

# Presentation of Primary Open Angle Glaucoma (POAG) at Lions Sight First Eye Hospital in Blantyre, Malawi

PC Kayange<sup>1,2</sup>, HB Nkume<sup>1,2</sup>, A Feyi-Waboso<sup>3</sup>, K Kalua<sup>1,2</sup>, G Msukwa<sup>2</sup>, M Schwering Schulze<sup>1,2,4</sup>

1. Ophthalmology Unit, Department of Surgery, College of Medicine, University of Malawi, Blantyre, Malawi

2. Lions Sight First Eye Hospital, Blantyre, Malawi

3. Royal Gwent Hospital, Newport, Wales

4. Tübingen University Eye Hospital, Tübingen, Germany

\* Corresponding Author & Address: Dr. Petros Kayange. Email address: petroskayange@yahoo.com

## Abstract

### Objective

Primary open angle glaucoma (POAG) is the most common type of glaucoma in Africa. We carried out a study to determine the clinical presentation pattern of patients with primary open angle glaucoma (POAG) at a tertiary hospital in Malawi.

### Design

A cross-sectional study

### Setting

Lions Sight First Eye Hospital—a major referral and teaching state eye hospital in Blantyre, Malawi

### Subjects

Study participants were newly diagnosed POAG patients at specialist eye clinic during study period.

### Results

A total of 60 POAG patients were recruited into the study. The mean age was 58.7 years (SD= 16.6, range 18 - 86). There were more male (44, 73.3%) than female (16, 27.7%) patients. The majority of patients (73%) presented one year after onset of visual symptoms. Twenty-six patients (43%) had unilateral blindness (visual acuity < 3/60; WHO classification), while nine patients (15%) presented with bilateral blindness. A vertical cup-to-disc ratio (CDR) of 0.8 or worse was seen in 92 eyes (79%). The mean intraocular pressure (IOP) reading was 35.5 mmHg (SD 13.30). Of the thirty-three eyes that successfully underwent visual field analysis, very advanced defects were recorded in 12 eyes (36%).

### Conclusion

This study demonstrates delayed presentation and male predominance among POAG patients at a tertiary eye hospital in Malawi. Glaucoma intervention programmes should aim at identifying patients with treatable glaucoma with particular attention to women.

## Introduction

Glaucoma is the second most frequent cause of blindness in Malawi after cataract. A recent rapid assessment of avoidable blindness (RAAB) survey in the Southern Region of Malawi showed that glaucoma accounts for 15.8% of the blindness there<sup>1</sup>. Glaucoma constitutes a greater public health challenge in Africa than cataract as it is more difficult to diagnose and is associated with worse treatment outcomes.<sup>2</sup>

Primary open-angle glaucoma (POAG) is more common in Blacks than other races,<sup>3</sup> and it is the most common type of glaucoma in Africa<sup>4,5</sup>. POAG is more aggressive, carries a worse prognosis and occurs at a younger age in people of African descent<sup>6</sup>. Although aggregate statistics for Africans are commonly cited, the clinical picture of POAG is not uniform among different African populations<sup>7</sup>. The reasons for the variation in clinical picture have not been established but may be a result of diverse ethnic variations among African people<sup>8,9</sup>.

This study was carried out as a hospital-based cross-sectional study at Lions Sight First Eye Hospital (LSFEH) in Blantyre, Malawi, to investigate the pattern of clinical presentation of

patients with POAG. Lions Sight First Eye Hospital, which is under the jurisdiction—and within the premises—of Queen Elizabeth Central Hospital (QECH), is the largest eye hospital in Malawi and serves as the main teaching eye hospital for the College of Medicine (COM), a constituent college of the University of Malawi.

## Methodology

This hospital-based cross-sectional study was carried out over a six-month period (January to June, 2010) among patients attending a specialist eye clinic at LSFEH. All newly diagnosed glaucoma patients and suspects during the study period were invited to participate in the study. The patients were first seen at a general outpatient clinic by ophthalmic clinical officers (OCO) before being referred to the specialist eye clinic. Ophthalmic clinical officers are mid-level ophthalmic non-physician clinicians who undergo three years of formal training in eye health care. They are trained to manage relatively simple eye diseases and refer difficult eye conditions to specialists. Patients with the following conditions were excluded from the study: opaque optical media, secondary glaucoma, angle closure glaucoma, and co-existing ocular diseases such as diabetic retinopathy or uveitis.

All the study patients were interviewed and examined by the principal investigator (PK), who used data collection forms. Information on demographics, duration of visual symptoms and pre-referral treatments was collected from study patients. Each study patient subsequently underwent a comprehensive eye examination in order to gather information on best corrected visual acuity (BCVA), pupillary light reflexes, intraocular pressure (IOP), optic disc, visual field and gonioscopy.

BCVA was assessed using an E visual chart. Static visual field assessment (30°) was done using a Dicon Autoperimeter 2000. Pupillary light reflexes were assessed with a pen torch. Slit lamp biomicroscopy, which also included funduscopy with a 90-dioptre Volk hand-held lens, was done after pupillary dilatation with tropicamide eye drops. IOP measurements were done with a Goldmann applanation tonometer (GAT) and this was followed by gonioscopic assessment of the anterior chamber angle by a Goldmann three-mirror contact lens. IOPs of all the patients were measured using the same Goldmann tonometer. The tonometer was calibrated (at 0 mmHg, 20 mmHg and 60 mmHg by weight and rod) at the beginning of the study and four months later during the study.

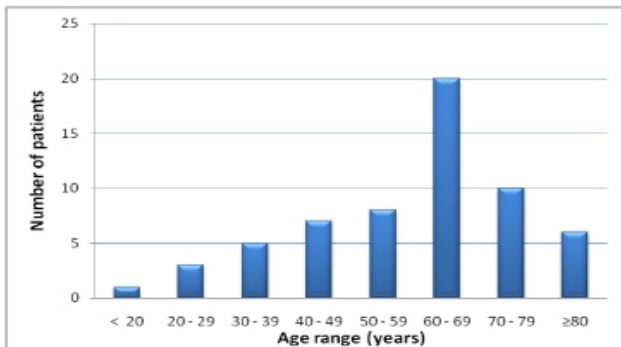
Data was stored in a Microsoft Excel spreadsheet and exported to SPSS version 16.0 for analysis. Ethical approval for the study was granted by the College of Medicine Research and Ethical Committee (COMREC). The study participants were recruited into the study after informed written consent.

## Results

Seventy-three patients were invited to participate in the study: 60 were recruited into the study and 13 were ineligible to participate according to our inclusion and exclusion criteria, described above. Almost three quarters of study patients were male (44, 73.3%), representing a male-to-female ratio

of 2.75:1. The age distribution of study patients is shown in Figure 1. The patients ranged from 18 to 86 years of age and the mean age was 58.7 years (SD= 16.6). Many patients (73%) presented to the eye hospital more than a year after onset of their visual symptoms, and 15 patients (25%) acknowledged use of traditional medicine before presenting to the eye hospital.

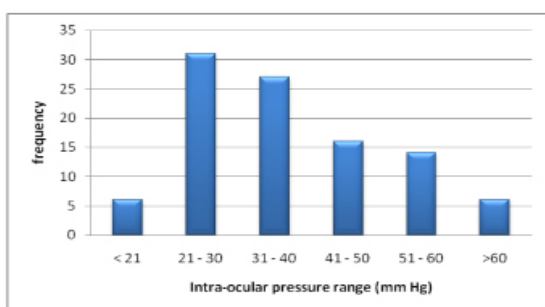
**Figure 1: Age distribution of 60 POAG study patients**



All the patients presented with POAG in both eyes and had eyes with open anterior chamber angles. BCVA was recorded in all 120 eyes of the 60 patients. Nine patients (15%) presented with bilateral blindness (visual acuity < 3/60; WHO classification) and 26 patients (43%) had unilateral blindness.

Ten patients were already on ocular hypotensive medications before presenting at the eye clinic and for the purpose of this study, their IOP readings (mean 25.8mm Hg, range 16 – 58 mm Hg) were excluded from the analysis. The results of IOP measurements in the 100 eyes of the remaining 50 patients are shown in Figure 2. The mean IOP was 35.50 mm Hg (SD = 13.30). The cup-to-disc ratio (CDR) results for 118 eyes of 59 patients are shown in Table 1. One patient’s result was missing at the time of analysis. The majority of patients presented with severely cupped optic discs. The results of the Dicon Autoperimeter 2000 visual field tests, which were successfully performed on 33 eyes of 21 patients, are shown in table 2.

**Figure 2: Intra-ocular pressure (IOP) readings in 100 eyes of 50 patients**



**Table 1: Cup to disc ratios (CDR) in 118 eyes of 59 patients**

| CDR       | No of eyes (%) |
|-----------|----------------|
| 1.0       | 23 (20%)       |
| 0.8 – 0.9 | 69 (58%)       |
| 0.6 – 0.7 | 22 (19%)       |
| <0.6      | 4 (3%)         |
| Total     | 118 (100%)     |

**Table 2: Visual field defects in 33 eyes of 21 patients**

| Type of Visual field defects          | No of eyes |
|---------------------------------------|------------|
| Paracentral scotoma                   | 5          |
| Inferior arcuate scotoma              | 1          |
| Superior arcuate scotoma              | 4          |
| Superior and inferior arcuate scotoma | 11         |
| *Very advanced changes                | 12         |
| TOTAL                                 | 33         |

\*Very advanced changes includes fields with ring scotoma or those with only a very small residual central island of vision

## Discussion

Our study reports the pattern of clinical presentation of patients with POAG at a tertiary eye hospital in Malawi. Many studies in Africa have shown that men are more likely than women to present at eye hospitals for POAG treatment. For example, men consisted of 74%, 65% and 72% of POAG patients presenting at eye hospitals in Nigerian, Ghanaian and Tanzanian studies respectively<sup>10,11,12</sup>. Our study demonstrated a similar trend (73.3% male preponderance). Owing to a number of socioeconomic and cultural reasons, women in developing countries are less likely to access eye health services than men<sup>13</sup>. Particular attention on women is therefore needed in glaucoma intervention programmes.

POAG is a chronic disease that eventually leads to irreversible blindness if left untreated. Timely intervention has to be done in order to prevent blindness. Our study demonstrates delayed hospital presentation among patients with POAG. Previous studies in other parts of Africa have found similar results. For example, a hospital-based study in Tanzania showed that the mean duration of disease before eye hospital presentation among POAG patients was 4.3 years<sup>12</sup>. We did not establish reasons for the late presentation. Long duration of symptoms before eye hospital presentation has been shown to be associated with poor visual acuities<sup>12</sup>. Our study patients sought medical treatment after experiencing sight changes. To our knowledge, there are no screening programmes in Malawi to actively detect and refer glaucoma cases to eye hospitals. There is a need to improve case detection of glaucoma cases in low-resource countries like Malawi. Some authorities suggest training of primary and secondary health care workers in Africa to diagnose and refer suspected glaucoma patients to eye hospitals<sup>14</sup>.

Highly cupped optic discs were observed in most of our study patients. While this is a sign of advanced glaucoma, this could also be an interesting finding, at least, in active glaucoma case identification at the primary and secondary levels. Due to high numbers of undiagnosed—and therefore untreated—POAG patients in Africa, the feasible option in glaucoma blindness prevention programmes is targeting persons with moderate POAG. This leaves out those with early glaucoma and targets persons with moderate glaucoma who are in immediate need of surgical treatment<sup>14</sup>. It is generally difficult for health care workers at the secondary level to make a diagnosis of glaucoma. Most of our patients presented with highly cupped optic discs—even those with mild visual impairment. Patients with more extensive disc cupping are easier to diagnose than those

relatively with more subtle cupping. This could possibly be advantageous to secondary-level health care workers in glaucoma case detection if they are adequately trained on optic disc assessment. A population-based study in Tanzania demonstrated satisfactorily correct glaucoma case detection by nurses after one week of intensive training on optic disc examination<sup>15</sup>.

Primary open angle glaucoma is predominantly a bilateral and asymmetrical disease<sup>16</sup>. These descriptors generally rang true for our study patients. Many of our patients presented with severely visually disabling disease in one eye and at least functional vision in the other eye. The asymmetrical presentation implies that patients may likely benefit from hospital intervention in at least one eye. We recorded lower presenting intraocular pressure readings than those reported in similar West African studies<sup>10,11</sup>. The IOP findings in our study are however similar to a study conducted in Tanzania<sup>12</sup>. Very advanced visual field defects were commonly seen in our study patients. However, our results could probably be biased as many elderly patients could not understand perimetry test instructions and therefore did not undergo visual field testing.

Traditional healers play a role in the health care of patients with eye problems. Previous data from Chikwawa in southern Malawi showed that the majority of traditional healers were treating at least one of six common eye conditions, and that they had more interactions with the rural populations than primary eye health care workers<sup>17</sup>. The present study shows that 25% of the patients acknowledged use of traditional medicine before coming to the eye hospital. This was based on reports from the patients and, as such, could probably be an underestimate as some patients are likely to deny use of traditional medicine. Collaboration with traditional healers could improve case detection and promote earlier treatment.

At a tertiary eye hospital, the best approach to detect cases of POAG is to offer a comprehensive eye examination routinely to every patient<sup>18</sup>. Our study patients were recruited from a specialist clinic at our eye hospital and not directly from a frontline general clinic run by ophthalmic clinical officers. The frontline team of clinical officers treats simple cases such as conjunctivitis and refers difficult cases (for example, glaucoma suspects; diabetic retinopathy) to the specialist clinic. The clinical officers are well trained but do not routinely conduct comprehensive eye examinations. This set up is one of our study limitations, as any glaucoma patient missed by the triage team would likely be missed in this study. For example, it is likely that some patients with early glaucoma, which is characteristically asymptomatic, were not captured by our study.

In conclusion, our study demonstrates delayed presentation and male predominance among POAG patients at a tertiary eye hospital in Malawi. Glaucoma intervention programmes should aim at identifying patients with treatable glaucoma with particular attention to women.

## References

1. Kalua K, Lindfield R, Mtupanyama M, Mtumodzi D, Msiska V. Findings from a Rapid Assessment of Avoidable Blindness (RAAB) in Southern Malawi. PLoS ONE. 2011;6(4).
2. Bowman RJC, Kirupananthan S. How to manage a patient with glaucoma in Africa, Community Eye Health J. 2006;19(59):38-39.

3. Buhrmann RR, Quigley HA, Barron Y, West SK, Oliva MS, Mmbaga BBO. Prevalence of Glaucoma in a rural east African population. Invest. Ophthalmol. Vis. Sci. 2000; 41(1):40-48.
4. Ntim-Amponsah CT, Amoaku WMK, Ofosu-Amaah S, et al. Prevalence of Glaucoma in African population. Eye. 2004; 18: 491-497
5. Tielsch JM, Sommer A, Katz J, Royall RM, Quigley HA, Javitt J. Racial variations in the prevalence of primary open-angle glaucoma. JAMA. 1991;266:369-374.
6. Murdoch I. Glaucoma in the developing world. Trop Doct. 2002;32:65
7. Cook C. Glaucoma in Africa: size of the problem and possible solutions. J Glaucoma. 2009;18(2):124-128.
8. Wilson MR, Martone JF. Epidemiology of chronic simple glaucoma. In: Ritch R, Shields MB, Krupin T, editors. The Glaucomas. 2nd ed. St Louis: Mosby, 1996; p. 753 -768.
9. Stringer CB. The emergence of modern humans. Scientific American. 1990;12: 68-74.
10. Lawan A .Pattern of presentation and outcome of surgical management of primary open angle glaucoma in Kano, Nigeria. Ann Afr Med. 2007;6(4):180-185.
11. Gyasi M, Amoako W, Adjuik M. Presentation patterns of primary open angle glaucomas in North eastern Ghana. Ghana Med J. 2010;44(1): 25-30.
12. Mafwiri M, Bowman RJ, Wood M, Karibu J. Primary open-angle glaucoma presentation at a tertiary unit in Africa: intraocular pressure levels and visual status. Ophthalmic Epidemiol. 2005;12(5):299-302.
13. Lewallen S, Courtright P. Recognizing and Reducing Barriers to Cataract surgery. Community Eye Health J. 2000;13 (34):20-21
14. Cook C. Chronic glaucoma case finding and treatment in rural Africa: Some questions and answers. Community Eye health J. 2001;14(39):43-44.
15. Buhrmann RR, Quigley HA, Barron Y, West SK, Oliya MS, Mmbaga BBO. Prevalence of glaucoma in a rural east African population. Invest. Ophthalmol. Vis. Sci. 2000;41(1)40-48.
16. Kanski JJ. Clinical Ophthalmology. 6th ed. Edinburgh: Butterworth Heinemann, 2003; p. 382-390
17. Courtright P, Lewallen S, Kanjaloti S, Divala DJ. Traditional eye medicine use among patients with corneal disease in rural Malawi. Br J Ophthalmol. 1994;78:810-812.
18. Thomas R. Glaucoma in developing countries. Indian J Ophthalmol. 2012;60(5):446-450