Original article:

Study of clinical profile of glaucoma at tertiary health care hospital

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Abstract:

Objective: To investigate the epidemiology and clinical profile of glaucoma patients in a population-based sample.

Methods: This cross-sectional study recruited 111 participants from a population-based sample. Demographic data, chief complaints, comorbidities, refractive errors, and intraocular pressure were recorded. Types of glaucoma were classified as primary or secondary and open angle or angle closure.

Results: The mean age of participants was 59.6 years (SD 10.7), with the majority belonging to the 55-64 years age group (40.5%). Diminished vision was the most common chief complaint (91.8%), with myopia being the most common refractive error (39.6%). Hypertension (41.4%) was the most prevalent comorbidity, and primary open-angle glaucoma (63.1%) was the most common type of glaucoma. Myopia was significantly more prevalent in patients with primary open-angle glaucoma than in those with primary angle closure glaucoma (p<0.05).

Conclusion: Glaucoma patients in the study population were predominantly middle-aged with diminished vision as the most common complaint. Hypertension was the most prevalent comorbidity, and primary open-angle glaucoma was the most common type of glaucoma. Myopia was significantly associated with primary open-angle glaucoma.

Keywords: glaucoma, epidemiology, clinical profile, comorbidity, refractive errors, intraocular pressure, primary open-angle glaucoma, primary angle closure glaucoma.

Introduction:

Glaucoma is the second leading cause of world blindness after cataract. Worldwide, the prevalence of glaucoma is increasing and is expected to affect 111.8 million people by 2040. The prevalence of open-angle glaucoma is reported to be highest in Africa and that of narrow-angle in Asia.[1] In a systematic meta-analysis, the global prevalence of glaucoma was found to be 3.54%.[2] Asians represent 47% of those with glaucoma and 87% of

those with angle closure glaucoma (ACG). Risk factors for glaucoma were studied in various studies .It was concluded that, high intraocular pressure, low blood pressure, low ocular perfusion pressure, narrow anterior chamber angles, thin corneas, pseudoexfoliation, a low body mass index, and myopia were some of the factors associated with glaucoma.[3-5]

Examining and monitoring the optic nerve head and the RNFL,structurally and functionally, is important for diagnosis and treatment.Functional loss recorded with automated static threshold perimetry isboth sensitive and specific to early loss and provides quantitative datafor the monitoring of change[6]

Clinically, visual field loss often correlates with nerve fiber layer loss and optic nerve damage. The natural evolution of primary open- angle glaucoma implies the loss of ganglion cells and their axons in the retina. It is well established that significant amount of ganglion cell death (25 to 30%) occurs before any visual field defect is produced, thus giving rise to the concept of pre- perimetric glaucoma [7-8]

Material and methods:

This study was a prospective interventional study conducted at the ophthalmology department of a tertiary care hospital from January 2021 to December 2022, with the aim of assessing the effect of management on glaucoma in patients attending the OPD. The study population included all patients with glaucoma who visited the OPD during the study period and satisfied the inclusion criteria.

Ethical clearance was obtained from the institutional ethics committee before the start of the study. Informed written consent was obtained from all participants before enrollment in the study. A predesigned and pretested case record form was used as a tool for data collection.

To be included in the study, patients had to be diagnosed with glaucoma or have new-onset primary or secondary glaucoma, be above 30 years of age, and willing to participate in the study and provide informed consent. Patients with diminution of vision with a known cause other than glaucoma, those requiring surgical intervention as definitive management (e.g., lens-induced glaucoma), those with anterior segment pathology precluding the visualization of the angle (e.g., corneal opacity, iridocyclitis), those with patient preference, pregnant and lactating mothers, and those with intolerance to medications including allergy were excluded from the study.

During the study period, all patients visiting the ophthalmology OPD were examined and a detailed history of patients with symptoms and signs suggestive of glaucoma was taken. The effect of management on glaucoma was assessed using various interventions such as medical treatment, laser treatment, and surgical treatment, and the outcomes were measured and recorded in the case record form.

Results:

We recruited a total number of 111 participants in the study. The mean age of the participants was 59.6 years (SD- 10.7 years). Majority of the participants belonged to 55-64 years' age group (n=45, 40.5%)

Majority of the participants were housewife (43.2%). (Table 2, Figure 3) Other participants were in private jobs (23.4%), farmers (5.4%), business (0.9%), and laborer (0.9%). However, 29 participants did not have a job.

57 (51.4%) of the participants had at least one comorbidities. Out of the comorbidities, hypertension (41.4%) was the commonest, followed by diabetes. The prevalence of hypertension was significantly high compared to the other conditions (p<0.05) (Table 3, figure 4)

Table 1: Distribution of comorbidities

Comorbidity	Frequency (%)	p-value
Diabetes	20 (18.0)	
Hypertension	46 (41.4)	
Thyroid	1 (0.9)	
HIV	1 (0.9)	0.02
IHD	1 (0.9)	
None	54 (48.6)	
Total	111 (100)	

Refractive errors: Myopia was the commonest (39.6%) refractive error among the study participants. (Table 4, figure 5)

Table 2: Distribution of refractive errors

Refractive error	Frequency (%)
Myopia	44 (39.6)
Hypermetropia	27 (24.3)
None	40 (36.1)
Total	111 (100)

Chief complaints: Diminished vision (Or loss of vision) is the most common complaint (n=102, 91.8%) followed by pain (n=29, 26.1%) redness (n=12, 10.8%) and watering of eyes (n=2, 1.8%). (Figure 6)

Table 3: Distribution of the chief complains of the participants.

Chief complaints	Frequency (%)
Diminished or loss of vision	102 (70.3)
Pain	29 (20.0)
Redness	12 (8.3)
Watering of eyes	2 (1.4)
Total	145* (100)

*Some participants had multiple complaints, proportion is out of total complaints (145)

The mean intraocular pressure in the right eye was 23.9 mm of Hg (SD 10.3 mm of Hg). In the left eye, the mean intraocular pressure was 23.7 mm of Hg (SD 10.6 mm of Hg). The categorized distribution of the IOP is shown in table 6 and figure 7.

Table 4: Distribution of IOP

IOP category	Frequency (%)
10 to 20 mm of Hg	41 (36.9)
21 to 30 mm of Hg	37 (33.3)
31 to 40 mm of Hg	15 (13.5)
41 to 50 mm of Hg	8 (7.2)
Phacolytic glaucoma	2
Phacomorphic glaucoma	4
Neovascular Glaucoma	1
Malignant Glaucoma	1
>50 mm of Hg	10 (9.1)
Phacolytic glaucoma	4
Phacomorphic glaucoma	2
Neovascular glaucoma	4

Table 5: Types of glaucoma

Type of glaucoma	Frequency (%)
Angle closure glaucoma (ACG)	28 (25.2)
Open angle glaucoma (OAG)	83 (74.8)
Total	111 (100)

Myopia was the commonest refractive error in OAG while hypermetropia was commonest in ACG. Overall, 17 () patients had hypermetropia out of 27 ACG, 31 (37.3%) out of 44 patients had myopia in the OAG group. When considered with patients with refractive errors only, 37.0% of patients with ACG and 70.5% of the OAG group had myopia. This difference was statistically significant ($p<0.05$).

Table 6: Distribution of refractive errors by types of glaucoma

Refractive errors	Frequency (%)		p-value
	Myopia	**Hypermetropia**	
ACG	10 (37.0)	17 (63.0)	0.02*
OAG	31 (70.5)	13 (29.5)	

*Statistically significant

The OAG and ACG were divided into primary and secondary cases. Primary open angle glaucoma was the commonest type (63.1%) among all four types of glaucoma. The prevalence of other types of glaucoma were- Primary angle closure glaucoma (13.5), Secondary angle closure glaucoma (11.7%), and Secondary open angle glaucoma (11.7%). (Table 9, figure 10)

Table 7: Distribution of open and angle closure types of glaucoma

Type of glaucoma	Frequency (%)
Primary angle closure glaucoma (PACG)	15 (13.5)
Secondary angle closure glaucoma (SACG)	13 (11.7)
Primary open angle glaucoma (POAG)	70 (63.1)
Secondary open angle glaucoma (SOAG)	13 (11.7)

Gender distribution in different types of glaucoma: All the four types of glaucoma were more common among the males. However, the difference between them was not statistically significant ($p > 0.05$).

Discussion:

Glaucoma is a group of eye diseases traditionally characterized by elevated intraocular pressure (IOP). However, glaucoma is more accurately defined as an optic neuropathy than a disease of high pressure. In open-angle glaucoma, optic nerve damage results in a progressive loss of retinal ganglion cell axons, which is manifested initially as visual field loss and, ultimately, irreversible blindness if left untreated (9).

We recruited a total number of 111 participants in the study. The mean age of the participants was 59.6 years (SD- 10.7 years). Majority of the participants belonged to 55-64 years' age group (n=45, 40.5%). Regarding gender there were 63 males (56.8%) and 48 females (43.2%).

The study included 111 participants with a mean age of 59.6 years (SD 10.7 years). Majority of the participants (40.5%) belonged to the age group of 55-64 years. The majority of the participants were housewives (43.2%), while 23.4% were in private jobs, 5.4% were farmers, and 0.9% were in business or laborer. Most of the participants had at least one comorbidity, with hypertension (41.4%) being the most common. Myopia was the most common refractive error (39.6%), followed by hypermetropia (24.3%). The most common chief complaint was diminished or loss of vision (91.8%). The mean intraocular pressure in the right eye was 23.9 mm of Hg (SD 10.3 mm of Hg) and in the left eye was 23.7 mm of Hg (SD 10.6 mm of Hg). Open-angle glaucoma (74.8%) was more prevalent than angle-closure glaucoma (25.2%). Primary open-angle glaucoma was the most common type of glaucoma (63.1%), followed by secondary angle-closure glaucoma (11.7%) and primary angle-closure glaucoma (13.5%). Myopia was more common in patients with open-angle glaucoma (70.5%) compared to angle-closure glaucoma (37.0%) ($p < 0.05$).

Similarly, results were obtained in other studies as well where Open-angle glaucoma is the most common type of glaucoma among all populations, whereas angle-closure glaucoma is more common among Asian populations **Kingman, 2004** and **Tham et al., 2014** (10,11).

Vijaya *et al.*, 2006 reported a prevalence of PACG and POAG in South Indian population (aged 40+ years) to be 0.88% (95% CI: 0.60, 1.16) and 3.51% (95% CI: 3.04, 4.0), respectively (12).

Refractive errors according to types of glaucoma: Myopia was the commonest refractive error in both types of glaucoma. Overall, 17 (46.4%) patients had hypermetropia out of 27 ACG, 31 (70.5%) out of 44 patients had myopia in the OAG group. When considered with patients with refractive errors only, 37.0% of patients with ACG and 70.5% of the OAG group had myopia. This difference was statistically significant (p<0.05).

In a study by **Shen et al., 2016,** Myopia was associated with an increased prevalence of all forms of open-angle glaucoma and OHTN, whereas hyperopia was associated with a substantially increased prevalence of PACG. Although high myopia is a strong risk factor for glaucoma subtypes, low and moderate myopia also have a significant effect on glaucoma risk. Additionally, there were moderate racial differences in the association of myopia with the risk of POAG and NTG (13).

The OAG and ACG were divided into primary and secondary cases. Primary open angle glaucoma was the commonest type (63.1%) among all four types of glaucoma. The prevalence of other types of glaucoma were- Primary angle closure glaucoma (13.5), Secondary angle closure glaucoma (11.7%), and Secondary open angle glaucoma (11.7%).

Conclusion:

Open angle glaucoma (OAG) (74.8%) was the commonest type in this study followed by angle closure glaucoma (ACG) (25.2%). Myopia was the commonest (70.5%) refractive error in Open angle glaucoma (OAG) while hypermetropia was the commonest (63%) in angle closure glaucoma (ACG).

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