

Eye Care Practices, Knowledge, and Attitude of Glaucoma Patients at Community Eye Outreach Screening in Nigeria

Abstract

Background: Community eye outreach (CEO) screening is an important model which has been widely employed to detect eye conditions such as cataract and glaucoma in high-risk groups. There is a dearth of data on the eye care practices of glaucoma patients identified using this model in South West Nigeria. **Objectives:** The aim of this article is to assess the eye care practices, knowledge, and attitudes of glaucoma patients/suspects identified at CEO screenings in Nigeria. **Design of the Study:** This was a mixed method study with quantitative and qualitative approaches. **Setting in Which the Study Took Place:** The study was carried out at 24 outreach screening centres in communities in Oyo and Osun states. **Materials and Methods:** The quantitative component of this study was a cross-sectional survey of patients with suspected glaucoma identified at routine CEO in South West Nigeria. Surveys were administered by trained personnel and gathered information on knowledge and attitudes towards glaucoma. The qualitative component consisted of structured interviews with providers to assess their knowledge and perspectives of glaucoma patients' attitudes and behaviours. **Results:** A total of 1881 patients were screened at 24 outreach screenings in South West Nigeria, among which 120 glaucoma cases/suspects were identified. Fifty-six (46.7%) of the glaucoma patients were aware of glaucoma, but only 39 (32.5%) patients could answer at least one knowledge question correctly. Predictors of awareness of glaucoma were minimum of secondary school education [adjusted odds ratio (OR) 8.76; 95% confidence interval (CI) 3.18–24.13] and having had an eye check-up in the past (adjusted OR 5.87; 95% CI 1.92 – 17.92). Patients said cost and 'not knowing the disease was serious' were reasons for not following up at the main hospital. Health workers interviewed said that cost and poor knowledge were the main reasons glaucoma patients frequently attended free outreach screening events rather than seeking definitive care. **Conclusion:** Although CEO screenings improve access to eye care, provision of appropriate health education programs and strengthening of the health insurance scheme are needed to improve its impact in glaucoma care.

Keywords: Community eye outreach, eye care practices, glaucoma, knowledge of glaucoma, Nigeria

Introduction

Glaucoma is the leading cause of irreversible blindness globally^[1] and in Nigeria.^[2] Tham *et al.*^[3] projected that by the year 2040, 118.8 million people will be living with glaucoma, and this will disproportionately affect Africa and Asia. The prevalence and incidence of glaucoma are highest in Africa.^[1] The Nigerian National Blindness Survey, a country-wide study, reported a prevalence of 5.02%^[2] and a glaucoma blindness prevalence of 0.7%.^[4] A study carried out in South West Nigeria reported a higher glaucoma prevalence of 6.9% in the region.^[5]

About 90% of people with glaucoma remain undiagnosed in most developing countries. In

Nigeria, the rate of previous diagnosis was as low as 5.6%.^[2] Glaucoma in Africans often occurs at an early age^[6,7] and often presents late in its clinical course.^[8-10] The high prevalence of glaucoma with associated early onset, aggressive course, and lack of resources for management leads to a high rate of glaucoma blindness in much of sub-Saharan Africa.

Population-based screenings have not been found to be cost-effective in high-income countries.^[11,12] Targeted screening of first-degree relatives of glaucoma patients and the integration of glaucoma screening into other eye screening programs in high-risk populations have been reported to be a more feasible control strategy for glaucoma.^[11] These screening programs could provide opportunities to create awareness about glaucoma, provide knowledge on its care, and identify early disease.

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The community eye outreach (CEO) is one of the practical eye screening models launched to provide eye care screening services in underserved communities, following the global initiative of Vision 2020. This global initiative had a mandate to eliminate needless blindness by the year 2020. Although the eye outreach screening model has been used mainly to deliver cataract surgical services, it has also been relevant in glaucoma screening services of high-risk groups. These outreach screenings offer opportunities to diagnose glaucoma in its asymptomatic stage. A previous study in Ibadan reported that patients identified at CEO screenings were more likely to present with mild-to-moderate glaucoma, compared with patients referred from other sources.^[13]

The World Health Organization recommends the integration of the prevention of avoidable blindness and visual impairment into primary health care.^[14,15] However, this has not been successfully executed in many parts of Nigeria. Primary health care in Nigeria has been fragile, fragmented, and almost non-existent as a result of inadequate resources and gross underfunding.^[16] Hence, the CEO performs some functions of the primary eye care program by providing preventive and some curative eye care services to the underserved. It has also been used to refer glaucoma patients to the main hospitals.^[13,17] It is important, however, to ensure that these outreach screenings are well implemented and asymptomatic glaucoma cases are counselled, diagnosed, and referred to the hospital for care.

Studies done in hospital settings among routine glaucoma follow-up patients in Nigeria have reported a high level of awareness of glaucoma ($\geq 80\%$), but knowledge level has been reported to be lower.^[18,19] Achigbu *et al.*^[18] reported a good knowledge of glaucoma in 46.3%, whereas another study reported a fair-to-good knowledge perception in 58.2% of glaucoma patients.^[19] A high level of awareness (65.5%) was also reported among glaucoma patients seen at an urban CEO screening program.^[17] This outreach program was however preceded by mass media awareness campaigns and publicity.

This study assessed the level of awareness, knowledge, attitudes, and eye care practices of glaucoma patients identified at several routine CEO screenings in South West Nigeria. To the best of our knowledge, this is the first study to report eye care practices among glaucoma patients identified at routine CEO screenings in South West Nigeria. This information will provide evidence for the development of appropriate eye health education programs for glaucoma management in Nigeria.

Materials and Methods

This was a cross-sectional descriptive study conducted at CEO screenings routinely organized by the University College Hospital, Ibadan, Nigeria, between March and September 2018. These outreach screenings were held in several communities in Oyo and Osun States in South West Nigeria. At these outreach screenings, patients with cataract, glaucoma, and other eye diseases requiring comprehensive care are referred to the main hospital, whereas those with simple eye conditions

such as conjunctivitis are managed at the site. There are four permanent outreach centres within Ibadan which are visited weekly and temporary screening centres which may take place in churches, mosques, or town halls. They are often preceded by mobilizations by camp managers with announcements often around the outreach screening sites.

Ethical approval was obtained from the Ethical Review Board of the University of Ibadan and the University College Hospital, Ibadan. The study was conducted in accordance with the tenets of the Declaration of Helsinki. All patients included in the study gave a verbal consent to participate in the study.

The study had both quantitative and qualitative components. The quantitative portion consisted of data collected via interviewer-administered surveys from consecutive participating patients who attended the CEO screening centers (CEOCs) and were diagnosed as glaucoma patients or glaucoma suspects. The qualitative portion consisted of data collected via structured interviews with public health nurses who conduct the screenings at the CEOCs.

Quantitative patient-based data collection

Questionnaires were administered to patients with confirmed or suspected glaucoma by trained facilitators to assess sociodemographic characteristics such as age, sex, place of residence, educational status, and occupation. The participants' knowledge and awareness of glaucoma were ascertained. Ocular history and ocular examination were also conducted.

Eye care practices

Questions were asked about having had an eye check in the past which was defined as attendance at community outreach screening/hospital attendance in the past (Yes/No). Participants were asked about the number of CEOCs they had attended in the past, locations of such outreach screenings/hospitals, and uptake of care at hospitals if they had been previously referred from outreach screenings (Yes/No). The reasons for not taking up care in the hospitals after referrals were explored using semi-structured questions. Adherence to follow-up and medication adherence in the past before the current outreach screening were also explored.

Awareness and knowledge

Patients were asked if they were aware of glaucoma or had ever heard of glaucoma at any time (Yes/No). If the answer to this question was 'Yes', then they were asked where they had heard of the disease and what glaucoma was, to determine their basic knowledge about the disease. Questions asked had a 'Yes' or 'No' or 'Don't know option'. Knowledge was assessed using a short questionnaire. Briefly, the following eight questions were asked 'Glaucoma causes blindness', 'Blindness from glaucoma is irreversible', 'It is gradually progressive', 'One may have it and not know it', 'It can be inherited', 'The nerve of vision is damaged' 'Africans have a higher chance of glaucoma', and 'Chance of glaucoma increases with age'. Patients were assigned one score for every correct answer making a total score of eight scores. A patient was deemed to be

knowledgeable about glaucoma if he could answer at least four questions correctly, have a fair knowledge if he scored at least two questions, and poor knowledge if he scored less than two. Trained research assistants conducted a face-to-face interview using a semi-structured questionnaire. The questionnaire was initially prepared in English. It was translated to Yoruba, which is the major language spoken in South West Nigeria, and back translated to English to check for consistency in meaning. The interview was conducted in either Yoruba or English language depending on which language each participant preferred.

Ocular examination

All patients had a visual acuity test (unaided and aided) using a standard illuminated Snellen chart or illiterate E-chart (where necessary). Pen torch examination of the anterior segment and fundoscopy of the two eyes were done by resident doctors in Ophthalmology who routinely attend these outreaches. Visual field test could not be performed at the outreach site due to logistic reasons. However, patients who were diagnosed as glaucoma suspects or glaucoma patients were referred to the main hospital for visual field tests, intraocular pressure measurement, and stereoscopic examination of the optic disc. The proportion of patients with glaucoma or glaucoma suspects at the outreach centre was determined using the International Society of Geographical and Epidemiological Ophthalmology (ISGEO) criteria^[20] for glaucoma in prevalence surveys and the Nigerian normative study data for defining glaucoma.^[21]

The patients were classified as glaucoma cases if they had glaucoma category 2 (structural damage, visual field was not performed): vertical cup-to-disc ratio (VCDR) ≥ 0.75 (99.5th percentile) or VCDR asymmetry ≥ 0.2 (99.5th percentile); or glaucoma category 3 (no view of fundus and no visual field): VA < 3/60 + evidence of glaucoma filtering surgery or currently on anti-glaucoma medications or medical records showing visual glaucomatous morbidity. Category 1 of the ISGEO classification was not used as visual field test was not performed at the outreach. Patients were considered suspects if they had VCDR ≥ 0.7 (97.5th percentile) or VCDR asymmetry ≥ 0.1 (97.5th percentile).

This was part of a larger study in which glaucoma patients were recruited from outreach screenings, referred to the main hospital and followed up for a period of 1 year. In the current study, we report the eye care practices, knowledge, and awareness of glaucoma among patients referred to the main hospital. A minimum sample size of 100 glaucoma patients or suspects was calculated based on a proportion of 14.5% of persons who had glaucoma at an outreach in Nigeria,^[17] a precision of 7.5%, and an alpha of 5% using the Kish formula. All glaucoma cases or glaucoma suspects who consented to the study at the CEOC were included until the minimum sample size was completed.

Qualitative provider-based data collection

Face-to-face in-depth interviews were conducted with the four public health nursing staff in charge of the outreach program

(total number of staff in charge of program). Interviews were conducted to assess their knowledge of glaucoma and to understand their perspectives on the eye care practices of glaucoma patients identified at the outreach screenings. Interviews were audio-recorded, transcribed verbatim, and validated. Inductive and deductive coding and thematic analysis were done using NVivo 11 (Qualitative Data Analysis Software; QSR International Pty Ltd. Version 11, 2015).

Data management

Data were entered into the Redcap Software Package. Analysis was done using SPSS version 23. Quantitative variables were summarized using means and standard deviations. Continuous variables were compared with the independent samples *T*-test. Categorical variables were summarized using frequencies and proportions. Bivariate χ^2 statistics were used to determine associations. Multivariate logistic regression was used to determine independent predictors of associations. A *P*-value of less than 0.05 was considered significant.

Results

A total of 1881 patients were screened at 24 outreach screenings in South West Nigeria, among which 120 glaucoma cases/suspects were identified. The mean age of the glaucoma cases/suspects was 59.4 (SD 12.8) years. There were more males (56.7%), less than a third (21.7%) had tertiary education, and only about 60% had an income-producing job [Table 1]. At the outreach, 113 (94.2%) patients had eye complaints, of whom 85 (75.2%) had visual blurring in one or both eyes. Sixty-nine (57.5%) patients reported having had an eye check-up at an eye care outreach screening or hospital prior to the current study, whereas 51 (42.5%) patients had never had an eye check-up in the past. About one-quarter of the patients (25.8%) knew someone who was blind and 22 (18.3%) said the person was a relation.

Patients' eye care practices

Of the 120 participants seen at these outreach screenings, 67 (55.8%) had attended one or more eye outreach screenings in the past, and of these, 16 (23.8%) had previously attended two or more CEO screenings. All 67 (55.8%) reported being told to visit a hospital for possible glaucoma; however, 41 (61%) of these failed to do so. These outreach screenings were organized by different clinics, hospitals, and political aspirants who sponsored some of the outreach screenings as part of their political/electoral campaigns. Two patients who had attended an outreach sponsored by some political aspirants said '*we were not examined because the crowd was large but some of us got free eye drops*'. One patient had attended up to 15 different outreach screenings and had also been to several hospitals in the past. Also, another respondent had attended 10 outreach screenings in the past but did not follow-up at any hospital. Reasons for not following up for further glaucoma evaluation included the following: 29 (24.2%) patients did not think that their eye problem was serious, 15 (36.6%) patients said they prayed and believed they did not have any serious eye problem,

Table 1: Sociodemographic and clinical characteristics of glaucoma cases and suspects

Variables	Frequency, N=120 (%)
Mean age (SD) years	59.4 (12.8)
Sex	
Male	68 (56.7)
Female	52 (43.3)
Age group	
<60	50 (41.7)
≥60	70 (58.3)
Distance to hospital (minutes)	
15–30	23 (19.2)
>30–60	93 (77.5)
>60	3 (2.5)
No response	1 (0.8)
Mean±SD (min)	52.5±17.5
Educational status	
None	23 (19.2)
Primary/secondary	70 (58.3)
Tertiary/more	26 (21.7)
No response	1 (0.8)
Income-producing job	72 (60)
Presenting visual acuity (worse eye)	
Blind (≤3/60)	66 (55.0)
Not blind (>3/60)	54 (45.0)
Visual acuity in better eye	
Good vision (6/6–6/18)	68 (56.7)
Moderate vision (<6/18–6/60)	19 (15.8)
Severe VI/blind (<6/60)	33 (27.5)

7 (17.1%) patients said that they were not told which hospital to visit, whereas 7 (17.1%) patients said that they did not have money to visit the hospital and elected instead to attend a future free outreach screening. There was no statistically significant association between attending more than one outreach and presenting vision in the better eye (0.289) or the worse eye ($P = 0.427$).

Twenty-four (20%) patients diagnosed with glaucoma were being followed up at a hospital prior to the current outreach screening. They were prescribed medical therapy, but none of them was using their glaucoma medical therapy at the time of the current screening. Of these, two patients said that they never bought the prescribed glaucoma medications, whereas the remaining had stopped using them prior to the current outreach screening. Common reasons reported for discontinuing therapy included depletion of dispensed medications, inability to purchase additional medications, and the belief that the medication was unnecessary.

Patients' awareness and knowledge about glaucoma

Of the 120 participants seen at the outreach screenings, 56 (46.7%) were aware of glaucoma, whereas only 39 (32.5%) could correctly describe the disease by answering at least one question assessing knowledge correctly. A majority of the patients (66.1%) heard about glaucoma from a healthcare provider at an outreach screening centre or hospital. Other

sources of information were the media or from friends and neighbours. Ten (8.3%) patients gave a positive family history of glaucoma. The predictors of glaucoma awareness are shown in Table 2. In the unadjusted logistic regression analysis, patients were more likely to be aware of glaucoma if they had a minimum of secondary school education, were of the male gender, had a positive family history of glaucoma, and had an eye check in the past. All of these variables were statistically significant [Table 2]. However, on multivariate logistic regression analysis, having a minimum of secondary school education [odds ratio (OR) 8.76, 95% confidence interval (CI) 3.18–24.13] and having an eye check in the past (OR 5.87, 95% CI 1.92–17.92) remained statistically significant. The patients who had a minimum of secondary school education were eight times more likely to be aware of glaucoma than those who had no education or had only a primary school education. The patients who had an eye check up in the past were five times more likely to be aware of glaucoma than those who did not have an eye check up in the past after controlling for other variables [Table 2]. Only seven (5.8%) patients had good knowledge, with a minimum score of 4, whereas 12 patients (10%) had fair knowledge. The other patients had poor knowledge, with only 32.5% being able to answer at least one question correctly [Table 3].

Providers' knowledge and perceived reasons for poor uptake of definitive services by glaucoma patients

Four nursing staff who worked at the outreach units were interviewed on their knowledge about glaucoma. They showed good knowledge about glaucoma, as evidenced by their responses: '*Glaucoma is the major cause of irreversible blindness all over the world, because it does not present with symptoms at the early stage*' (JO, 58 years, 10 years' nursing experience at outreach screenings).

'Glaucoma is a hereditary condition, is a painless eye disease which will cause serious impairment to the vision' (MO, 48 years, 8 years' experience).

'Glaucoma is an eye disorder that is characterized by impaired vision, especially the peripheral visual field, then increase intraocular pressure, then damage to the optic nerves' (BO, 34 years, 8 years' experience).

They were also asked about their opinion on glaucoma patients' approaches to accessing eye care, specifically the common practice of attending serial screenings rather than seeking definitive continuity of care. One theme that appeared consistently was a recognition of patients' financial constraints, which may prevent patients from using their medications or even presenting at hospitals after attending the outreach screenings. '*You know when you tell them that when you're coming even with your referral letter you have to pay for a card, you have to be registered to be seen by the consultant and it will cost you money, some people will say haaaahaaa (exclamation)..., I don't have money... you understand, that is the major reason, why they are not coming'* (Mrs C,

Table 2: Factors that predict awareness of glaucoma

Variables	Awareness of glaucoma		UOR (95% CI)	AOR (95% CI)	AOR, P-value
	Yes (%)	No (%)			
Age					
<60	26 (52.0)	24 (48.0)	1.000	1.000	
≥60	30 (42.9)	40 (57.1)	0.69 (0.33–1.44)	0.47 (0.16–1.37)	0.167
Gender					
Male	43 (63.2)	25 (36.8)	0.19 (0.09–0.43)	0.29 (0.11–0.77)	0.013
Female	13 (25.0)	39 (75.0)	1.000	1.000	
Educational status					
None/primary	16 (25.0)	48 (75.0)	1.000	1.000	
Secondary and more	40 (72.7)	15 (27.3)	8.00 (3.52–18.16)	8.76 (3.18–24.13)	<0.001
Occupation status					
Unemployed	20 (45.4)	24 (54.6)	1.000	—	—
Employed	36 (47.4)	40 (52.6)	1.08 (0.51–2.27)	—	—
Family history of glaucoma					
Yes	9 (90.0)	1 (10.0)	12.06 (1.48–98.54)	4.87 (0.31–77.33)	0.262
No/don't know	47 (42.7)	63 (57.3)	1.000	1.000	
Ever had an eye check					
Yes	42 (60.9)	27 (39.1)	4.11 (1.88–8.99)	5.87 (1.92–17.92)	0.002
No	14 (27.4)	37 (72.6)	1.000	1.000	
Family history of blindness					
Yes	17 (65.4)	9 (34.6)	2.66 (1.08–6.59)	1.03 (0.26–4.00)	0.968
No	39 (41.5)	55 (58.5)	1.000	1.000	
Ever attended an eye screening before					
Yes	35 (52.2)	32 (47.8)	1.67 (0.80–3.46)	—	—
No	21 (39.6)	32 (60.4)	1.000	—	—
Presenting visual acuity (worse eye)					
Blind (≥3/60)	28 (42.4)	38 (57.6)	1.000	—	—
Not blind (<3/60)	28 (51.9)	26 (48.1)	0.68 (0.63–1.84)	—	—

Table 3: Patients' knowledge about glaucoma

Questions	Knowledgeable, N=120 (%)
Glaucoma causes blindness	36 (30.0)
Glaucoma progresses gradually	9 (7.5)
One may have glaucoma and not know	5 (4.2)
Glaucoma can be inherited	12 (10.0)
Glaucoma blindness is irreversible	2 (1.7)
Nerve of vision (optic nerve) is damaged in glaucoma	9 (7.5)
Glaucoma is more common in Africans	10 (8.3)
Glaucoma prevalence increases with age	4 (3.3)
Number who answered any of the above questions correctly	39 (32.5)

46 years, female, 10-year experience). Another theme was poor knowledge and awareness among the patients. One of the nurses said: 'Then ignorance at times, because some of them still believe they can still go to a traditionalist and they can still treat their ailments locally' (Mrs C).

The nurses felt that phobia of large institutions like a tertiary hospital was a major barrier to glaucoma patient care, as the patients preferred to be managed at smaller healthcare facilities closer home. They also expressed belief that patients were more likely to seek proper hospital care after being referred if they possessed a good knowledge of glaucoma and were

financially able to pay for care. 'Patients who come to hospital are financially ready, and all the taboo has been dispelled and they know that they will receive adequate treatment when they get to the tertiary hospital, because it is filled with specialists' (J.O.).

Discussion

This study assessed the knowledge, awareness, and eye care practices of patients with suspected glaucoma identified at the CEO screenings in South West Nigeria. The results of this study suggest that knowledge, awareness, and eye care practices are suboptimal among glaucoma patients identified at the community outreach screenings, with many patients opting to attend serial screenings rather than seek definitive continuity of care.

Eye outreach screening services ideally should provide improved access and an efficient care supported by guidelines.^[22,23] It should also provide education, counselling, preventive, and basic curative services. This study assessed the CEO screening as a vital aspect of the glaucoma care pathway in an underserved population. From this study, poor knowledge and awareness of glaucoma, and the inability to afford the cost of services, might have resulted in poor access.

Access is related to the timely use of services according to need.^[24] An important dimension of access is financial accessibility. This examines the relationship between the cost of healthcare services

and the ability and willingness of users to pay for such services.^[25] More than a third of the patients in this study were completely dependent on children or relatives for their daily living. This may have contributed to their inability to seek or sustain glaucoma care in the hospital. Poverty is not just about deprivation of income and material assets, but it is also a situation in which individuals lack freedom to make a choice and lead a life they have reason to value.^[25] Dependence on others for daily living can also be seen as a form of poverty, as it leads to the inability to make choices about their health. The main themes from the health workers in the outreach screenings also reiterated the role of poverty in seeking health care. According to the healthcare workers, financial constraint was an important problem that prevented patients from seeking care in the hospitals. When the patients were asked for the reason for not presenting at the main hospital where they had been referred, some mentioned that they were waiting for the next free outreach screening. Availability and acceptability are also important domains in considering access to healthcare services.^[26]

Another dimension of access is geographic accessibility, which examines the physical distance or travel time from service delivery point to the user. The CEO screening in part solves this problem of access. These services are often close to the patients and are free. However, they have not been designed to manage certain diseases such as glaucoma in Nigeria. These services may be adapted to permanent vision centres, where stable glaucoma can be conservatively managed with medications and laser for the underserved population. Other plausible explanations for patients 'hopping' from one outreach to the other may be related to their hope of receiving a different message of cure rather than management of their disease. Kyari *et al.*^[27] also described a process of glaucoma patients hopping from place to place hoping to get a different message, which was described as 'hopping and hoping'.

Despite more than half of the patients having attended more than one outreach screening, they still had a poor knowledge about glaucoma. Fewer than half of the patients (46.7%) were aware of their disease, and they had a very poor knowledge of the disease process. Awareness of glaucoma and knowledge of disease have been shown to improve health literacy, health outcomes, the use of health services, and improved involvement in self-care and disease management.^[28] Appropriate knowledge of glaucoma influences patients' utilization of eye care services. Some studies conducted in urban settings in Nigeria have reported that many glaucoma patients are aware of the disease, but they lack knowledge about the disease process.^[17,19,29,30] Our findings were similar. The majority of the patients only had primary education or no education at all. In a study by Mbadugha and Onakoya,^[19] it was reported that educated patients were more likely to be aware of the disease. A similar trend was also reported in Ghana,^[31] where higher educational status was reported to be related to the knowledge of glaucoma. This trend has also been reported in other studies.^[17,32]

In this study, patients who had an eye check-up in the past were more likely to be aware of glaucoma. In contrast, attending an

outreach in the past was not associated with awareness of the disease. The patients who had undergone an eye check-up in the past may be more likely to have had an individualized interaction with care givers, who may have taken more time to explain the disease to them. Although family history was significantly associated with awareness in the bivariate analysis, there was no association between the two variables in the multivariate analysis. The small number of patients who were aware of a family member with glaucoma may account for this finding.

The community outreach screening centres can be an avenue for the early diagnosis of glaucoma. They can be adapted as permanent vision care centres, which can provide primary eye care services, where stable glaucoma patients can have intraocular pressure monitoring after diagnosis has been established in the hospital. The patients can then visit hospitals once or twice a year to ascertain stability and/or progression of disease. This may be a more appropriate model in underserved communities. It is important to provide adequate and appropriate knowledge about glaucoma at these outreach screenings. It is also important that healthcare providers have a standard written knowledge guideline that is adapted to the local context. This will ensure consistency in the minimum standard of knowledge provided to all patients at the outreach screenings.

This study shows that knowledge, awareness of glaucoma, and eye care practices among glaucoma patients identified at the CEO are suboptimal. On the basis of our findings which reinforce prior knowledge, we recommend that adequate eye health education programs should be provided at eye outreach screenings. We also recommend that CEO screenings should be integrated into the primary healthcare system. This will reduce the distance to main hospitals and bring glaucoma services closer and more accessible to the community. In addition, this study further provides evidence for the strengthening of the health insurance scheme, as limited financial resources are an oft-cited barrier to seeking definitive health care. The findings of this study provide important evidence and recommendations for glaucoma diagnosis and management in underserved communities.

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Conflicts of interest

There are no conflicts of interest.

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