

## Original Research Article

# A hospital based study of scenerio of glaucoma patients in upper Assam, India

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### ABSTRACT

**Background:** Glaucoma can be defined as a chronic multifactorial optic neuropathy with a characteristic accelerated degeneration of retinal ganglion cells presenting as classical optic nerve head features and correlating visual field changes, which may or may not be associated with angle abnormality in the presence or absence of any cause for the disease.

**Methods:** This was a prospective hospital based study of patients >40years with a suspicion of glaucoma attending the Outpatient Department of Ophthalmology, Assam Medical College, Dibrugarh, Assam, india. Patients were subjected to a comprehensive eye examination to diagnose and classify glaucoma.

**Results:** In this study out of 1000 patients, 22 were diagnosed to have glaucoma (2.2%), most common age group >61years (50%), male patients were 73%, PACG accounted for 11 patients (50%). POAG in 7 cases (32%), LIG in 14%, Neovascular in 1 cases (5%).

**Conclusions:** Glaucoma prevalence, age and sex distribution was found to be similar to studies conducted in other parts of India. Most common type of glaucoma was PACG followed by POAG.

**Keywords:** Demography, Glaucoma, PACG, POAG

### INTRODUCTION

Glaucoma can be defined as a chronic multifactorial optic neuropathy with a characteristic accelerated degeneration of retinal ganglion cells presenting as classical optic nerve head features and correlating visual field changes, which may or may not be associated with angle abnormality in the presence or absence of any cause for the disease.<sup>1-3</sup> Glaucoma is the second leading cause of blindness worldwide, with preponderance in females, Blacks and Asians.<sup>4-7</sup>

Glaucoma afflicts almost 67 million people worldwide of which 10% or 6.6 million are blind. Glaucoma remains the leading cause of irreversible blindness worldwide responsible for 14 % of blindness after Cataract and Trachoma.<sup>8</sup> Closed angle glaucoma accounts for lesser

than 10% of glaucoma cases in the United States and Europe, but as much as half of glaucoma cases in other nations (particularly Asian countries).<sup>9</sup>

The regional burden of blindness (RBB) is the highest for India (23.5% of global blindness), with at least 5.8 million blind due to glaucoma. India accounts for a minimum of 12.9% of primary open angle glaucoma blindness and 12.7% of primary angle closure glaucoma blindness in world.<sup>10,11</sup> An estimated 8million Indians have glaucoma with a 1:1 ratio of primary open angle glaucoma (POAG) to primary angle closure glaucoma (PACG).<sup>4</sup> There have been five population based studies, three from the state of Tamil Nadu, one from Andhra Pradesh and one from Bengal.<sup>12-16</sup> Data from North Eastern India is currently lacking. The World Health Organization (WHO) recommended its member countries

to combat the public health problem of glaucoma through a program approach. To plan the strategies, it is of utmost significance that the prevalence, distribution, the various subtypes in a region and risk factors of glaucoma are identified. Such a study has been a challenge so far due to variation in the definitions and diagnostic criteria for glaucoma.<sup>17</sup>

The aim of the current study is to determine and investigate the clinical profile and subtypes of glaucoma in Upper Assam in a prospective hospital based study. The study of clinical profile and subtypes of the various glaucomas in >40 years. Age group also aims to help in the screening and early detection of the disease. Another motive behind this study is to find out the demographic distribution of the glaucomas. The study aims to make observations that reflect the pattern of glaucoma in Upper Assam, and provide useful background information and knowhow to plan epidemiological surveys on glaucoma.

## METHODS

The study was conducted in the Glaucoma Clinic of the Post Graduate Department of Ophthalmology, Assam Medical College, Dibrugarh, Assam, India The study was a Prospective and hospital based one in which 1000 patients of >40years of age was studied. The patients were diagnosed having glaucoma on basis of:

- Detailed History in regard to chief complaints, any history of pain, redness, watering, decrease in vision, frequent change of glasses, colored haloes, photophobia, any history of previous eye surgery, trauma, any laser treatment of the eye, use of topical steroids, any family history of glaucoma, any history of systemic disease like diabetes mellitus, hypertension, asthma etc.
- Comprehensive and exhaustive Ocular Examination includes visual acuity and the best corrected visual acuity. Refraction was done where it is indicated. Examination of the eye in diffuse light for any gross abnormality of the anterior segment was done. IOP of the patient was measured with the help of NCT first and then those patients with IOP >21 mmHg was referred to the Glaucoma clinic where IOP was rechecked with Goldman applanation tonometer. Detailed ocular examination for glaucoma was done with a slit Lamp. Fundus examination was done by slit lamp biomicroscopy using a plus 90 D lens. The Optic disc was examined in minute details in regard to its size, cup disc ratio, state of the neuroretinal rim, any hemorrhage on the disc, blood vessels, any peripapillary atrophy etc. The posterior pole was examined with red free light to note early changes of retinal nerve fibre layer in the arcade. Gonioscopy was done by Goldmanns two mirrorgonioscope in all the cases. This helped in classifying the Glaucoma into the various subtypes and to record changes like peripheral anterior synechia, pigmentation of

trabeculum strampollis line, angle configuration, any neovascularization, PXE material, angle recession etc. Field examination was performed by Humphrey's automated field analyser using the SITA programme in selected patients who had good vision and were cooperative and analyses of data was performed. P value of <0.05 was considered significant. Optical Coherence Tomography was also performed in some suspect patients with normal appearing discs and normal-appearing retinal nerve fibre layers (on slit-lamp biomicroscopy) as a new modality for corroborating the retinal nerve fibre thickness.

- Related investigations to substantiate the Diagnosis of Glaucoma and to monitor its progress as well as response to treatment.

## RESULTS

The findings are summarized in the Tables 1-9. In this study out of 1000 patients, 22 were diagnosed to have glaucoma (2.2%). Majority of the patients in this study group belonged to the age group of >61years (50%) (Table 1) and majority of patients were male (73%) (Table 2).

**Table 1: Distribution of patients according to age.**

Age in years	No : of cases	Percentage
40 - 50	4	18%
51- 60	7	32%
>61	11	50%

**Table 2: Distribution of patients according to sex.**

Sex	No : of cases	Percentage
Male	16	73%
Female	6	27%

**Table 3: Distribution of patients according to type of glaucoma.**

Type of Glaucoma	No: of cases	Percentage
PACG	11	1.1%
POAG	7	0.7%
LIG	3	0.3%
Neovascular	1	0.1%

**Table 4: Distribution of patients according to socioeconomic class.**

Sex	No : of cases	Percentage
Upper middle	16	73%
Lower middle	6	27%

Out of 1000 patients PACG accounted for 11 patients i.e. 1.1%, (50% of all Glaucoma cases). POAG in 7cases i.e. 0.7% (32% of all Glaucoma cases), LIG in 3 cases i.e.

0.3% (14% of all Glaucoma cases), Neovascular in 1 cases i.e. 0.1% (5% of all Glaucoma cases). The PACG: POAG ratio is 11:7 (Table 3), of the patients were from upper middle class (Table 4). Majority of PACG patients were male (63.64%) (Table 5).

**Table 5: Distribution of PACG patients according to sex.**

Sex	No : of cases	Percentage
Male	7	63.64%
Female	4	36.36%

**Table 6: Distribution of PACG patients according to age.**

Age in years	No : of cases	Percentage
40 - 50	2	18.2%
51- 60	3	27.3%
>61	6	54.5%

**Table 7: Distribution of PAOG patients according to sex.**

Sex	No : of cases	Percentage
Male	5	71.4%
Female	2	28.6%

Majority of the PACG patients in this study group belonged to the age group of >61 years (54.5%) (Table 6). Majority of PAOG patients were male (71.4%) (Table 7). Majority of the PAOG patients in this study group belonged to the age group of >61 years (43%) (Table 8). And risk factors associated history in patients (Table 9).

**Table 8: Distribution of PAOG patients according to age.**

Age in years	No : of cases	Percentage
40 - 50	2	28.5%
51- 60	2	28.5%
>61	3	43%

**Table 9: Risk factors associated history in patients.**

Relevant factors in patients	Primary angle closure glaucoma	Primary open angle glaucoma
Family history	1 (9.09%)	2 (28.5%)
Hypertension	2 (18.18%)	3 (42.87%)
Diabetes mellitus	2 (18.18%)	1 (14.28%)
Smoking	6 (54.54%)	4 (57.14%)

## DISCUSSION

Glaucoma is a major public health problem in the world causing immense damage in terms of economic terms and irreversible blindness if left undiagnosed and untreated.

That glaucoma is not a single disease entity of raised I.O.P only but a complex disorder is well known. Glaucoma is characterized by widely diverse clinical and histopathological manifestations, leading to gradual visual loss in a majority of cases which unfortunately is irreversible and permanent. Despite its myriad of presentations glaucoma is still diagnosed by a thorough clinical examination, raised I.O.P, disc Changes, field changes, loss of retinal nerve fibre layer, being the mainstay of the diagnosis. As raised intraocular pressure is the only treatable factor in glaucoma known to us at present it can be lowered by medical means, laser treatment or surgery.

In this hospital based study, the overall prevalence of glaucoma was 2.2%. In Glaucoma Study in a rural population in southern India, the Aravind comprehensive eye survey, the prevalence of glaucoma was 2.6%, Porwal et al reported a prevalence of 4%.<sup>16,18</sup> In present study out of 1000 patients PACG accounted for 11 patients i.e. 1.1%, (50% of all Glaucoma cases). POAG in 7 cases i.e. 0.7% (32% of all Glaucoma cases), LIG in 3 cases i.e. 0.3% (14% of all Glaucoma cases), Neovascular in 1 cases i.e. 0.1% (5% of all Glaucoma cases). The PACG: POAG ratio is 11:7. Sihota reported that angle closure glaucoma constituted 45.9% of all primary adult glaucomas in a study.<sup>20</sup> Sharma et al reported primary angle closure glaucoma (34.8%) was the most predominant glaucoma subtype and Primary open angle glaucoma was 22%, POAG to PACG ratio was 39:61.<sup>21</sup>

**Table 10: Comparison of different studies.**

Name of study	Age range	Prevalence of POAG	Prevalence of ACG
Chennai glaucoma study <sup>14</sup>	40+	1.62%	1.58%
Andhra Pradesh eye disease study <sup>19</sup>	All ages	2.56%	1.26%
Aravind comprehensive eye survey <sup>16</sup>	40+	1.7%	0.5%
West Bengal glaucoma study <sup>15</sup>	50+	2.99%	0.29%
Vellore eye study <sup>23</sup>	30+	0.41%	4.32%
Present study	40+	0.7%	1.1%

A study conducted in North India by Das et al showed the Primary Angle Closure Glaucoma (PACG) sub-group to be the most common glaucoma subtype (36.62%). The Primary Open Angle Glaucoma (POAG) to PACG ratio was 37:63.<sup>23</sup> Rashid W et al reported 29% had POAG; 7.25% had angle closure glaucoma.<sup>22</sup> The Aravind comprehensive eye survey, the prevalence of POAG 1.7% and PACG 0.5%.<sup>16</sup> The Chennai Glaucoma study, which is a large population based study from southern India, gives a prevalence of POAG as 1.62% and ACG as

1.58%.<sup>14</sup> Andhra Pradesh eye disease study gives a prevalence of POAG as 2.56% and ACG as 1.26%.<sup>19</sup> West Bengal Glaucoma Study gives a prevalence of POAG as 2.99% and ACG as 0.29%.<sup>15</sup> The prevalence of PACG was 4.32% and POAG was 0.41% in Vellore Eye Study (VES).<sup>23</sup> In fact, most studies done in India depict the PACG group to constitute the largest subtype. These results therefore seem to match with present study (Table 10).

Majority of the PACG and POAG patients in this study group belonged to the age group of >61 years (54.5%, 43% respectively). Sharma et al reported most common age group >60 years.<sup>21</sup> Sihota et al reported that angle closure glaucoma occurred maximally in the sixth decade (50-59 age groups).<sup>20</sup> In all the prevalence studies from South India and West Bengal, namely the Andhra Pradesh eye diseases study (APEDS), the Aravind comprehensive eye survey (ACES), the Chennai glaucoma study (CGS), the vellore eye study (VES) and the West Bengal glaucoma study (WBGs), reported a similar age distribution.<sup>14-19</sup>

**Table 11: Comparison of risk factors associated history in PACG patients.**

Relevant factors in patients	Present study	Sharma et al <sup>21</sup>
Family history	9.09%	11.49%
Hypertension	18.18%	9.19%
Diabetes mellitus	18.18%	8.04%

In present study majority of PACG patients were male (63.64%). Sharma et al, Das et al reported a male preponderance.<sup>21,22</sup> Sihota et al reported females constituted the majority.<sup>20</sup> In present study majority of POAG patients were male (71.4%). Sharma et al, Das et al reported a male preponderance.<sup>21,23</sup> ACES noted an increased association with male gender, no association to gender were noted in both CGS and APEDS.<sup>14,16,19</sup>

**Table 12: Comparison of risk factors associated history in PAOG patients.**

Relevant factors in patients	Present study	Sharma et al <sup>21</sup>
Family history	28.5%	25.45%
Hypertension	42.87%	27.27%
Diabetes mellitus	14.28%	18.18%

The population-based Aravind comprehensive eye survey from south India reported a 0.3% prevalence of secondary glaucomas.<sup>16</sup> In present study prevalence of secondary glaucoma is 0.4%, most common is LIG (0.3%). A family history of glaucoma in the first degree relatives was seen in 28.5% cases of primary open angle glaucoma, 9.09% cases of primary angle closure glaucoma, Sharma et al reported family history of glaucoma in the first degree relatives in 25.45% of

primary open angle glaucoma, 11.49% of primary angle closure glaucoma (Table 11, 12).<sup>21</sup>

## CONCLUSION

Glaucoma prevalence, age and sex distribution was found to be similar to studies conducted in other parts of India. Most common type of glaucoma was PACG followed by POAG.

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