



## To Study the Prevalence of Significant Visual Impairment and Blindness in Patients with Primary Glaucomas at the Time of Presentation

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**ABSTRACT**

**Background-** Glaucoma affects more than 67 million people worldwide. It is the leading cause of irreversible blindness worldwide and is second only to cataract as the most common cause of blindness overall but lacks its share of attention. **Objectives-** To determine the burden and prevalence of functional visual impairment and blindness in patients with Primary Glaucoma at a Tertiary Care Centre in South West Punjab. **Materials and methods-** 50 eyes of patients of primary glaucoma were included in this study. Detailed history, general physical examination and ocular examination of every patient were done. All patients also underwent indirect gonioscopy and automated perimetry. **Results-** 48% were suffering from POAG and 52% were suffering from PACG. 29.17% patients presented with good vision in primary open angle variety while 50% patients presented with good vision in primary angle closure variety. 41.67% patients in POAG variety presented with blindness as compared to only 5.38% patients in PACG ( $p < 0.03$ ). Severe visual field defects were seen to be more commonly associated with PACG (4 patients) than POAG (nil). **Conclusion-** Glaucoma is yet to be dislodged as a major cause of blindness in our country. The key to this is actually picking up glaucoma when patient has yet not suffered a significant visual loss through detailed history, thorough examination and meticulous investigations.

**KEYWORDS**

**INTRODUCTION**

The term *glaucoma* refers to a group of diseases that have in common a characteristic optic neuropathy with associated visual function loss for which elevated IOP is one of the primary risk factors, its presence or absence though does not have a role in the definition of the disease.<sup>[1],[2]</sup> Glaucoma can be classified in various ways with separate anatomic, gonioscopic, biochemical, molecular and genetic views. The most acceptable scheme of classification combines the mechanism of anterior segment changes leading to glaucoma (Developmental, open angle or angle closure) and whether this mechanism is without any apparent cause (Primary) or due to some discrete cause or pre existing ocular or systemic disease (Secondary).<sup>[3]</sup>

Glaucoma affects more than 67 million people worldwide, of whom about 10% or 6.6 million are estimated to be blind. It is the leading cause of irreversible blindness worldwide and is second only to cataract as the most common cause of blindness overall.<sup>[4],[5]</sup>

The irony of the whole situation is that this leading cause of irreversible blindness can largely be brought into control most importantly by timely diagnosis, effective treatment and constant ongoing monitoring. Glaucoma is yet to be dislodged as a major cause of blindness in any country. The key to this is actually picking up glaucoma when patient has yet not suffered a significant visual loss through detailed history, thorough examination and meticulous investigations. Patient awareness, education and compliance is also equally important.<sup>[6]</sup>

This study is a step to assess and collect the information about the current status of Primary Glaucoma and the magnitude of visual impairment and blindness due to Glaucoma at a Tertiary Care Centre in South West Punjab. This would help us to know the magnitude of visual handicap that can be avoided by early diagnosis and treatment

**MATERIALS AND METHODS**

This study was conducted on 50 eyes of patients above 40 years of age and of either sex diagnosed to be suffering

from primary glaucoma at their first presentation in OPD of Department of Ophthalmology, G.G.S.Medical College and Hospital, Faridkot (Punjab). Detailed history, general physical examination and ocular examination under diffuse torch light and Slit lamp of every patient was done to assess all inclusion and exclusion criteria. Any patient harbouring even a slightest evidence of any secondary cause of Glaucoma was excluded from the study. Patients having systemic diseases which had already adversely affected vision in that particular patient were excluded from this study

Both uncorrected visual acuity and best corrected visual acuity were documented. The World Health Organisation (WHO) definition of blindness was used. IOP was recorded with Goldmann's Applanation Tonometer and fundus examination (Figure 1 & 2) done by slit lamp biomicroscopy using Volk's 90 D lens. Indirect gonioscopy was done using Goldmann three mirror gonio-lens and grading of anterior chamber angle was done by Shaffer's grading. Automated perimetry using SITA-STANDARD 30-2 field was done for all patients with best corrected visual acuity  $\geq 6/18$ . (Figure 3)

**RESULTS**

The study included 50 eyes, out of which 24 patients had Primary Open Angle Glaucoma and 26 had Primary Angle Closure Glaucoma. (Figure 4)

The mean age of patients was found to be  $56.58 \pm 7.52$  years in POAG and  $54.42 \pm 8.85$  years in PACG. There was no significant difference between POAG and PACG. ( $p > 0.1$ ) (Figure 5)

40% of patients among total patients of primary glaucoma at their first presentation had good vision ( $\geq 6/18$ ), 52% had significant visual impairment ( $6/18 - 3/60$ ) and 8% presented with blindness ( $<3/60$ ). Individually in each variety (Table 1), 7 (29.17%) patients presented with good vision in primary open angle variety while 13 (50%) patients presented with good vision in primary angle closure variety. Good Vision ( $\geq 6/18$ ) was seen more commonly in PACG than POAG. Also 10 (41.67%) patients in POAG variety presented with blindness as compared to only 4 (15.38%) patients in PACG ( $p < 0.03$ )

4 PACG (15.3%) patients and 1 POAG (4.1%) patient presented with IOP of more than 41.5 mmHg. 6 (25%) patients presented with Normal or Low Tension Glaucoma (Figure 6). 18 (75%) POAG patients and 16 (61.5%) PACG patients presented with moderate cupping ( $p = 0.001$ ). Severe cupping was seen in 6 POAG (25%) patients and 7 (26.9%) PACG patients. (Table 2)

On Automated perimetry, mild visual field defects were seen in 7 PACG and 6 POAG patients; moderate visual field defect in 2 PACG and 1 POAG patient. Severe visual field defects were seen to be more commonly associated with PACG (4 patients) than POAG (nil). (Table 3)

On subjective refraction number of myopes is 6 (25%) in POAG category as well as in PACG (23.08%). The hypermetropes are 2 (8.2%) in POAG category as compared to 8 (30.77%) in PACG ( $p = 0.0475$ ) and also 1 patient in each category had astigmatism.

10 (41.67%) patients were found to be suffering from Diabetes in POAG as compared to 3(11.5%) in PACG and this association was found to be statistically significant ( $p = 0.03$ ). Almost equal number of patients were found to be suffering from Hypertension in both POAG – 6(25.1%) and PACG – 7(26.9%).

**DISCUSSION**

Glaucoma is the second leading cause of blindness worldwide accounting for 15% of global blindness.<sup>[7]</sup>The regional burden of blindness (RBB) is highest for India (23.5% of global blindness) with at least 5.8 million blind due to glaucoma.<sup>[8]</sup> India accounts for a minimum of 12.9% of Primary open angle

glaucoma (POAG) blindness and 12.7% of Primary angle closure glaucoma (PACG) blindness in the world. These blindness figures are expected to double by 2020 AD. However, India still lacks epidemiologically valid data on various subtypes of glaucoma.<sup>[9] ,[10]</sup>

Glaucoma has yet to be dislodged as a major cause of blindness in any country. The key to this is actually picking up glaucoma when patient has yet not suffered a significant visual loss through detailed history, thorough examination and meticulous investigations<sup>[6]</sup>

This study comprising of 50 eyes diagnosed to have Primary Glaucoma was done to find out the visual morbidity attributable to primary glaucoma in this region and also the relationship of various diagnostic modalities and their place and significance in diagnosis of primary glaucoma. Out of 50 eyes, 24(48%) were suffering from POAG and 26(52%) were suffering from PACG and the involvement in Primary Glaucoma was typically bilateral though asymmetric POAG was significantly more than PACG in above 60 years old age group. In this study no significant gender predilection was seen. In our study, good Vision ( $\geq 6/18$ ) was seen more commonly in PACG than POAG. POAG is more commonly associated with blindness ( $<3/60$ ) at presentation than PACG and this difference was statistically significant( $p < 0.03$ ). (25%) patients presented with Normal or Low Tension Glaucoma.

The correlation between elevated IOP at presentation and severity of visual status deterioration was stronger and statistically significant in PACG than POAG. Severe visual field defects were seen to be more commonly associated with PACG than POAG but this is not statistically significant.

This study inferred no significant relationship between C:D ratio and presenting best corrected visual acuity . Around 5 (10%) cases with moderate cupping presented with blindness while 2 (4%) patients with severe cupping also presented with good vision. So it was seen that patients with moderate and severe cupping could also have preserved good vision.

When the IOP readings of different patients were compared with their C:D ratio in fundus it was seen that most patients, 34 (68%) out of 50,presented with moderate cupping in all ranges of IOP. Very high and statistically significant association was seen in high ranges of IOP with severe cupping. 5 patients had IOP  $> 40$ mm Hg and all 5 of them had severe cupping more than 0.8:1. No significant association was seen between POAG and myopia. In this study an association between Hypermetropia and PACG was definitely seen ( $p = 0.0475$ ). POAG was shown to have weak association with diabetes among systemic diseases ( $p = 0.03$ ).

**CONCLUSION**

All the diagnostic tools and modalities – IOP, Fundus examination, Visual field charting have a complex interplay and relationship in pathophysiology and progression of disease and are important variables affecting the presenting visual status and acuity of the patient.

The high proportion of blindness due to advanced disease at presentation was disturbing and indicates an urgent need for early detection and treatment through national programs. The national policies which seem to be exclusively battling cataract blindness at the moment need urgent reorientation due to the enormity and irreversibility of the problem of glaucoma blindness.

**Table 1 Distribution of patients according to BCVA**

BCVA	POAG (n = 24)	PACG (n = 26)	P value
$\geq 6/18$	7 (29.1%)	13 (50%)	$>0.1$
6/18 - 6/60	4 (16.6%)	7 (26.9%)	$<0.01$
6/60 - 3/60	3 (12.5%)	2 (7.6%)	$>0.5$
$<3/60$	10 (41.6%)	4 (15%)	$<0.03$

**Table 2 Distribution of patient according to C : D Ratio**

	POAG (n = 24)	PACG (n = 26)	Total
<0.6	-	3 (11.5%)	3 (6%)
0.6 - 0.8	18 (75%)	16 (61.5%)	34 (68%)
>0.8	6 (25%)	7 (26.9%)	13 (26%)

**Table 3 Distribution of patient according to Automated Perimetry changes**

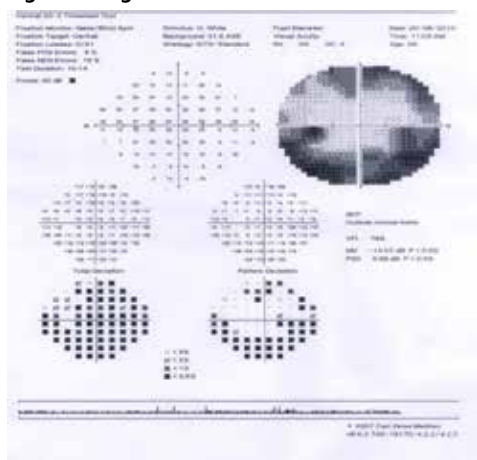
	PACG	POAG
MILD	7 (26.8%)	6 (25%)
MODERATE	2 (7.0%)	1 (4.1%)
SEVERE	4 (15.4%)	-



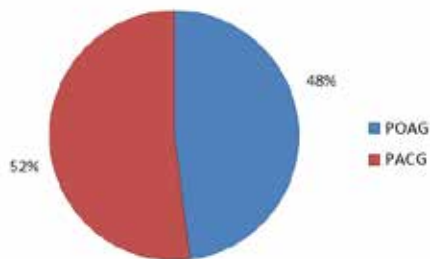
**Fig 1- Severe cupping C:D ratio**



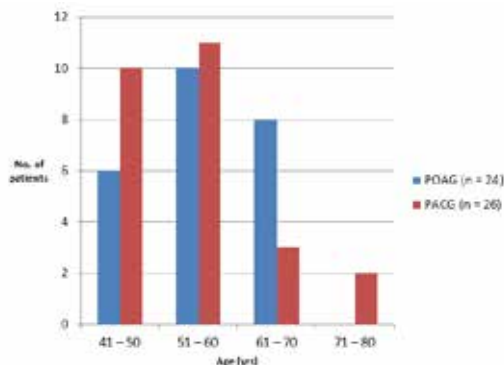
**Fig 2- Baring of circumlinear 0.9:1 vessel inferiorly**



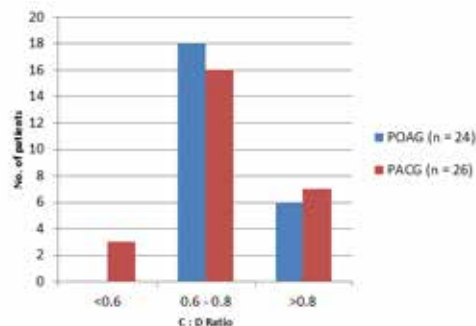
**Figure – 3 Visual field charting of a POAG patient**



**Figure 4 – Percentage Distribution of patients between Primary open angle and Primary angle closure glaucoma**



**Figure 5 – Age wise distribution of patients**



**Figure 6 – Distribution of patients according to IOP**

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