

# GLAUCOMA SERVICES IN THE GAMBIA

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## SUMMARY

### Objectives:

- To determine the existing glaucoma services at the three levels of eye care in The Gambia
- To highlight the problems with these services

**Methodology:** Through observation, oral interviews examination of The Gambia's documented eye care plan, data on personnel and their role, diagnostic equipment, treatment and follow-up at the three levels of eye care were critically analysed.

**Results:** Gonioscopy, perimetry and the surgical treatment of glaucoma are only performed at the tertiary centre where the ophthalmologists are based. The problems with the existing glaucoma services in The Gambia ranged from lack of a structured programme to lack of regular ophthalmologists with an interest in glaucoma, as well as a limited supply and variety of antiglaucoma therapy.

**Conclusion:** Preventive measures to reduce blindness from glaucoma in The Gambia are not part of the public health programme at present.

**Key words:** Glaucoma, The Gambia

## INTRODUCTION

Glaucoma remains the leading cause of irreversible blindness in the world. According to WHO estimates, over 100 million people are glaucoma suspects,<sup>1</sup> 73 million suffer from glaucoma,<sup>2</sup> and 7 million are bilaterally blind as a result of glaucoma.<sup>1</sup> Approximately, 70% of glaucoma sufferers in the world are found in the developing countries.<sup>1</sup>

In parts of West Africa, chronic glaucoma is responsible for over 20% of blindness (binocular visual acuity less than 3/60).<sup>3</sup> However, not much is known about the prevalence and types of glaucoma encountered

in Africa. Blindness surveys that exist only provide crude estimates of the prevalence of blindness from glaucoma.

Reports from all population-based studies among people of African extraction living in USA, UK and the Caribbean, however, indicate that they are 5-10 times more likely to develop glaucoma and glaucomatous blindness from primary open angle glaucoma (POAG) than Caucasian populations.<sup>4-6</sup>

The national blindness survey conducted in The Gambia in 1996<sup>7</sup> reported that glaucoma accounted for 9% of and was the third leading cause of blindness in the country. Among those aged 30 years and above the prevalence of glaucoma was found to be 0.12%.

In spite of its public health significance worldwide glaucoma has not been included as one of the priority conditions for disease control in the first 5-year programme of the Vision 2020 Initiative (2000 - 2004). The reasons are that there are as yet no reliable ways of detecting the disease nor are there straightforward ways of treating them in large populations, within prevention of blindness programmes. Even in The Gambia where there is a structured and effective national eye care programme, the issue of prevention of blindness from glaucoma has not been fully addressed. While the ongoing preventive programmes for cataract- and trachoma-blindness in the country have had some positive effect, glaucoma is fast creeping up the list of causes of blindness.

With the existing structured and effective eye care programme in the country and a glaucoma clinic at the Royal Victoria Hospital, Banjul, a specific programme could be put in place using the primary health care approach to identify and treat patients with moderate and severe cases of glaucoma, who would otherwise go blind. As a first step toward achieving this, we have critically analysed the existing glaucoma services in The Gambia, and our findings are presented here.

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**BACKGROUND INFORMATION ON EYE CARE IN THE GAMBIA**

The Gambia is a small country located on the west coast of Africa. Its population is about 1.02million,<sup>8</sup> with 49% between 0-15years. The country has five administrative and six health districts: Western Division (which is further divided into Banjul City and Greater Banjul), North-Bank East Division, North Bank West Division, Lower River Division, Upper River Division and Central River Division.

The first national blindness survey was conducted in The Gambia in 1986. Its aim was to assess the magnitude, causes and distribution of eye health problems in the country. The results of the survey led to the establishment of the National Eye Care Programme, which is mainly aimed at reducing the blindness prevalence rate and improving the availability and affordability of eye care services. In 1986, glaucoma accounted for 2% of the cases of blindness in the country.

A repeat survey 10 years later showed a 40% decrease in blindness prevalence and an improvement in the accessibility and availability of eye care services across the country. For example, in 1986, eye care services were available at only the Royal Victoria Hospital, Banjul but by 1996, eye care services had cut across the whole nation; presently eye care services in the country are as follows:

*Tertiary level services:* There is only one tertiary level eye clinic in The Gambia - the Royal Victoria Hospital, Banjul. Resident ophthalmologists and doctors run the eye clinic at the Royal Victoria Hospital. The facility also provides primary and secondary services to the urban population living in Banjul, and to the rural population living in Western Division.

*Secondary level services:* The secondary eye centres are managed by Senior Ophthalmic Medical Assistants (SOMAs)<sup>1</sup> and are available at Brikama (Western Division); Farafenni (which covers 3 districts: Lower River Division, North Bank East and North Bank West Divisions); Basse (Upper River Division); and Bansang (Central River Division).

*Primary level services:* Primary eye care centres are staffed with SEN-Os (State-Enrolled Nurse-Ophthalmic) or

CHN-Os<sup>2</sup> (Community Health Nurse-Ophthalmic) and are located at various outreach points located in various rural areas of the country. At the village/community level, The Gambia is split into Primary Health Care (PHC) villages (those with a population of more than 400) and non-PHC villages (those with a population of less than 400). PHC villages are clustered into groups of 4 or 5 and a community health nurse (CHN) is located in one of these villages (called the key village). The CHNs travel around the 4 or 5 villages under their care, a circuit, providing general primary health care. The CHN-O covers a number of PHC village circuits, which together are termed the catchment area.

**METHODS**

Data on existing glaucoma services at the three levels of eye care in the country namely, primary, secondary and tertiary, was obtained between October 2000 and September 2001, through observation, an interview with the supervisor of The Gambian eye care programme (HBF) and an examination of The Gambia's documented eye care plan .

During the supervisory visits to the secondary eye care centres by the technical adviser to the National Eye Care Programme (NECP), the existing structure of glaucoma service delivery was observed and recorded. The technical adviser to the NECP is an ophthalmologist and also the head of the eye unit in Royal Victoria Hospital, Banjul.

The data was analysed for personnel, their role, diagnostic equipment and tests, treatment and follow-up for each of the levels of eye care delivery.

**RESULTS**

**Primary Level**

At the village/community level the personnel comprises of village health workers and CHN and they provide eye care services at health posts. The only diagnostic equipment they have are Snellen's E-chart and the pen-torch; they offer no specific service for glaucoma. With the instruments they have they can only measure visual acuity, referring those with visual acuity <6/18 to the next level of eye care. To treat minor ocular ailments they are provided with topical antibiotics eg, Oc. tetracycline 1%.

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<sup>2</sup> A state-enrolled nurse (SEN) is a school certificate holder who has undergone a two-year training in Bansang, while a community health nurse (CHN) with the same entry qualifications has undergone a two-year training in community health nursing. SENs are more bedside nursing-oriented, while CHNs are more community-oriented. To become CHN-Ophthalmic or SEN-Ophthalmic they now undergo an extra 9-month ophthalmic training in the training school at Royal Victoria Hospital, Banjul.

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<sup>1</sup> A SOMA is a state-registered nurse who first undergoes a one-year training in Malawi to be an ophthalmic medical assistant (OMA). To be a SOMA he/she undergoes another one-year training in cataract surgery in the same country after his/her internship. The term SOMA is an administrative one, which indicates that the OMA, after this extra training, has been promoted.

The providers of eye care at the primary level beyond the village/community level are the state-enrolled nurses (ophthalmic) and community health nurses (ophthalmic). They are based at the eye care centres, satellite clinics and outreach points located in various rural areas of the country. The services provided consist of visual acuity measurement, tests for pupillary reactions to light, funduscopy and tonometry. To enable them perform these tests they have the Snellen's E-chart, pentorch, direct ophthalmoscope and Schiottz tonometer. On suspicion of glaucoma from tonometry readings and fundoscopic findings, the patient is referred to the secondary level. No form of glaucoma treatment is given at the primary level.

### Secondary Level

There are four secondary eye centres in the country. Their role in case detection and the treatment of glaucoma consists of gonioscopy and perimetry, in addition to the functions listed for the primary level eye care provider. To perform their roles, the staff at this level are provided with the Snellen's E-chart, pentorch, slitlamp biomicroscope, direct ophthalmoscope, gonioscope, Bjerrum's screen, Goldman's applanation tonometer in addition to the Schiottz tonometer.

However, gonioscopy and perimetry are never done; tests for pupillary reactions are done occasionally and tonometry is only done in glaucoma suspects. The only drug options for medical treatment are guttae Timoptol 0.5%, which is not always available; guttae pilocarpine 4% ,which is produced locally in the eye drops unit in Royal Victoria Hospital; and Diamox tablets.

### Tertiary Level

The Eye Unit of the Royal Victoria Hospital, Banjul has a glaucoma clinic to which patients are referred from the ophthalmic outpatients' department. The role of the staff is the same as that of the secondary level staff. In addition, they perform funduscopy using +78D Volk lens, treat glaucoma cases medically and surgically and do initial follow-up of patients who have had surgery (trabeculectomy).

In addition to the instruments available at the secondary level, staff are also provided with a +78D Volk lens.

The problems at this level are as follows:

- a. *Personnel*
  - i. There is no regular ophthalmologist with an interest in glaucoma so that the glaucoma clinic is not run as a specialist clinic.
- b. *Clinical examination for glaucoma*
  - ii. There is no standard format for clerking glaucoma patients so the information obtained from patients is often insufficient.

- iii. Since the doctors are expatriates, interpreters are needed for history-taking. Consequently, the information obtained may be distorted.
- iv. Applanation tonometry is not always done on patients with glaucoma. Sometimes, indentation tonometry is done.
- v. Perimetry and follow up are not always carried out on new cases.
  - Visual field analysis is done by dispensing opticians who are not familiar with the characteristic visual field changes in glaucoma, and so do not specifically look for them.
  - The Bjerrum's screen is the only functional perimeter. It is a good perimeter but time-consuming. With it, it is difficult to hold elderly patients' attention for long, therefore results are usually not reproducible.
- vi. Gonioscopy is not routinely done in all cases mainly due to inability to interpret the findings.
- vii. Anterior chamber depth is not routinely estimated in all glaucoma cases.

Because gonioscopy and anterior chamber depth estimation are not routinely carried out for glaucoma patients, cases of angle closure glaucoma are rarely diagnosed.

### c. Medical treatment

The only drugs in use are:

- Guttae Timoptol 0.5% (not always available)
- Guttae pilocarpine 4% (locally produced)
- Diamox tablets (always available)

### d. Surgical treatment

Trabeculectomy, with or without 5-FU, is possible but since there are hardly ophthalmologists with interest in glaucoma neither is done regularly.

### e. Follow-up

A lot of patients do not return for follow-up.

## DISCUSSION

There is little doubt that the glaucomas now constitute the second greatest cause of blindness in the world after cataracts.<sup>9</sup>

In The Gambia, glaucoma is the third leading cause of blindness, accounting for 9% of the cases. It is second to cataract and corneal opacity (trachomatous and nontrachomatous). The Gambia's model eye care programme adopts the primary health care approach to eye care delivery, whereby services are offered at three levels (primary, secondary and tertiary). Its cataract surgical services have almost eliminated cataract

blindness in the country. In a few years' time it is hoped that the country will be declared both cataract and trachoma-blindness free. The assessment of the existing glaucoma services in the country has shown that though not structured, there are skeletal services at all levels.

At the *primary level*, glaucoma is detected during visual acuity tests, fundoscopy, tonometry and tests for pupillary reactions. Where fundoscopic findings and tonometry readings suggest glaucoma, the patients are referred to the next level.

The number of tests run at the primary level are more than those recommended by Cook.<sup>10</sup> He recommended visual acuity testing and examination of the colour of the pupil for all people aged 40 years and above seen for whatever reason (a target population) at the primary level. Though this is a good recommendation it can only be used as a guideline in The Gambia as some services are already in place. Cook also suggests that every case of reduced visual acuity (<6/18) and 'black' pupil should be referred to the secondary level. Although there is no target population in The Gambia, tonometry and fundoscopy are done at the primary level with no diagnostic cut-off levels. However, there is no provision for examination of the colour of the pupil.

Visual acuity measurement of glaucoma will only pick up advanced cases of glaucoma. By the time glaucoma comes to be recognized on the basis of reduced central visual acuity, it is usually too late to save residual vision in the symptomatic eye. However, the process may be delayed in the second eye.

There are many causes of reduced visual acuity plus black pupil, one of these includes refractive errors which are very common. The additional test of pupillary reactions to light for relative afferent pupillary defect (RAPD) undertaken at the primary level in The Gambia, further reduces the number of 'probable' cases referred to the secondary level.

Where tonometry and fundoscopy are also undertaken for case-finding, the sensitivity and specificity of the tests, though increased, are still not satisfactory. From the Baltimore eye survey,<sup>11</sup> (using a combination of vertical cup-disc ratio of  $\geq 0.5$  and IOP of  $>21\text{mmHg}$ ) gives only a sensitivity of 61% and a specificity of 84%.

Whereas the *secondary level* in The Gambia is equipped to undertake the following tests for glaucoma: visual acuity measurement, tonometry, fundoscopy, tests for pupillary reactions to light, perimetry, slit-lamp biomicroscopy and gonioscopy. Cook<sup>10</sup> recommends only tonometry and discography (equivalent to fundoscopy) at this level for the same target population (40 year-olds and above) who are seen for whatever reason. Using cut-off levels of  $< 28\text{mmHg}$  or  $\geq 28\text{mmHg}$  for IOP and a cup-disc ratio of  $< 0.6$  or  $\geq 0.6$ , cases should be categorized as 'normal', 'suspect case' or 'diagnosed case'. Suspect and diagnosed cases should be referred to the tertiary level. This combination of tests will be able to pick up patients

with moderate and severe cases of glaucoma, who would lose their vision, if there is no urgent intervention. Testing for pupillary reactions to light to detect RAPD may further increase the sensitivity of the tests. Gonioscopy and slit-lamp biomicroscopy, which is meant to classify glaucoma, should be done at the tertiary level by the ophthalmologist after confirmation of diagnosis. Because perimetry for case-finding in glaucoma requires skills and accurate interpretation it should also be reserved for the tertiary level.

Medical treatment is offered at this level for the obvious cases and those being followed up after initial treatment, at the tertiary level. Cook,<sup>10</sup> however, recommends that treatment at this level should be for only the follow-up cases.

At the *tertiary level* Cook recommends that confirmation of diagnosis of glaucoma should be made. With applanation tonometry, fundoscopy using the +78D Volk lens and perimetry this can be achieved. To further classify the glaucoma, gonioscopy and slit-lamp biomicroscopy are provided at this level. Cook did not make recommendations for the classification of glaucomas. This is important as chronic glaucomas include the chronic angle closure type which can only be diagnosed using gonioscopy. The treatment, however, is essentially the same for all the chronic glaucomas.

If the problems - ranging from lack of appropriate personnel, non-availability of a wide range of topical anti-glaucoma medications to loss of patients to follow-up - are overcome, the existing services at tertiary level in The Gambia will be close to those recommended by Cook.<sup>10</sup>

Primary trabeculectomy with adjunct if indicated, is recommended for the treatment of glaucoma in rural Africa.<sup>10</sup> For a reduction in IOP to levels low enough to halt further loss in vision, trabeculectomy is the ideal treatment in Africa. Furthermore, due to the non-availability of drugs; the possibility of purchasing fake drugs; the cost of drugs and poor compliance, primary trabeculectomy is the most practical treatment for glaucoma in the developing world. However, due to the lack of a regular ophthalmologist with an interest in glaucoma in The Gambian eye care programme, this is not practicable at the moment.

Where the use of medications is the treatment of choice for a patient, only guttae Timoptol 0.5%; guttae pilocarpine 4% and Diamox tablets are available. Apart from their well-documented systemic complications these do not satisfactorily lower the IOP.

Cook<sup>10</sup> recommended a follow-up interval of 6 months for secondary level patients whose intraocular pressures have been adequately controlled following trabeculectomy at the tertiary centre. To avoid loss of patients to follow-up, a glaucoma register should be kept. Presently, in The Gambia, the follow-up of glaucoma patients who have had surgery, as well as

patients to follow-up, a glaucoma register should be kept. Presently, in The Gambia, the follow-up of glaucoma patients who have had surgery, as well as those on medical treatment, is done at all levels, but not in a structured way.

### CONCLUSIONS

Glaucoma services are available in the eye care programme of The Gambia. These services, however, are not systematic or structured.

### RECOMMENDATIONS

A crucial step in planning for a blindness prevention programme for glaucoma is to improve basic eye care services at every level. The following recommendations are made:

- i. A regular ophthalmologist with an interest in glaucoma should be recruited into the programme.
- ii. A target population should be selected, eg, patients aged 40 years and above.
- iii. Clear and concise case definitions must be made, eg, who is a glaucoma case? Who is a glaucoma suspect?
- iv. The role of the staff in glaucoma case-finding at each level must be clearly defined.
- v. Which patient and when to refer should be clearly stated.
- vi. The glaucoma clinic at the tertiary level should be adequately equipped so that it can function as a specialist clinic.
- vii. A standard format for recording information on all glaucoma patients should be developed.
- viii. Gonioscopy should be done and interpreted only at the tertiary level by the ophthalmologist alone.
- ix. All new cases of glaucoma should be seen at the tertiary level for diagnosis confirmation and decision on treatment.
- x. Personnel should be adequately trained to perform visual field analysis for glaucoma.
- xi. Staff at secondary and tertiary levels should be trained to carry out anterior chamber depth estimations.

- xii. More sensitive perimeters eg, Humphrey's visual field analyzer should be provided at the tertiary level.
- xiii. Primary trabeculectomy should be carried out on new cases of glaucoma only when surgery cannot be done.
- xiv. A regular supply of affordable anti-glaucoma medications should be ensured at the secondary and tertiary levels.
- xv. Follow-up of patients will be seen at the secondary level at regular intervals. A glaucoma register should be kept at this level to ensure that patients are not lost to follow-up.

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