ISSN: 0975-3583,0976-2833 VOL15, ISSUE 04, 2024

‘Unveiling Glaucoma’: A Comprehensive Analysis of Newly Diagnosed Glaucoma Patients ina tertiary care centre in Western India.

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ABSTRACT:

CONTEXT: Glaucoma is the leading cause of blindness and vision loss worldwide and hasa major impact on quality of life. As glaucoma is a multifactorial disease, it is important to identify the association between its ocular and systemic risk factors.

AIMS: To assess the demographic profile, type of glaucoma, grade, risk factors and severity of same in first time diagnosed patients of glaucoma.

SETTINGS AND DESIGNS: Primary open angel and Primary close angle glaucoma patients were selected according to inclusion criteria and cross-sectional observational study was carried out.

METHODS: This analysis includes study of 200 patients diagnosed with glaucoma for the first time at a Western Regional Institute of Ophthalmology in Western India. Patients visual BCVA, age, intraocular pressure, corneal pachymetry, gonioscopy, central disc ratio, visual field findings and optical coherence tomography (OCT) were analysed.

STATISTICAL ANALYSIS USED: Data were analysed using independent t test and statistical software Spss 26.0 version and Microsoft excel. $P < 0.05$ was considered stastically significant.

RESULTS: The study revealed that the mean age of patient of POAG was 60 and PACG was 57 years. POAG mean IOP was 20.98 ± 2.78 and PACG mean IOP was 28.37 ± 5.33. We observed 11.5% patients with advanced glaucomatous damage clinically and on perimetry report. POAG patients were more aged than POCG patients and also had advanced glaucomatous damage clinically and on perimetry report. Hypertension and diabetes were most commonly observed risk factors.

CONCLUSIONS: this study undermines the utmost importance of raising awareness about glaucoma and the significance of early screening before irreversible glaucomatous damage occurs.

KEY WORDS: POAG, PACG, Visual fields, gonioscopy, intra ocular pressure, newly diagnosed

Introduction:

Glaucoma is a group of progressive optic neuropathy characterized by degeneration of retinal ganglion cells and retinal nerve fibre layer and resulting in changes in the optic nerve head [1]. Glaucoma is the second leading cause of blindness worldwide[2]. Glaucoma is accounted to have affected more than 60 million people worldwide and it is expected to increase to 111.8 million in 2040[3]. Risk factors include age, gender, myopia, family history, smoking, race, systemic hypotension, and hypertension, vasospasm, use of systemic or topical steroids, migraine and increased IOP [4,5].

METHOD: In this study we included 200 patients newly diagnosed case of glaucoma at tertiary care centre in western India presented between January 2023 to August 2023. All patient’s data was collected from age, gender, visual acuity, risk factors, intraocular pressure, gonioscopy, disc findings, visual field analysis.

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Diagnostic definition of glaucoma based on the International Society of Geographic and Epidemiologic Ophthalmology (ISGEO) recommendations [6] with some study specific modifications. A diagnosis of glaucoma is made when subjects fulfilled two or more of the following criteria:

a. IOP by Goldman applanation tonometry >22mm Hg

b. VCDR>0.6 in either eye or VCDR asymmetry of >0.2

c. Shaffer grading of 2 or less for more than 270^0 in either eye by gonioscopy

d. Perimetry results suggestive of glaucomatous damage as interpreted by three senior trained glaucoma specialists. the presence of a cluster of three contiguous points at 5% level or less on pattern deviation plot of N-30 threshold test was taken to be indicative of glaucomatous damage [6].

All patient underwent comprehensive eye examination including IOP with Goldman applanation tonometry(GAT), central corneal thickness measurement, gonioscopy with Sussman 4 mirror gonioscope, and optic disc assessment with 90 D lens by a glaucoma specialist. Angle was considered occludable if > 270^0 of posterior trabecular meshwork was not visible. In eyes with occludable angle, indentation was performed to look for presence of peripheral anterior synechiae. Optic nerve was considered glaucomatous if there was neuroretinal rim thinning, notching, nerve fiber layer defect or asymmetric disc cupping (difference in cup to disc ratio >0.2 between two eyes. Visual field was assessed with Octupus visual field analyzer and optic disc was assessed with optical coherence tomography.

Patient was categorized into one of the following diagnosis[6]:

Glaucoma suspect: IOP<21 mm Hg, open angle with suspicious disc and visual field not definitive of glaucoma

Ocular hypertension (OHT): IOP>21 mm Hg. open angle with normal disc and visual field.

Normal tension glaucoma (NTG): IOP<21mm Hg: open angle and definite disc damage with or without visual field damage.

Primary open angle glaucoma (POAG): IOP>21 mm Hg, open angle with definite disc damage with or without visual field damage.

Primary angle closure suspect (PACS): Eye with >270^0 of post trabecular meshwork not visible on gonioscopy in the absence of synechiae, elevated IOP and glaucomatous optic changes.

Primary angle closure (PAC): PACS with elevated IOP and/or synechiae without glaucomatous optic disc changes.

Primary angle closure glaucoma (PACG): PAC with glaucomatous optic disc and visual field damage.

Severity of glaucoma can be classified according to American Academy of Ophthalmology (AAO) guidelines [7]:

Mild glaucoma: Definite optic disc, RNFL, or macular imaging abnormalities consistent with glaucoma and a normal visual field as tested with standard automated perimetry (SAP).

Moderate glaucoma: Definite optic disc, RNFL, or macular imaging abnormalities consistent with glaucoma and visual field abnormalities in one hemifield that are not within 5 degrees of fixation.

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Severe glaucoma: Definite optic disc, RNFL, or macular imaging abnormalities consistent with glaucoma and visual field abnormalities in both hemifields and/or within 5 degrees of fixation in at least one hemifield as tested with SAP.

Indeterminate glaucoma: Definite optic disc, RNFL, or macular imaging abnormalities consistent with glaucoma, inability of patient to perform visual field testing, unreliable/uninterpretable visual field test results or visual fields not yet performed.

Statistical analysis included mean and standard deviation (SD) for continuous variables and percentages for categorical variables.

INCLUSION CRITERIA: 1) patients > or = 18 years of age.

2) patients diagnosed as POAG or PACG for the first time.

3) patients willing to participate in study

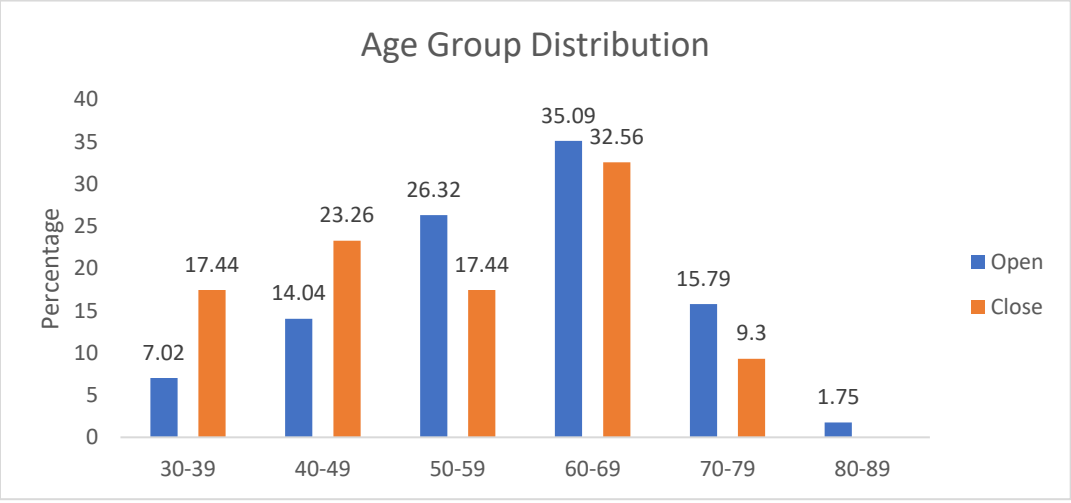
EXCUSION CRITERIA:1) patients < 18 years of age.

2) uncooperative or unwilling for participation in study.

3) secondary glaucoma (PEX and pigmentary glaucoma).

4) patients on treatment or undergone antiglaucoma surgery.

RESULTS: We enrolled 200 patients with newly diagnosed glaucoma, comprising both POAG and PACG cases at our tertiary care centre. Among these cases, POAG patients were 114 and PACG patients were 86. In our study 62% of patients were males and 38% of patients were females. We found 55% of them had unilateral involvement and 45% had bilateral involvement. We discovered POAG was more common in males and PACG was more in females. The overall mean age of the glaucoma patients was 56.68 ±12.49 years for POAG mean age was 60 and for PACG was 57. In close angle patients 11% of patients had visual acuity in CF,HM and No PL and in open angle patients 8% of patients had visual acuity of CF,HM and No PL.



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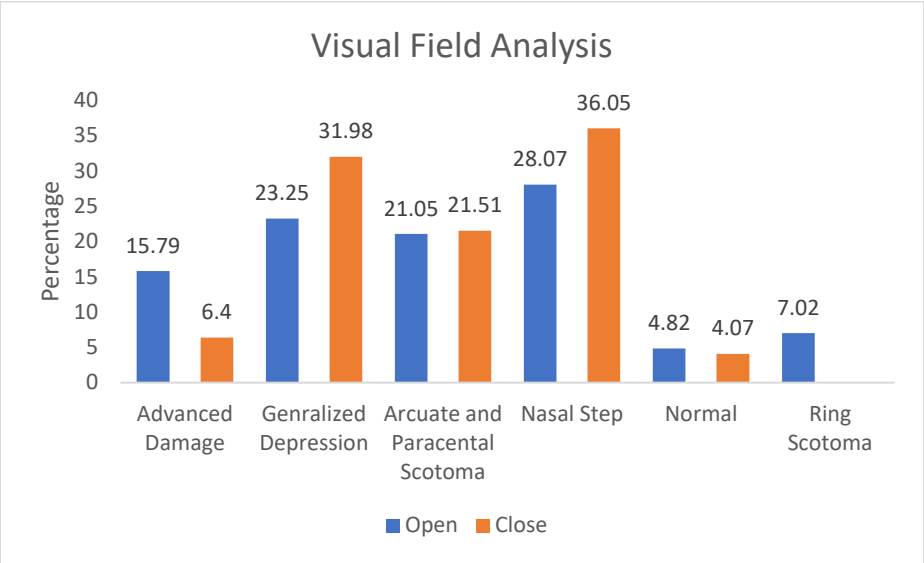

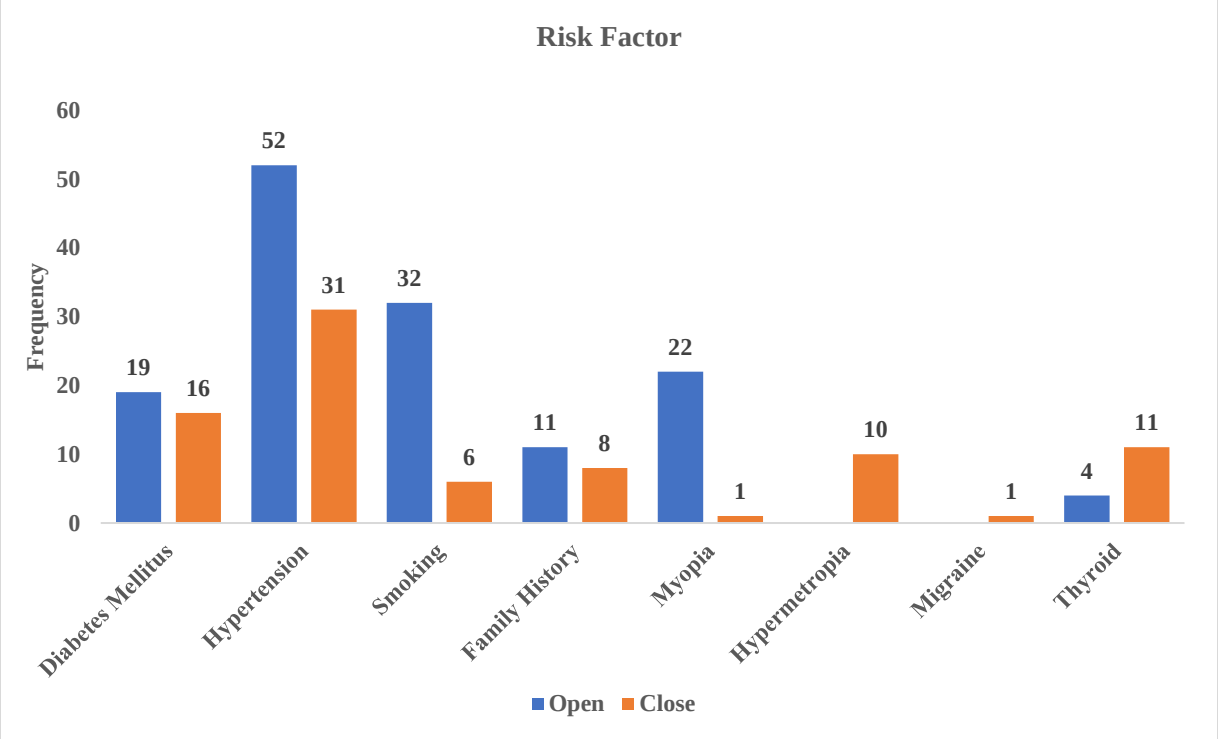

Gender		Frequency	Percentage
Male	Open (N=114)	98	85.96
	Close(N=86)	26	30.23
Female	Open(N=114)	16	14.04
	Close(N=86)	60	69.77

		Open	Close	p-value
Age		60(30-87)	57(33-70)	0.0150

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IOP	RE	19(12-26)	22(12-32)	<0.0001
	LE	22(14-26)	30(16-40)	<0.0001
PACHY	RE	535(423-601)	555(512-679)	<0.0001
	LE	530(434-570)	545(511-601)	<0.0001
CDR	RE	0.5(0.3-0.9)	0.5(0.3-0.8)	0.00020
	LE	0.6(0.4-0.9)	0.6(0.4-0.9)	<0.0001

	Open		Close	
	Frequency	Percentage	Frequency	Percentage
Advanced Damage	36	15.79	11	6.4
Generalized Depression	53	23.25	55	31.98
Arcuate and Paracentral Scotoma	48	21.05	37	21.51
Nasal Step	64	28.07	62	36.05
Normal	11	4.82	7	4.07
Ring Scotoma	16	7.02		

We observed that POAG patients had significantly higher mean age compared to PACG patients. (p=0.0150). Furthermore, PACG patient exhibited significantly higher intraocular pressure compared to POAG patient in both eye(p=<0.0001). PACG patient had significantly higher pachymetry value compared to POAG patient in both eye (p=<0.0001). Additionally, CDR was significantly higher in POAG patients than in PACG patients in both eyes (p=<0.0001).

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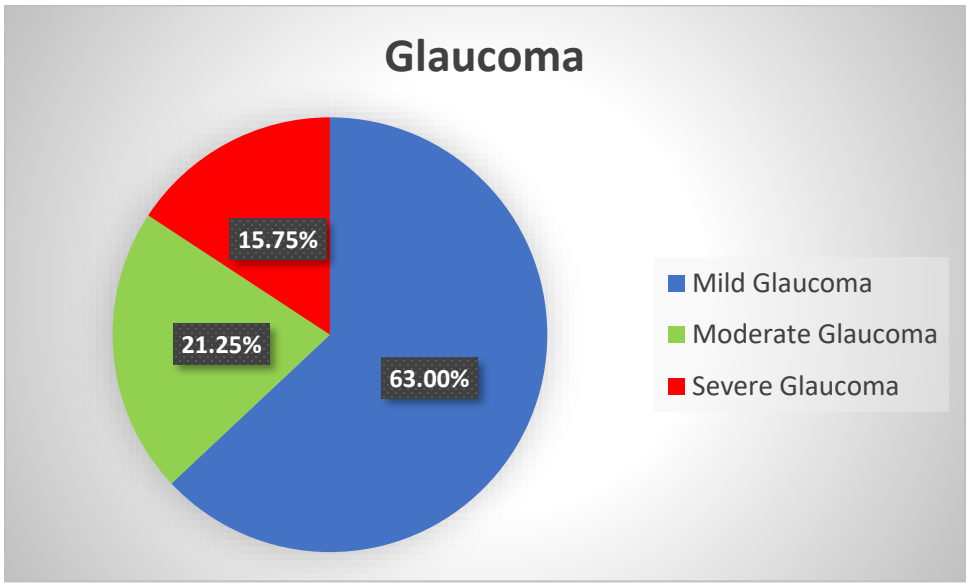

In terms of risk factors, in POAG patients hypertension was the most common, followed by smoking, diabetes, myopia, family history and thyroid and in PACG patients most common was hypertension followed by diabetes, thyroid, hypermetropia, family history, smoking, migraine and myopia. We observed that in PACG patients 6.4% had advanced glaucomatous damage in visual field analysis and in POAG patients 15.79% had advanced damage. In our study of 200 patients with newly diagnosed 63% of patients had mild glaucoma, 21.25% had moderate glaucoma, 15.75% patients had severe glaucomatous damage.

DISCUSSION: Glaucoma being a chronic and silent disease goes undiagnosed until the late stage of the disease. It is estimated that in India >90% of glaucoma patients are undiagnosed [5]. This shows the magnitude of undiagnosed glaucoma cases in the country. The reasons for this were the asymptomatic nature of the disease. In its early stages, poor access to health care, lack of awareness about the disease, and lack of comprehensive eye examination who seek care leads to delay in diagnosis.

In our study we did detailed study on urban population of Gujarat where patients were accidentally diagnosed of glaucoma while check-up for cataract or other eye disease. there were more POAG patients than PACG patients similar to Andhra Pradesh eye study where urban population noted to have more POAG patients than PACG patients [8]. In our study average age of presentation was 56.68 ± 12.49 years and in POAG mean age was 60 and in PACG mean age was 57. similar findings noted in Chennai glaucoma study age being major risk factor for glaucoma [4,5]. Glaucoma being more prevalent in older age group also leads to lack of awareness. POAG was more common in males and PACG was common in females.

In our study PACG patients had higher mean pachy value and IOP levels. Mean IOP in PACG was 28 which is higher in comparison with POAG where mean IOP is 22.This is similar to findings in south Indian study where in POAG patients mean IOP was 16.17± 3.74 and in PACG patients mean IOP was 26±14.9 [4,5].

In our study 15.79% POAG patients and 6.4% PACG patients had advanced damage in visual field report. These findings underscore the pressing need for heightened awareness regarding glaucoma and increased screening efforts to detect the condition at an earlier stage.

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In the analysis of risk factors associated with glaucoma, hypertension emerged as the most common risk factor followed by diabetes similar finding was found in Andra pradesh study where Hypertention and Diabetes were major risk factors[8]. It is hypothesized that antihypertensive medication may disturb vascular autoregulation and decrease the ability for vessels to vasodilate in low perfusion states, which may decrease blood flow to the optic nerve and increase risk of glaucoma[9,10].In the Hisayama study in Japan was found that Glaucoma patients with diabetes had shallow anterior chamber and thick lens, suggests that diabetes could be a risk factor[11] Additionally, family history emerged as a major risk factor, but accurately eliciting this information from older patients proved challenging, possibly due to lack of previous glaucoma screening within families also found in Andhra Pradesh study where family history details not retrieved confidently. Smoking was also prevalent, affecting around 40% of patients, mainly in males and often associated with other risk factors. Smoking is a risk factor for COPD and also leads to oxidative stress. Glaucoma and cataract may be assigned as side effect of COPD treatment [12]. In our study 4% of POAG and 11% of PACG patients had thyroid as a risk factor. Thyroid dysfunction is associated with thyroid-associated orbitopathy and glaucoma [12].

In this study majority of patient presenting to our tertiary health care centre had elevated IOP and neuronal damage in perimetry, indicating that many patients sought medical attention only after experiencing eye pain or visual defects. It is also noteworthy that some patients were accidentally diagnosed during cataract screening and retinal examination highlighting use of glaucoma screenings in routine eye examinations.

CONCLUSION: Based on this study, glaucoma represents a significant healthcare burden in India. Action needs to be taken to diagnose the patients of glaucoma at an early stage. Some recommendation includes implementing awareness about glaucoma and its asymptomatic nature, importance of regular eye check-up especially in older age group, patients with family history and associated systemic comorbidities. Additionally, hypertension and diabetes emerged as a prominent systemic risk factor, necessitating awareness and management of associated conditions in glaucoma patients.

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ISSN: 0975-3583,0976-2833 VOL15, ISSUE 04, 2024

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