

Prevalence of glaucoma among patients attending Buluk Eye Centre, Juba, South Sudan: a one-year study

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ABSTRACT

Introduction: Glaucoma remains the second leading cause of blindness worldwide. Early detection and treatment play a key role in glaucoma management. The aim of this study was to determine the prevalence of glaucoma among patients attending the eye clinic at Buluk Eye Centre from 1st January to 31st December 2017.

Method: This study was a cross-sectional retrospective study using data extracted from the registration cards of patients at Buluk Eye Centre from 1st of January 2017 to 31st of December 2017. A datasheet was used to collect the relevant variables including demographic variables. Data were entered, organized and analysed using SPSS version 21 [IBM SPSS Statistics] and $p < 0.05$ was considered statistically significant.

Results: The studied population was 16,727 patients (33,454 eyes) seen, age range from 7 months to 90 years, (mean 56.7, SD 14.7). There were 63% females and 37% males, ratio of 1.7:1 ($p < 0.05$). Glaucoma accounted for 2.3% of diseases seen with $p < 0.05$. Females (58%) were more affected than males (42%), with age group 46-60 years being the most affected (36.9% $p < 0.05$). Most of the patients (71.9%) had visual acuity of less than 3/60 in both eyes ($p < 0.05$). The highest proportion of glaucoma cases (29.4%) presented in July to September, with the least (21.2%) from January to March. Most of the glaucoma cases (39%) originated from Central Equatoria and the least (1%) from Abyei.

Conclusion: Glaucoma remains a significant cause of severe sight loss in South Sudan, particularly affecting females and those aged 45-60 years.

Key words: Glaucoma, Buluk Eye Centre, Optic nerve cupping, South Sudan.

INTRODUCTION

Globally glaucoma is the second leading cause of blindness. It accounts for 8% (3.1 million) of the total blindness (39 million) worldwide.^[1] Within Africa 15% of blindness is caused by glaucoma.^[2] It has been estimated that bilateral blindness due to glaucoma will increase from 8.4 million to 11.1 million between 2010 and 2020.^[3]

Blindness due to glaucoma is influenced by many factors including: the time of onset, natural history, access to eye health services, quality of care provided by health institutions, and compliance with treatment and follow up.^[2] Furthermore in Africa there is poor or no awareness of the condition and limited access to care. The availability of diagnostic equipment and medical and surgical management is frequently less than ideal.^[2] Insecurity, corruption and poor leadership in Africa have worsened the situation.

Glaucoma prevention and treatment has gained international recognition. This is seen in the World Health Organization VISION 2020 campaign. Africa hosted its first World Glaucoma Summit in Accra, Ghana in August 2010 to commit African countries to strengthening and incorporating glaucoma management, training and education in their existing national programmes.^[4] Likewise, a meeting in Kampala, Uganda in April 2012 made a resolution in which glaucoma managers issued a call “to highlight the importance of controlling vision loss from glaucoma as an integral part of eye healthcare and in health and safety policies.”^[5]

METHOD

Study site, type of study and population

This study was conducted at Buluk Eye Centre (BEC), Juba, from the 1st January to 31st December 2017. It was a cross-sectional retrospective study which involved analysis of all records of patients attending eye clinic during that period. Patients attending eye care services at BEC undergo the following tests/examinations: visual acuity, intraocular pressure (IOP) using iCare automated tonometer, anterior segment examination using slit lamp (binocular microscope), posterior segment examination using direct or ophthalmoscope or 90D lens after full dilation with 5% tropicamide eye drop and refraction. Diagnosis of glaucoma is mainly based on the funduscopy examination of the optic nerve head. Any cup to disc ratio

>0.6 is considered as glaucoma suspect. IOP helps in the diagnosis of different types of glaucoma. Normal IOP ranges from 10-21 mmHg.

Data were collected using a structured form that included: date, name, age, sex, visual acuity and diagnosis. All patients who attended BEC from 1st January to 31st December 2017 were included.

The collected variables were entered into Excel and then transferred to SPSS version 22. Mean, mode and median were calculated with their standard deviations. Chi-squared tests were used to compare variables and p-value of less than 0.05 were considered statistically significant. Data are displayed in pie charts, bar charts and tables as appropriate.

Ethical Clearance

Ethical approval for the study was obtained from the ethical committee of the College of Medicine and the national Ministry of Health.

RESULTS

The studied population was 16,727 patients (33,454 eyes) seen at BEC in 2017. The age ranged from 7 months to 90 years with a mean of 56.7 (SD 14.7). There were 63% (10538) females and 37% (6189) males in the ratio of 1.7:1. Glaucoma accounted for 2.3% (377) of eye diseases (Table 1). Most glaucoma cases, 39% (145) originated from central Equatoria and the least, 1% (4) from Abyei (Figure 1).

The highest proportion of glaucoma cases, 29.4% (111) presented from July to September with the lowest 21.2% (80) from January to March as shown in Figure 2.

More females 58% (220) were affected with glaucoma

Table 1. Distribution of common five eye diseases and glaucoma at Buluk Eye Centre, 2017

Disease	n (%)
Allergy conjunctivitis	2588 (15.5)
Bacterial conjunctivitis	831 (5.0)
Dry eye syndrome	789 (4.7)
Cataract	601 (3.6)
Glaucoma	377 (2.3)
Other eye iseases*	11,541 (69.0)
TOTAL	16,727 (100)

*Other eye diseases: blepharitis, trichiasis, corneal foreign body, corneal scar, optic atrophy, stye, scleritis, bacterial keratitis, uveitis, onchocirciasis volvos, xerophthalmia, staphyloma, refractive error, chalazae, allergic conjunctivitis, pterygia, pseudophakia, retinoblastoma, corneal dystrophy, fungal keratitis, ocular injury, ophthalmia neonatrum, age related macular degeneration, phthisis bulbi, facial nerve palsy, episcleritis, endophthalmitis, aphakia, dendritic ulcer, retinal degeneration, maculopathy, amblyopia, cortical blindness, and retinal detachment.

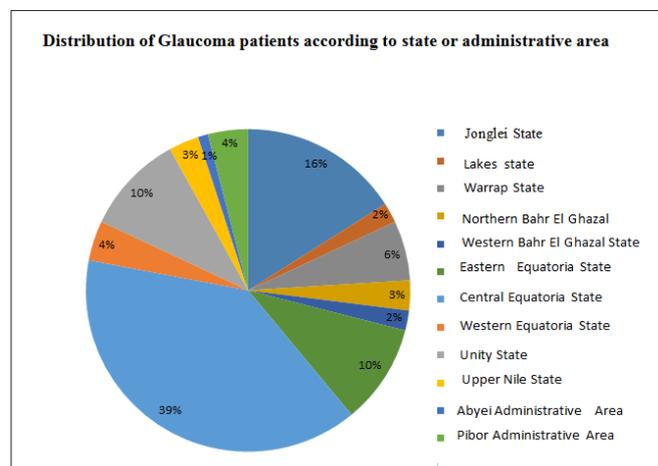
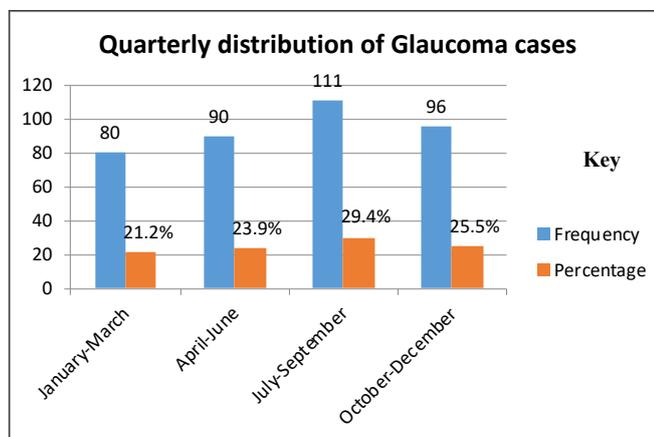


Figure 1. Distribution of Glaucoma according to patients’ residential eye care services at Buluk Eye Centre, 2017.

Table 2. Distribution of age, sex, affected eye and visual acuity among glaucoma patients attending eye care services at Buluk Eye Centre, 2017

Age group (years)	Male n (%)	Female n (%)	Total n (%)	p-value
<15	9 (64.3)	5 (35.7)	14 (3.7)	
15-30	11 (42.3)	15 (57.7)	26 (6.9)	
31-45	51 (68)	24 (32)	75 (19.8)	
46-60	70 (50.2)	69 (49.6)	139 (36.9)	
61-75	71 (64)	40 (36)	111 (29.4)	
>75	8 (66.7)	4 (33.3)	12 (3.2)	
Total	220 (58)	157 (42)	377 (100)	0.020
Visual Acuity	Right eye n (%)	Left eye n (%)	Both eyes	
≥6/18	51 (49.5)	52 (50.5)	103 (13.7)	
<6/18-6/60	33 (60)	23 (40)	56 (7.4)	
<6/60-3/60	32 (50)	32 (50)	64 (8.5)	
<3/60-PL	267 (50.3)	264 (47.7)	531 (70.4)	
Total	383 (50.8)	371 (49.2)	754 (100)	0.001

**Figure 2. Quarterly distribution of glaucoma cases attending eye care services at Buluk Eye Centre, 2017.**

than males 42% (157) with age group 46-60 years being the most affected 36.9% (139). Those older than 75 years were the least affected 3.2% (12) with p-value 0.020 (Table 2).

The majority of glaucoma patients 70.4% (531) had visual acuity of less than 3/60 in both eyes. While the minority of glaucoma patients 13.7% (103) had visual acuity of 6/6 to 6/18 in one or both eyes with p-value 0.000 (Table 2).

DISCUSSION

Glaucoma is considered as the leading cause of irreversible blindness^[6] in the world and second leading cause of blindness after cataract.^[7]

In this study female attendance was higher than male. Females may be more aware of their eye diseases than males and consequently oriented to identify eye care service delivery centres like BEC. Moreover, they were more affected with glaucoma than males. The sex distribution of glaucoma is uncertain with a review^[8] showing that females are more affected than males while others have contradicting findings [add references]. Glaucoma in this study could not be classified due to lack of equipment.

Studies of worldwide primary open angle glaucoma prevalence among people aged 40 years and above ^[2] have showed estimates of 2.31% in Asia, 3.65% in Latin America and the Caribbean, and 4.20% in Africa. Glaucoma prevalence was 2.3% in this study. This is less than the global prevalence of glaucoma of 3.54%,^[8] Tanzania 4.5%,^[3] and South Africa 5.3%.^[3] In Uganda, the all-cause incidence of blindness was 9.9/1000 persons per year with glaucoma accounting for 3.6% of incident cases (i.e., 0.36/100 per year).^[9] In the Barbados eye studies open angle glaucoma was the second leading cause of incident blindness, accounting for 14.3% of the 9-year incidence (190) i.e., 0.14% over 9 years.^[10]

These differences may be due to the fact that these studies were population based in comparison to our study. Some studies done in Nigeria showed prevalences of 0.55%, 1.02% and 2.1%.^[2] Even though one study is similar to ours, the methodology is different. Most of these studies used different variables to define and diagnose glaucoma: IOP measurements, cup-disc ratio using optical coherence tomography and visual field test. In this study direct ophthalmoscopy was used to estimate the cupping of the optic nerve head. This is a subjective technique, so the results are not reproducible. Most of the patients, 71.9%, had visual acuity of less than 3/60 in both eyes.

The World Health Organization classifies vision into four categories namely:

1. Normal vision or no visual impairment: 6/6-6/18.
2. Visual impairment : <6/18-6/60.
3. Severe visual impairment : <6/60-3/60
4. Blindness: <3/60 to no light perception.

In our study, a very high proportion of patients, 71.9%, were blind in both eyes. Sube et al^[11] have shown only 16.7% blind due to glaucoma in a rural outreach programme. Moreover, studies done in Ghana showed 34% of glaucoma patients blind in both eyes.^[12] Buluk Eye Centre is now the only specialized facility in the whole South Sudan. Accessibility to it is very expensive especially to patients coming from outside to the capital city. Hence patients present late to the centre.

Most of the patients presented to the centre in the 3rd quarter of the year. This is because during the beginning of the year most of the patients are financially insecure, but this tends to improve by the 3rd quarter.

Buluk Eye Center is located in the capital city Juba, which is within the Central Equatoria state, in the south of South Sudan. This makes it easily accessible to people from Central Equatoria. As a result of this, 39% of glaucoma patients were from this state. Abyei is the least accessible from Juba and had the lowest attendance accordingly.

CONCLUSION

This study has highlighted that glaucoma is still the leading cause of irreversible blindness among patients attending eye care services at Buluk Eye Centre. Females were more affected than males.

RECOMMENDATIONS

The followings are the recommendations from the study:

1. Provision of diagnostic tools for glaucoma diagnosis like autotonometry, visual field test, ocular coherence tomography, gonioscopes, etc.

for BEC and the eye department at Juba Teaching Hospital by the Ministry of Health.

2. Conduct population-based study for glaucoma in the country.
3. Expansion of eye care services outside the capital for better eye care by integrating them into the health care system by the Ministry of Health.
4. Development of health education tools for glaucoma by the national Ministry of Health.
5. Promotion of health education on glaucoma via different types of media outlets present in the country by the national and state Ministries of Health.
6. Involvement of interested partners in eye care services by the Ministry of Health to scale up glaucoma preventive programmes nationally as well as at the state levels.
7. Scaling up training of more ophthalmic cadres by the Ministry of Health by funding the existing Institute of Ophthalmology in order to increase the workforce.
8. Scaling up of outreach programmes by securing additional funding, in order to reduce the burden of blindness in the country.
9. Implementing a 5-year study at BEC for glaucoma.

Competing interests

The authors declare that they have no competing interests, except Joseph Monday who works as medical director of BEC.

Authors' contributions

SJL, KAS, MTA, CVO, HIA, NJM, and PMM designed proposal, data collection and manuscript writing. JBT and JDL proof-read the manuscript. AC, JML and KLS supervised the activities. KLL prepared the final manuscript and submitted it for publication.

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