 participants during the Glaucoma screening week in Benghazi 2023. It was a simple random sampling.

2.4. Inclusion and Exclusion Criteria

The Study included all attendees to glaucoma week in Benghazi 2023, and there was no exclusion for the participants.

2.5. Ethical Considerations

The study and data collection conformed to all local laws and were compliant with the principles of the Declaration of Helsinki.

2.6. Methods

Data collection involved the use of a data extraction sheet as shown as **Appendix**

to collect data on the first visits of the participants on sociodemographics that included gender, age, occupation, source of information about glaucoma week, and full medical and ophthalmological history, family history of glaucoma. Then all participants had an ophthalmological examination that included:

Visual acuities using Snellens chart, refraction using TOPCON KR-800 Auto-refractometer (Topcon, Tokyo, Japan), ophthalmological examination using slit lamp, intraocular pressure by Goldmann applanation tonometer, fundus examination by use of +90.00 D biomicroscopic funduscopy and cup to disc ratio using ZEISS Cirrus HD-Optical Coherence Tomography (OCT).

2.7. Data Analysis

Data were analyzed using the International Business Machines Corporation's Statistical Package for the Social Sciences, (IBM SPSS) version 25 (SPSS Inc, Chicago, USA). A descriptive analysis was carried out, which involved calculating descriptive data such as mean, median, and percentage.

3. Results

This study screened 367 participants for ophthalmological disorders including glaucoma. The mean age of the sample was 57.8 years, with a standard deviation of 12.2, and median age is 59 years, minimum age of 4 and a maximum of 88 years, 23 persons (6.3%) are younger than 40 years compared to 343 persons (93.7%) are forty years and more (**Table 1, Figure 1**).

Table 1. Age statistics of the sample.

	Age in years
N	363
Missing	4
Mean	57.8
Median	59
Standard deviation	12.2
Minimum	4
Maximum	88
Age < 40	23 (6.3%)
Age ≥ 40	343 (93.7%)

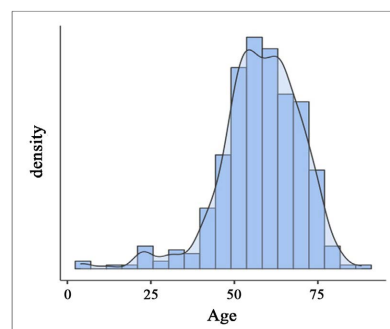


Figure 1. Age distribution of the sample.

Male gender is greater among the sample, with 218 males (59.4%) and 149 females (40.6%). Libyan nationality is the predominant representing 92.9% of the sample and white race represented 93.7% (**Table 2**).

Table 2. Sociodemographic characteristics of the sample.

Characteristics		Frequency	Percent
Gender	Male	218	59.4
	Female	149	40.6
Nationality	Libyan	341	92.9
	Non-Libyan	15	4.1
	missing	11	3
Race	White	344	93.7
	Black	23	6.3

Table 3 shows distribution of the study sample according to their socio-economic profiles as the following.

Occupation has 367 observations and 6 levels. Public worker n =106, 37.46%. Other job: n = 81, 28.62%. Unemployed: n = 76, 26.86%. Technician: n = 11, 3.89%. Professional: n = 5, 1.77%. Student: n = 4, 1.41%. There are 84 missing values.

Education level has 367 observations and 4 levels. University: n = 96, 35.8%. Secondary education: n = 79, 29.5%. Primary education: n = 63, 23.5%. No Formal education: n = 30, 11.2%. There are 99 missing values.

Socio-economic level (SES) has 367 observations and 5 levels. Middle: n = 145, 39.5%. High: n = 75, 20.4%. Low: n = 72, 19.6%. Unemployed: n = 51, 13.9%. Very low: n = 11, 3.0%. There are 13 missing values.

Table 3. Sociodemographic characteristics of the sample.

Characteristics		Frequency	Percent
Occupation	public servant	131	35.7
	Student	5	1.4
	Unemployed	98	26.7
	Technician	16	4.4
	Others	99	27.0
	Professional	9	2.5
Missing		84	22.8
Education level	No formal education	38	10.4
	Primary education	76	20.7
	Secondary education	103	28.1
	University education	122	33.2
Missing		99	26.9
Socioeconomic status	Upper	75	20.4
	Middle	145	39.5
	Low	72	19.6
	Very low	11	3.0
	Unemployed	51	13.9
Missing		13	3.5

Table 4 shows that 161 (44.1%) of the participants diagnosed with glaucoma while 204(55.9%) do not have glaucoma. Family history of glaucoma is claimed by 127 persons (34.9%), and 237 (64.6%) denied a family history of glaucoma.

Table 4. Frequencies of Glaucoma case and family history of glaucoma.

	Level	Count	%	Missing
Glaucoma case	Yes	161	43.9	2
	No	204	55.6	
FH of glaucoma	Yes	127	34.9	3
	No	237	64.6	

Table 5 shows the presence of chronic morbidity and medical history of the sample as the following.

DM has 367 observations and 2 levels. No: n = 185, 51.4%. Yes: n = 175, 48.6%. There are 7 missing values.

HTN has 367 observations and 2 levels. No: n = 214, 59%. Yes: n = 148, 41%. There are 5 missing values.

Migraine has 367 observations and 2 levels. No: n = 265, 74%. Yes: n = 92, 26%. There are 10 missing values.

Cortisone therapy has 367 observations and 2 levels. No: n = 314, 86%. Yes: n = 50, 14%. There are 3 missing values.

Asthma is reported by 28 persons (7.6%), 315 (85.6%) do not have asthma, 24 missing.

Eczema is reported by 14 persons (3.8%), 337 (91.8%) do not have eczema, 16 missing.

Heart diseases are reported by 49 persons (13.4%), thyroid diseases by 33 persons (9%), and rheumatoid arthritis by 24 participants (6.5%).

Table 5. Medical history of the sample.

Medical problem	No		Yes		Missing	
	Count	%	Count	%	Count	%
DM	185	50.4	175	47.7	7	1.9
HTN	214	53.3	148	40.3	5	1.4
Migraine	265	72.2	92	25.1	10	2.7
Corticosteroid therapy	314	85.6	50	13.6	3	0.8
Asthma	315	85.8	28	7.6	24	6.5
Eczema	337	91.8	14	3.8	16	4.4
Heart disease	309	84.2	49	13.4	9	2.5
Thyroid disease	322	87.7	33	9.0	12	3.3
Rheumatoid Arthritis	313	85.3	24	6.5	30	8.2

Table 6 shows the source of information about glaucoma week, which has 527 observations and 6 levels. Hospital: n = 117, 33.4%. Radio: n = 88, 25.1%. Patient or relative: n = 77, 22.0%. Social media: n = 45, 12.9%. Other source: n = 22, 6.3%.

Hospital and radio: n = 1, 0.3%. There are 177 missing values (Figure 2).

Table 6. Source of information about glaucoma week.

Source of information about glaucoma week	Counts	% of Total	Cumulative %
Hospital	117	33.4 %	33.4 %
Radio	88	25.1 %	58.6 %
Social media	45	12.9 %	71.4 %
Patient or relative	77	22.0 %	93.4 %
Other source	22	6.3 %	99.7 %
Hospital and radio	1	0.3 %	100.0 %

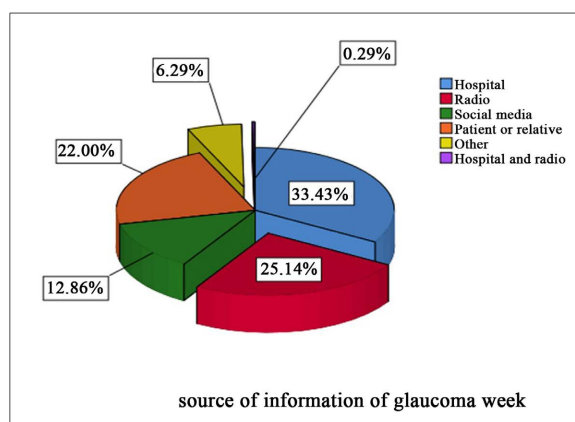


Figure 2. Source of information about glaucoma week.

Table 7 shows the measurements of the vertical cup to disc ratio by OCT, IOP by Goldman applanation tonometer of the sample as the following.

Table 7. Measurements of vertical cup to disc ratio by OCT and Intra ocular pressure (IOP) of the sample by Goldman applanation tonometer.

	N	Missing	Mean	Median	SD
RE vertical cup to disc ratio by OCT	302	65	0.45	0.30	0.23
LE vertical cup to disc ratio by OCT	309	58	58.62	0.40	234.26
RE IOP by Goldman applanation tonometer	298	69	16.29	16.0	5.56
LE IOP Goldman applanation tonometer	293	74	19.95	16.0	57.67

4. Discussion

This study is the first to provide information on the sociodemographic characteristics and clinical profile of persons who attended Glaucoma screening week in Benghazi-Libya. Glaucoma continues to be the commonest cause of avoidable blindness globally despite the renewed strength to create a yearly week-long World Glaucoma awareness campaign. The 2023 World Glaucoma Week celebra-

tion was marked in our tertiary clinic with a free eye screening which was well advertised in the media. This ensured that participation was open to a wide range of people of different ages and occupations. The overwhelming representation of participants aged ≥ 40 years (93.7%) aligns with global evidence identifying age as a critical risk factor for glaucoma, particularly primary open-angle glaucoma (POAG) [14] [15]. However, this raises questions about younger populations in Benghazi. While younger individuals may perceive themselves as low-risk, undetected cases of juvenile glaucoma or secondary glaucoma (e.g., trauma-induced) could be overlooked. In Libya, cultural attitudes toward healthcare—where younger adults may prioritize acute over preventive care—could explain their underrepresentation. Future campaigns could explicitly target younger demographics to dispel misconceptions about glaucoma as an “older adult disease.”

The male predominance (59.4%) contrasts with global epidemiological trends, where females often exhibit higher glaucoma prevalence due to longer life expectancy and hormonal factors. However, this aligns with hospital-based studies in sub-Saharan Africa [15]-[17], suggesting regional patterns in healthcare-seeking behavior. In North Africa, gendered roles may influence access: males, often primary income earners, might prioritize health screenings if they perceive vision loss as a threat to employment. Conversely, women may face barriers such as caregiving responsibilities or limited autonomy to attend screenings. Further qualitative research is needed to explore these dynamics in Benghazi.

The relatively high proportion of university-educated participants (33.2%) mirrors findings from Ghana and India, where education correlates with glaucoma awareness [18] [19]. However, Libya’s literacy rate is 91% (World Bank, 2021), suggesting that even educated populations may lack disease-specific knowledge. This highlights a paradox: while educated individuals are more likely to attend screenings, they may still harbor gaps in understanding glaucoma’s asymptomatic progression. Public health campaigns should combine media messaging with community workshops to bridge this gap, particularly for non-university-educated groups.

The hospital as the primary information source (33.4%) diverges from studies where media dominates [20]. This may reflect the tertiary clinic’s established reputation, drawing existing patients or referrals. Alternatively, media campaigns (despite being “well-advertised”) might have failed to reach broader audiences due to low health literacy or distrust in media sources. In conflict-affected regions like Libya, institutional trust in hospitals may outweigh trust in media, which is often politicized. To enhance reach, future campaigns could collaborate with community leaders or religious institutions, which serve as trusted information hubs in many Arab societies.

The high glaucoma diagnosis rate (44.1%) underscores the value of targeted screenings during awareness weeks. Comparatively, population-based studies report lower prevalence (3% - 5% in adults >40 years), suggesting this cohort may have self-selected due to symptoms or risk factors. However, if Benghazi’s preva-

lence is genuinely elevated, environmental factors (e.g., solar exposure, smoking) or genetic susceptibility unique to North African populations warrant investigation.

The lower familial history (34.9% vs. 60% in Tasmania [21]) may reflect underreporting due to fragmented family structures, stigma around blindness, or poor intergenerational health communication in Libyan society. Alternatively, it could signal a stronger role for non-genetic risk factors (e.g., untreated ocular hypertension, diabetes) in this population. Genetic studies in Libyan cohorts are needed to clarify hereditary contributions to POAG.

The applanation tonometer was the instrument used at the tertiary eye center to measure intraocular pressure (IOP) since it is the gold standard for IOP measurement [22]. The mean IOP (16.29 - 19.95 mmHg) aligns with normal ranges but starkly contrasts with African studies reporting means >30 mmHg [14] [16]. This discrepancy likely stems from differing cohorts: cited studies focused on glaucoma patients, whereas 55.9% of our cohort were healthy. However, even among glaucoma patients in our study, IOPs may be lower due to early detection or effective pre-screening management (e.g., hypotensive medications). This reinforces the limitations of relying solely on IOP for diagnosis, particularly in normal-tension glaucoma, which is prevalent in certain ethnic groups. The cup-to-disc ratio is a prominent sign of glaucoma among patients. With the advancement in technology for the examination of the retina and optic nerve head, sophisticated techniques such as optical coherence tomography (OCT) provide quantitative measurements of vertical cup to disc ratio and other measurements [23]-[25]. In our study the median vertical CDR (0.3 - 0.4) diverges sharply from Samuel Kyei's study (0.9) [26], likely reflecting differences in participant profiles. Kyei's cohort included advanced glaucoma patients, whereas our screening captured early-stage or pre-perimetric cases. Ethnic variations in optic disc morphology may also play a role: African populations typically have larger CDRs than Europeans or Arabs, independent of disease. The use of OCT in our study—a tool absent in many resource-limited African settings—enabled precise detection of subtle structural changes, advocating for its integration into screenings to identify glaucoma before irreversible vision loss.

5. Conclusion

This study, the first to profile attendees of a glaucoma screening initiative in Benghazi, Libya, reveals critical insights into the sociodemographic and clinical dimensions of glaucoma in a region where such data have historically been scarce. The findings challenge conventional assumptions, underscore the interplay of cultural and biological factors, and highlight actionable pathways for improving glaucoma care in North Africa.

5.1. Sociodemographic Patterns: A Reflection of Access, Not Risk

The predominance of males (59.4%) and individuals over 40 (93.7%) underscores

a healthcare engagement gap rather than a true epidemiological distribution. While age is a well-established risk factor for glaucoma, the near-exclusion of younger participants likely reflects systemic barriers: cultural perceptions of glaucoma as an “aging disease,” limited preventive health literacy, and gender roles that prioritize male access to healthcare. The overrepresentation of university-educated participants (33.2%) further signals inequities in health outreach. Educated individuals, often more health-literate and economically empowered, are more likely to attend screenings, leaving marginalized groups (e.g., rural populations, less-educated women) underserved. This disparity calls for decentralized, community-driven screening programs that bridge gaps in access and education.

5.2. High Glaucoma Prevalence (44.1%): A Dual Narrative

The striking proportion of glaucoma diagnoses—far exceeding global averages—carries two potential explanations:

- **Effective Case-Finding:** The screening’s use of gold-standard tools (applanation tonometry, OCT) and its timing during Glaucoma Week likely attracted high-risk individuals (e.g., those with undiagnosed symptoms or familial history), demonstrating the value of targeted awareness campaigns.
- **A Silent Epidemic:** If this rate reflects true regional prevalence, it signals a public health crisis. Because this may have allowed glaucoma to proliferate untreated, environmental factors, such as high UV exposure in arid climates or untreated diabetes, could compound the risk.

5.3. Normal IOP and CDR: Rethinking Diagnostic Paradigms

The majority of participants, including those diagnosed with glaucoma, exhibited normal IOP (16.29 - 19.95 mmHg) and vertical cup-to-disc ratios (CDR 0.3 - 0.4). This challenges the traditional reliance on IOP as a diagnostic cornerstone and emphasizes:

- **The Prevalence of Normal-Tension Glaucoma (NTG):** NTG, common in Asian and Arab populations, may dominate Benghazi’s glaucoma profile. This subtype, invisible to IOP-centric screenings, demands structural assessments (e.g., OCT) to detect optic nerve damage before irreversible vision loss.
- **Ethnic Variations in Optic Disc Morphology:** The lower CDR values compared to African studies (e.g., CDR 0.9 in Ghana [26]) highlight the need for population-specific reference ranges. Arab populations may have smaller optic discs, making universal CDR thresholds (e.g., >0.6) potentially misleading.

5.4. Familial History (34.9%): A Cultural or Biological Signal

The lower familial history compared to Tasmanian studies (60% [21]) may reflect underreporting due to stigma around blindness, or a true predominance of sporadic glaucoma cases. This finding urges caution: while genetics are key in POAG, environmental and systemic health factors (e.g., vascular disease, steroid misuse) may be more salient in Libya’s context.

5.5. Clinical and Policy Implications

- **Beyond IOP: A Structural Revolution:** The study advocates for OCT as a frontline tool in glaucoma screenings, particularly in resource-limited settings where NTG may be prevalent but underdiagnosed.
- **Gender-Equitable Outreach:** To address male predominance, screenings could partner with female community leaders or offer mobile clinics in residential areas to reduce access barriers for women.
- **Education Tailored to Reality:** Simplify glaucoma messaging for non-university-educated groups using visual aids (e.g., infographics in Arabic) and leverage mosques or local media (e.g., radio) to broaden reach.

6. Limitations and Future Directions

As a hospital-based study, the findings may not generalize to Libya's broader population. Community-based screenings are critical to capture undiagnosed cases, particularly in rural areas. Longitudinal follow-up could clarify progression rates, while genetic studies might unravel the role of hereditary vs. environmental risk factors. Establishing Arab-specific CDR and IOP norms will refine diagnostic accuracy and reduce over-/underdiagnosis.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Thylefors, B. and Négrel, A.D. (1994) The Global Impact of Glaucoma. *Bulletin of the World Health Organization*, **72**, 323-326.
- [2] Quigley, H.A. (1996) Number of People with Glaucoma Worldwide. *British Journal of Ophthalmology*, **80**, 389-393. <https://doi.org/10.1136/bjo.80.5.389>
- [3] Rim, T.H., Choi, M., Yoon, J.S. and Kim, S.S. (2015) Sociodemographic and Health Behavioural Factors Associated with Access to and Utilisation of Eye Care in Korea: Korea Health and Nutrition Examination Survey 2008-2012. *BMJ Open*, **5**, e007614. <https://doi.org/10.1136/bmjopen-2015-007614>
- [4] Kolar, P. (2014) Risk Factors for Central and Branch Retinal Vein Occlusion: A Meta-Analysis of Published Clinical Data. *Journal of Ophthalmology*, **2014**, Article No. 724780. <https://doi.org/10.1155/2014/724780>
- [5] Abdull, M.M., Gilbert, C.C. and Evans, J. (2015) Primary Open Angle Glaucoma in Northern Nigeria: Stage at Presentation and Acceptance of Treatment. *BMC Ophthalmology*, **15**, Article No. 111. <https://doi.org/10.1186/s12886-015-0097-9>
- [6] National Research Council (US) RPanel on Race, Ethnicity, and Health in Later Life. In: Anderson, N.B., Bulatao, R.A. and Cohen, B. Eds., *Critical Perspectives on Racial and Ethnic Differences in Health in Late Life*, National Academies Press, 9.
- [7] Braveman, P. and Gottlieb, L. (2014) The Social Determinants of Health: It's Time to Consider the Causes of the Causes. *Public Health Reports*, **129**, 19-31. <https://doi.org/10.1177/00333549141291s206>
- [8] Fouad, D., Mousa, A. and Courtright, P. (2004) Sociodemographic Characteristics Associated with Blindness in a Nile Delta Governorate of Egypt. *British Journal of Oph-*

- thalmology*, **88**, 614-618. <https://doi.org/10.1136/bjo.2003.026997>
- [9] Abou-Gareeb, I., Lewallen, S., Bassett, K. and Courtright, P. (2001) Gender and Blindness: A Meta-Analysis of Population-Based Prevalence Surveys. *Ophthalmic Epidemiology*, **8**, 39-56. <https://doi.org/10.1076/opep.8.1.39.1540>
- [10] Rim, T.H., Choi, M., Yoon, J.S. and Kim, S.S. (2015) Sociodemographic and Health Behavioural Factors Associated with Access to and Utilisation of Eye Care in Korea: Korea Health and Nutrition Examination Survey 2008-2012. *BMJ Open*, **5**, e007614. <https://doi.org/10.1136/bmjopen-2015-007614>
- [11] Foster, P. and Quigley, H. (2012) Glaucoma. In: Johnson, G.J., Minassian, D.C., Weale, R.A. and West, S.K., Eds., *The Epidemiology of Eye Disease*, Imperial College Press, 241-266. https://doi.org/10.1142/9781848166271_0013
- [12] Pascolini, D. and Mariotti, S.P. (2011) Global Estimates of Visual Impairment: 2010. *British Journal of Ophthalmology*, **96**, 614-618. <https://doi.org/10.1136/bjophthalmol-2011-300539>
- [13] Mehari, T., Giorgis, A.T. and Shibeshi, W. (2016) Level of Adherence to Ocular Hypotensive Agents and Its Determinant Factors among Glaucoma Patients in Menelik II Referral Hospital, Ethiopia. *BMC Ophthalmology*, **16**, Article No. 131. <https://doi.org/10.1186/s12886-016-0316-z>
- [14] Omoti, A.E., Osahon, A.I. and Waziri-Erameh, M.J.M. (2006) Pattern of Presentation of Primary Open-Angle Glaucoma in Benin City, Nigeria. *Tropical Doctor*, **36**, 97-100. <https://doi.org/10.1258/004947506776593323>
- [15] Eballe, A. (2011) Prevalence and Causes of Blindness at a Tertiary Hospital in Douala, Cameroon. *Clinical Ophthalmology*, **5**, 1325-1331. <https://doi.org/10.2147/opth.s23064>
- [16] Gyasi, M., Francis, A., Chen, Y., Harrison, R. and Kodjo, R. (2014) Presentation of Glaucoma in the Greater Accra Metropolitan Area of Ghana. *Ghana Medical Journal*, **48**, 143-147. <https://doi.org/10.4314/gmj.v48i3.4>
- [17] Usifoh, S., Udezi, W. and Omege, J. (2014) Prevalence of Glaucoma in a Nigerian Hospital. *Journal of Pharmacy & Bioresources*, **11**, 22-28. <https://doi.org/10.4314/jpb.v11i1.4>
- [18] George, R., Sathyamangalam, R., Paul, P., Baskaran, M., Hemamalini, A., Madan, R., *et al.* (2009) Determinants of Glaucoma Awareness and Knowledge in Urban Chennai. *Indian Journal of Ophthalmology*, **57**, 355-360. <https://doi.org/10.4103/0301-4738.55073>
- [19] Nkum, G., Lartey, S., Frimpong, C., Micah, F. and Nkum, B. (2015) Awareness and Knowledge of Glaucoma among Adult Patients at the Eye Clinic of a Teaching Hospital. *Ghana Medical Journal*, **49**, 195-199. <https://doi.org/10.4314/gmj.v49i3.11>
- [20] Ogbonnaya, C.E., Ogbonnaya, L.U., Okoye, O. and Kizor-Akaraiwe, N. (2016) Glaucoma Awareness and Knowledge, and Attitude to Screening, in a Rural Community in Ebonyi State, Nigeria. *Open Journal of Ophthalmology*, **6**, 119-127. <https://doi.org/10.4236/ojoph.2016.62017>
- [21] Green, C.M., Kearns, L.S., Wu, J., Barbour, J.M., Wilkinson, R.M., Ring, M.A., *et al.* (2007) How Significant Is a Family History of Glaucoma? Experience from the Glaucoma Inheritance Study in Tasmania. *Clinical & Experimental Ophthalmology*, **35**, 793-799. <https://doi.org/10.1111/j.1442-9071.2007.01612.x>
- [22] O'Leary, N., Artes, P.H., Hutchison, D.M., Nicoleta, M.T. and Chauhan, B.C. (2012) Rates of Retinal Nerve Fibre Layer Thickness Change in Glaucoma Patients and Control Subjects. *Eye*, **26**, 1554-1562. <https://doi.org/10.1038/eye.2012.202>

- [23] Kamal, D. and Hitchings, R. (1998) Normal Tension Glaucoma—A Practical Approach. *British Journal of Ophthalmology*, **82**, 835-840.
<https://doi.org/10.1136/bjo.82.7.835>
- [24] Kanski, J.J. (2007) *Clinical Ophthalmology. A Systematic Approach*. 6th Edition, Elsevier Butterworth-Heinemann.
- [25] Sommer, A. (1991) Clinically Detectable Nerve Fiber Atrophy Precedes the Onset of Glaucomatous Field Loss. *Archives of Ophthalmology*; **109**, 77-83.
<https://doi.org/10.1001/archoph.1991.01080010079037>
- [26] Kyei, S., Owusu-Afriyie, B., Tagoh, S., Kwarteng, M.A., Nsiah, P. and Guramatunhu, S. (2021) Clinical and Sociodemographic Characteristics of Glaucoma Patients at a Tertiary Referral Facility in Zimbabwe. *The Malawi Medical Journal*, **33**, 15-20.

Appendix

Glaucoma work sheet

Date: \ \20

ID:

Name:

Age:.....

Age: above 40? yesno

Gender:..... Race.....

Phone numberNationality:.....

Occupation:

civil /public servant	Technician
Student	Others
Unemployed	
Professional	

Education:

no formal education	Secondary education
Primary education	Post secondary education

Any Complaint:

ocular pain, headache.....,pain around the eye.....,red-ness.....,haloes around the light

Blurring of vision.....,itching/irritation

tearing....., floaters.....,flashes of lightothers

Past medical history : Diabetes mellitus: yes No

Hypertension : yes no ,

ischemic heart disease: yes no Migraine: yes no Thyroid eye disease : yes No Bronchial asthma : yes No Eczema: yes No

Presence of vascular disease : yes no

H/O any other chronic disease

Past ocular surgery: yes No

If yes what is the ocular surgery done

H/O glaucoma surgery

Past surgical history:

Any history of trauma: blunt..... or penetrating.....

Family history of glaucoma: yes no

If yes who has a glaucoma in the family:

first degree relative....., second degree relative3rd degree relative

duration of glaucoma:

less than one year.....,1 - 5 years , more than 5 yearsor don't know.....

Age of the patient at presentation of the disease

F/H of any other ocular disease:

F\H of any chronic medical disease:

Drug history: glaucoma cases :

Number of antiglaucoma eye drops used: none, one, two, three,four

Name of antiglaucoma used

Dose, side effects

Any other medication used

In glaucoma patients: Where was the diagnosis done: in the hospital, out of the hospital or could not tell.....

Source of informations about glaucoma week : from the hospital, TV\radio , relatives of the patient, other sources

Social history: history of smoking: yes or no

Socioeconomic status: upper (salary ≥ 1500 LD),middle (salary <1500-900 LD) low (salary 900 LD)very low (< 900 up to 450LD)unemployed

Very far (out of Benghazi)

Examination:

	RE	LE
Visual acuity(non aided)		
Autorefractometry (ARM)		
Lid		
conjunctiva		
Cornea		
sclera		
Anterior chamber		
iris		
pupil		
lens		
IOP by Goldmann Applanation tonometry		
Fundus :		
Vitreous :		
Optic disc :		
Macula :		
Vessels :		

Gonioscopy:

RE

LE:.....

Comment: Type of glaucoma: RE : open angle or closed angle

LE: open angle glaucoma or closed angle glaucoma.....

Primary or secondary glaucoma :

RE

LE

Investigations:

OCT optic nerve:

RE

LE.....

❖ is the patient glaucoma suspect

❖ or confirmed

Or unlikely.....