

# IMPACT OF IMPROVED EYE CARE SERVICES ON TIME OF DIAGNOSIS OF PRIMARY OPEN ANGLE GLAUCOMA

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## SUMMARY

The case notes of new glaucoma patients seen at the Eye Unit of Korle-Bu Teaching Hospital, Accra, Ghana between the period of January, 1996 and April 1998 were reviewed. The results were compared with a study done by Hagan et al.

A total of two hundred and twenty eight case notes were reviewed. Only 20.2% were found to be blind in both eyes when first seen and 50.4% had useful vision in both eyes. This shows a great change as compared to the situation in 1986-1990 when 63.3% were blind in both eyes and only 20.1% had good vision in both eyes.

About 25% of patients seen at the clinic were referred from outreach services run by ophthalmic nurses. 58% reported directly with blurred vision in one or both eyes; 15.4% reported with other complaints and only 13.3% were picked up from family screening during the period under review.

**Keywords:** Primary open angle glaucoma, intra-ocular pressure, glaucoma screening, cup to disc ratio, visual fields.

## INTRODUCTION

Primary Open Glaucoma is a disease without symptoms in its early stages. The mainstay of prevention of blindness from glaucoma is early diagnosis of the disease. Hagan and colleagues showed that about 63.5% of 159 new cases reporting to Korle-Bu Teaching Hospital, Accra, from January 1986 to 1990 were blind in both eyes when first seen. (Blindness defined as central visual field of less than 10 degrees)<sup>1</sup>. All the 159 patients had vertical cup to disc ratios of more than 0.7. Since 1986 a Five Year Action Plan for Eye Care in the country has been drawn up and implemented. Before this period only 3 of the ten regions in the country had ophthalmologists and there was one ophthalmologist to 1,000,000 population. There were only 12 ophthalmic nurses. The Eye Clinic at Korle-Bu

Teaching Hospital had only three ophthalmologists and four ophthalmic nurses.

The excessive work load did not allow for outreach work and active and deliberate screening for glaucoma. Since the implementation of the first 5 year Eye Care Programme, all the ten regions now have at least one ophthalmologist: and there are 5 ophthalmologists, one resident, one medical officer, and 25 ophthalmic nurses at Korle-Bu Teaching Hospital. Ophthalmic nurses carry out outreach services at the polyclinics. They also screen at-risk groups at work places, churches etc. Also the Glaucoma Association of Ghana organizes free eye screening for glaucoma once a year. This study has been designed to determine whether with improved eye care delivery system in Ghana, glaucoma cases are now being picked up at an earlier stage.

## MATERIAL AND METHOD

The case notes of 272 new glaucoma patients seen between the period of January, 1996 and April, 1998 at the Glaucoma Clinic of the Eye Unit of the Korle-Bu Teaching Hospital in Accra were reviewed. Patients with incomplete data, low tension glaucoma and ocular hypertensive were excluded in the study. A total of 228 patients qualified to be entered into the study. The age/sex distribution, vertical cup to disc ratio, reasons for presenting to the eye clinic and visual fields were analysed. Visual fields were Humphrey, Friedmans or Goldmans. The results were compared with a study done by Hagan et al<sup>1</sup> which reported on new patients seen at this clinic from 1986 to 1990. Definition of blindness was central visual field less than 10° on perimetry.

## RESULTS

Of the 228 patients who were entered into the study, there were 134 (58.8%) males and 94 (41.2%) females giving M:F ratio of 14.4:1. The age/sex distribution is shown in Table 1.

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**Table 1** Age/Sex distribution of 228 patients seen between January, 1996 and April, 1998

Age	M	F	Total	% of 228
0-9	-	-	-	-
10-19	2	5	7	3.1
20-29	14	2	16	7.0
30-39	20	6	26	11.4
40-49	20	15	35	15.4
50-59	25	24	49	21.5
60-69	33	26	59	25.9
70-79	19	10	29	12.7
80+	1	6	7	3.1
<b>Total</b>	<b>134 (58.8%)</b>	<b>94 (41.2%)</b>	<b>228</b>	<b>100</b>

M:F = 1.4:1

One hundred and seventy nine 179 (78.5%) were over 40 years of age. There were 46 (20.2%) patients not blind in both eyes; 67 (29.4%) blind in one eye and 115 (50.4%) patients not blind in either eye (Table 2).

**Table 2** Age distribution of patients (1996-1998)

Age	Total	Bilateral Blindness		Unilateral Blindness		Not Blind in Either Eye	
		No.	%	No.	%	No.	%
0-9	-	-	-	-	-	-	-
10-19	7	1	14.3	1	14.3	5	71.4
20-29	16	4	2.5	2	12.5	10	16.6
30-39	26	1	7.7	6	19.2	18	69.2
40-49	35	1	8.6	6	17.1	26	74.3
50-59	49	12	13.3	15	30.6	22	44.9
60-69	59	12	20.3	24	40.7	23	39.0
70-79	29	8	27.6	12	41.4	8	31.0
80+	7	4	57.1	1	14.3	9	28.6
<b>Total</b>	<b>228</b>	<b>46</b>	<b>20.2</b>	<b>67</b>	<b>29.4</b>	<b>115</b>	<b>50.4</b>

**Table 3** Blindness rates among patients (1986-1990 vrs. 1996-1998)

Period	Bilateral Blindness	Unilateral Blindness	Not Blind in either Eye
1986-1990	63.5%	16.1%	20.1%
1996-1998	20.2%	29.4%	50.4%

This shows a highly significant improvement over the situation in 1986-1990 ( $P < 0.006$ ) as shown in table 3.

**Table 4** Age distribution of patients blind in both Eyes

Age	1986 - 1990		1996 - 1998	
	Total	No. Blind	Total	No. Blind
0-9	3	-	-	-
10-19	4	-	7	1
20-29	15	7	16	4
30-39	12	6	26	2
40-49	31	17	35	3
50-59	35	24	49	12
60-69	32	24	59	12
70-79	18	15	29	8
80+	9	8	7	4
<b>Total</b>	<b>159</b>	<b>101</b>	<b>228</b>	<b>46</b>

Table 4 compares the age/sex distribution of bilateral blindness between the period 1986-1990 and 1996-April, 1998.

During the period 1986-1990 all eyes reporting to the glaucoma clinic included in that study had vertical cup to disc ratio greater than 0.7, compared to less than 55% of eyes between 1996-1998 (Table 5).

**Table 5** Vertical cup: disc ratio of 228 patients 1996-1998

V/cd	Right Eye		Left Eye		Total	
	No.	%	No.	%	No.	%
<0.5	44	19.3	41	18.0	85	18.6
>0.5-0.7	67	29.4	51	22.4	118	25.9
>.7-0.8	37	16.2	55	24.1	92	20.2
>0.8-1.0	80	35.1	81	35.5	161	35.3
<b>Total</b>	<b>228</b>	<b>100</b>	<b>228</b>	<b>100</b>	<b>456</b>	<b>100</b>

It is significant that the number of glaucoma patients seen during the five year period reviewed by Hagan et al (159 patients) is less than half the number of patients (228 patients) seen during the less than two and a half year period currently under review.

Table 6 shows the mode of presentation of patients to the clinic.



**Table 6** Mode of presentation to the eye clinic

Presentation	Number	%
Blurring of Vision (Unil./Bil) <sup>(1)</sup>	133	58.3
Outreach/Screening	57	25.0
Family Screening	3	13.3
Others <sup>(2)</sup>	35	15.4
<b>Total</b>	<b>228</b>	<b>100</b>

1. About 50% (61) of those presenting with blurring of vision had refractive errors.
2. Others include Pterygia, watering, irritation, conjunctivitis, sty, minor pains, retinal detachment.

## DISCUSSION

Hitchings has defined glaucoma as a name given to a group of diseases showing the common characteristic of deformation of the optic nerve head. (Glaucomatous cupping) Primary Open Angle Glaucoma (POAG) is a diagnosis of exclusion<sup>2</sup>. It is the 3<sup>rd</sup> commonest cause of global blindness<sup>3</sup>.

In Ghana it is second only to cataract, being responsible for 20% of all causes of blindness<sup>4</sup>. A detailed review of available data and disease projections in 1993 have shown that the problem of glaucoma as a major cause of global blindness is greater than previously thought<sup>5</sup>. It has been established through population based studies that 50% or more of POAG cases in any given community are not under medical care<sup>6</sup>, because they are unaware that they have the disease. The most recent estimates from the WHO suggest that over 100 million people are glaucoma suspects, over 20 million suffer from glaucoma and 5 million people are blind as a result of glaucoma. And approximately 70% of global glaucoma is found in developing countries<sup>6</sup>. POAG in black patients is more common, has an earlier onset, is more resistant to treatment, and is more aggressive at a younger age than in white patients.

It has been suggested that earlier diagnosis may prevent blindness from glaucoma. This can only be done through screening programmes or case finding, since POAG is silent until very late stages of the disease when visual deterioration is experienced. The issue of screening for glaucoma has been under considerable debate since POAG does not satisfy all the WHO guidelines for major population screening<sup>7</sup>. In developing countries, especially, there are not enough facilities and personnel to cope with the increasing workload of managing POAG patients. Primary surgery advocated for

these communities may not be feasible and the high cost of glaucoma medications lower compliance of patients. However, it has been strongly suggested that case finding among at risk group must be carried out to detect early glaucoma.

Before the development of the Five Year Action Plan for Eye Care in Ghana there were very few eye workers. Because of excessive workload, active and deliberate screening for glaucoma, even in hospital attendees, was not frequently undertaken. Most of the glaucoma patients therefore presented blind. In 1990, Hagan et al drew attention to the problem of glaucoma at the Eye Clinic at Korle-Bu by reviewing the case notes of all new glaucoma patients seen at this clinic from 1986 – 1990.

They reported a total of 159 new patients within a five year period studied, 63.5% of whom were bilaterally blind. Ten years later, we have reviewed currently, 228 (>1.4 times) cases seen over the last two and a half years (1996 – 1998). Out of this only 20.2% are blind in both eyes. This suggests that significantly more people have been diagnosed. The success has been achieved through the establishment of a local programme for manpower development. Optometrists and primary eye care workers are currently being trained locally.

Ophthalmic nurses have been well trained among other things to recognise glaucomatous cupping and to check the Intraocular Pressure (IOP) with schiotz tonometer. Any suspicious disc or an increase in IOP is referred to ophthalmologist for further evaluation.

Twenty five percent of all cases seen were referred from outreach clinics and community screening by ophthalmic nurses. With increased numbers of ophthalmologists and their better distribution in the regions, active case finding by ophthalmologist has also improved. Fifteen percent of patients reporting with conditions other than blurring of vision or glaucoma suspects were picked up by the ophthalmologists.

Significantly, referrals by optometrists have not been recorded in this series. In the United Kingdom the major source of referrals of glaucoma patients for hospital service is from the optometrist<sup>8,9</sup>. In Ghana, there are very few optometrists trained to screen for ophthalmic disease. The older generation of optometrists did not have the privilege of being trained to screen for eye disease. The locally trained optometrists have had such training.



The first crop came out in 1993; so far about 20 have been trained. Some are in private practice. Those in government practice probably are not screening for ophthalmic pathology because of excessive refraction workload and also because they assume that the ophthalmologists are taking care of that.

Another category of personnel who could be involved in case findings are General Practitioners (GP's). Two years ago the Glaucoma Association of Ghana retrained ten general practitioners in private practice in Accra, to recognise glaucomatous optic disc damage. Unfortunately the follow up for these doctors was poor. Arrangements to have them attached to the glaucoma clinic to reinforce their diagnostic skills failed due to lack of time on parts of the GP's. Referrals from GP's are therefore lacking in these series.

The most sensitive screening methods for the early detection of glaucoma<sup>10</sup>, optic disc changes are a reliable way of detecting established glaucoma<sup>11,12</sup>, although this is also known to be prone to errors<sup>13</sup>. Cup to disc ratio alone especially is not a reliable method for diagnosing glaucoma. Sommer has suggested therefore that for developing countries, techniques using newer simpler visual field techniques aimed at identifying those who have moderate to severe fields loss and not early loss must be employed<sup>14</sup>. This, he says will reduce the number of false negatives and therefore excessive load on the already scarce ophthalmic resources in these regions.

Until these newer visual field techniques become available in developing countries, optic disc characteristics indicating mild to moderate glaucomatous damage and intraocular pressure measurements remain the main screening tools in developing countries. It remains for us to determine the false negative and false positive rates using these techniques in developing countries. But it has been established that general practitioners and other eye workers can be quickly and reliably taught to evaluate the optic disc for moderate to severe glaucomatous damage<sup>15</sup>. Using this method we have seen a remarkable improvement in the stage at which POAG is diagnosed at the eye clinic, Korle-Bu Teaching Hospital, Accra. 50.4% are first seen not blind in both eyes in contrast to 20.1% between 1986 and 1990. Whilst between 1986 and 1990 all the patients seen had vertical cup to disc ratio of more than 0.7, between 1996 and April, 1998, 44.5% had vertical cup to disc ratio equal to or less than 0.7.

## CONCLUSION

This study clearly suggest that with improvement in eye care delivery services and active and deliberate screening for glaucoma the disease can be detected at an earlier stage. What is not yet known is whether this earlier detection leads to prevention of blindness form glaucoma. However early detection is an important step in the prevention of blindness from glaucoma.

We therefore recommend that for the developing world ophthalmic nurses (or ophthalmic assistants) optometrists and perhaps general practitioners should be involved in the screening for glaucoma.

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