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RESEARCH ARTICLE

CLINICAL PROFILE AND DISTRIBUTION OF VARIOUS SUBTYPES OF GLAUCOMA IN A TERTIARY HEALTH CENTRE IN WESTERN ODISHA.

Dr. Kanhei Charan Tudu[1] and Dr. Nisha Jha[2].

1. Associate professor, Department of Ophthalmology, Veer Surendra Sai Institute of Medical Science and Research, Burla, Sambalpur, Odisha-768017.
2. Post graduate student, Department of Ophthalmology, Veer Surendra Sai Institute of Medical Science and Research, Burla, Sambalpur, Odisha-768017.

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Abstract

Purpose- To know the clinical profile and distribution of various subtypes of glaucoma in patients who presented to V.S.S Institute of Medical Sciences And Research.

Methods- All the patients attending the Ophthalmology department, V.S.S. Institute of Medical Sciences and Research, Burla from November 2014 to November 2016 with a history and ocular examinations suggestive of glaucoma were included in the study.

Results- A total of 280 cases were studied. Out of these males constituted 153 (54.64%) of total cases and the females were 127 (45.35%) of the study. Primary glaucoma was more common than secondary glaucoma. Among primary glaucoma, primary open angle glaucoma (38.92%) was more common than primary angle closure glaucoma (37.5%). Mean age of POAG patients was 58.22±8.95 years, mean age of PACG patients was 61.67±9.13 years and the mean age of NTG patients was 60.38±9.89 years. Hypertension (22.5%) and diabetes (12.1%) were found in large numbers compared to other systemic condition.

Conclusion- The goal should be to atleast diagnose and manage the clear cut cases of glaucoma with established functional loss. This is possible only when we adopt comprehensive eye examinations such as IOP measurement, optic disc evaluation and gonioscopy as a routine.

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Introduction:-

Glaucoma is a chronic, progressive optic neuropathy caused by a group of ocular conditions which lead to damage of the optic nerve with loss of visual function. The most common risk factor known is a raised intraocular pressure[1]. The pathogenesis of glaucomatous damage is attributed to a combination of factors affecting axonal health. The 3 main influences are: Mechanical changes due to rise of intraocular pressure, Vascular perfusion of the optic nerve head[1], Biochemical (decrease in neurotrophic factors / increased levels of neurotoxins). Glaucoma is second only to cataract as a leading cause of global blindness, and is the leading cause of irreversible visual loss. It is estimated that there are more than 60 million cases of glaucoma worldwide and it will increase to 80 million by 2020[2]. It is estimated that 4.5 million persons globally are blind due to glaucoma and that this number will rise to 11.2 million by 2020. In India, the estimated number of cases of glaucoma is 12 million, around one fifth of the global burden of

Corresponding Author:- Kanhei Charan Tudu.
Address:- Associate professor, Department of Ophthalmology, Veer Surendra Sai Institute of Medical Science and Research, Burla, Sambalpur, Odisha-768017.

glaucoma. Primary open angle glaucoma is estimated to affect 6.48 million persons. The estimated number with primary angle closure glaucoma is 2.54 million[3]. Damage to the optic nerve is irreversible so it is imperative to detect glaucoma early so that visual morbidity can be avoided. As it is a chronic, insidious disease, the patient requires close follow up throughout life. Glaucoma is still misunderstood as the disease of elderly age group only. But everyone is at risk of glaucoma from babies to senior citizens. Existing treatments slow the process of vision loss for most of the patients but still we have not been successful in restoring the lost vision due to glaucoma.

The purpose of this study is to know the clinical profile and distribution of various subtypes of glaucoma in patients who presented to V.S.S Institute of Medical Sciences And Research.

Material and Methods:-

It was a prospective and observational study. 280 patients attending the Ophthalmology department, V.S.S. Institute of Medical Sciences and Research, Burla from November 2014 to November 2016 with a history and ocular examinations suggestive of glaucoma were included in the study.Inclusion Criteria were patients with intraocular pressure (IOP) more than 21 mmHg or < 21 mmHg with optic nerve head changes suggestive of glaucoma (focal notching of the disc, deepening of the cup, thinning of the neuroretinal rim, enlarged cup/ disc ratio [> 0.5], laminar dot sign, asymmetrical cup/disc ratio(>0.2) in two eyes, and abnormalities in the visual field considered suggestive of glaucoma like relative paracentral scotomas, Ronne's nasal step, arcuate scotoma & advanced constriction of fields. Exclusion Criteria were patients with a raised intra ocular pressure of more than 21 mmHg without any changes in optic nerve head or any visual field abnormalities, patients already on treatment with anti- glaucoma drugs and glaucoma suspects. A standard clinical proforma was filled in all cases, which included salient feature in history, visual acuity using Snellens visual acuity chart, slit lamp emamination, applanation tonometry, gonioscopy, dirent ophthalmoscopy, indirect ophthalmoscopy, 90D/78D lens examination, OCT examination, HVF testing and laboratory investigations. Grading of the anterior chamber angle was done according to Shaffer's grading system. Depth of anterior chamber was assessed by Van Herrick's technique in uncooperative patients.

Criteria used for diagnosing of different subtypes of glaucoma are listed below:

- **Congenital glaucoma** categorised as glaucoma associated with developmental anomalies of eye present at birth or an isolated maldevelopment of the trabecular meshwork not associated with other developmental anomalies or ocular diseases that can cause raised IOP.
- **Primary Open angle glaucoma** can be considered a chronic, progressive anterior optic neuropathy that is accompanied by a characteristic cupping and atrophy of optic disc, visual field loss, open angles and no obvious causative ocular or systemic condition.
- **Juvenile open angle glaucoma (JOAG**)- Patients less than 40 years of age with clinical picture similar to POAG.
- **Primary angle closure glaucoma(PACG)-** greater than 270^0 of irido-trabecular contact plus elevated IOP plus optic nerve and visual field damage
- **Normal tension glaucoma** patients were classified as having open angles, and progressive optic nerve head changes or visual field loss suggestive of glaucoma in absence of elevated IOP
- **Secondary glaucoma** in a patient was defined as increased IOP or changes suggestive of glaucomatous nerve head cupping in a patient with any ocular or systemic problems predisposing to glaucoma.

Statistical analysis:- Data analysis has been done using linear regression analysis(by using excel sheet). Mean and standard deviation has been calculated by using formulas in Microsoft excel.

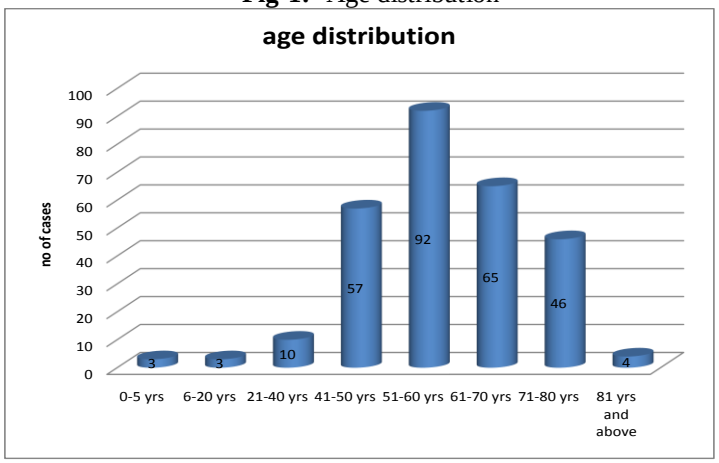
Results:- This study included 280 diagnosed glaucoma patients. In our study the male population was 54.64% (153) and the female population was 45.35% (127). The male: female ratio was 1.2:1. About 70% of the studied cases were hailing from rural areas and 61.42% of our patients were below poverty line. Demographic profile has been described in table 1

Table 1:- Demographic data of glaucoma cases

Sex ratio	Male	153	54.64%	M:F
	Female	127	45.35%	1.2:1
Locality	Rural	196	70%	R:U
	Urban	84	30%	2.3:1

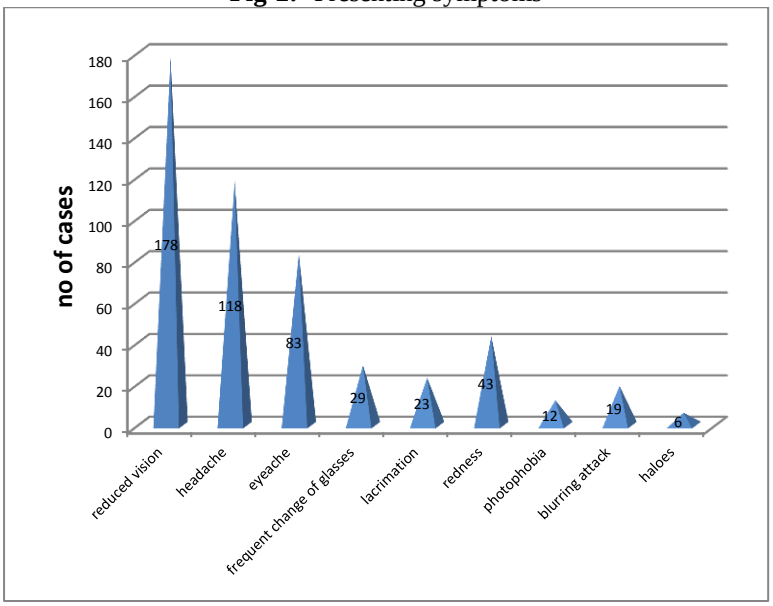
Economic status	BPL	172	61.42%	BPL:APL
	APL	108	38.57%	1.6:1

Fig-1:- Age distribution



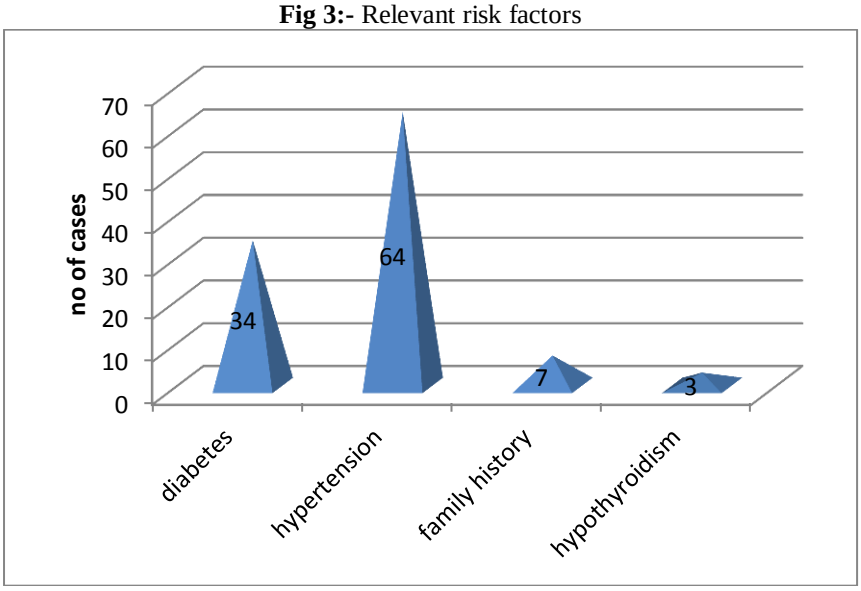
The mean age of patients in our study is 58.26 ±12.56 years. We got only three cases (1.07%) below the age of 5 years and 3(1.07%) cases in the age group 6-20 years. 20.36% of cases were in 41-50 years age group, 32.86% in 51- 60 years age and 23.21% belonged to 61-70 years of age. There were only 4 cases (1.43%) in the age group 81 and above.

Fig-2:- Presenting symptoms



Out of 280 cases right eyes were involved in 59 (21.07%) cases and left eyes were involved in 37 (13.21%) cases. Bilateral involvement was seen in 184 (65.71%) cases. Reduced vision was the most common complaint of the patient was reduced vision as seen in 63.57% of cases. The next most common symptom was headache as seen in 42.14% of cases followed by eye pain in 29.64% of cases. Most of the patients had more than one complaint. Most of the people were not aware of their condition.

Fig 3:- Relevant risk factors



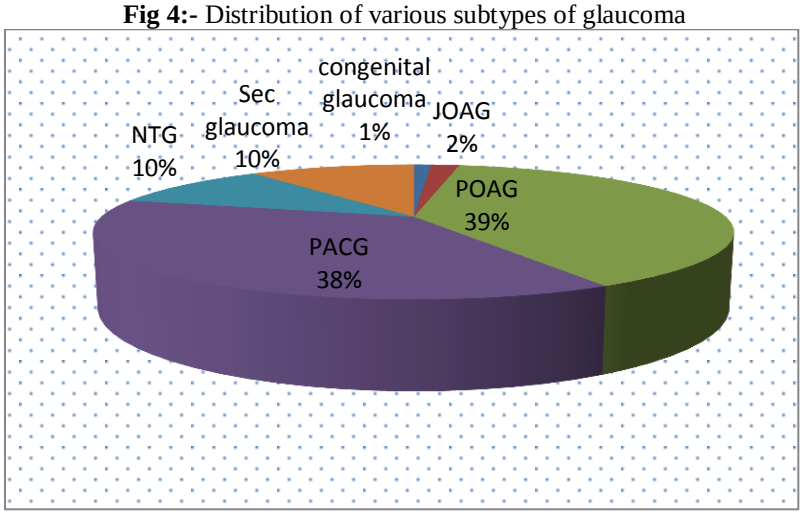
The most common risk factors were hypertension 22.5% of cases and diabetes 12.1% of cases

Table 2:-Visual acuity

Vision	Right eye	Left eye	Total (n=554)	percentage
6/6-6/12	59	70	129	23.29
6/18-6/36	101	90	191	34.47
6/60-3/60	70	81	151	27.26
<3/60-PL+	29	25	54	9.75
PL absent	18	11	29	5.23

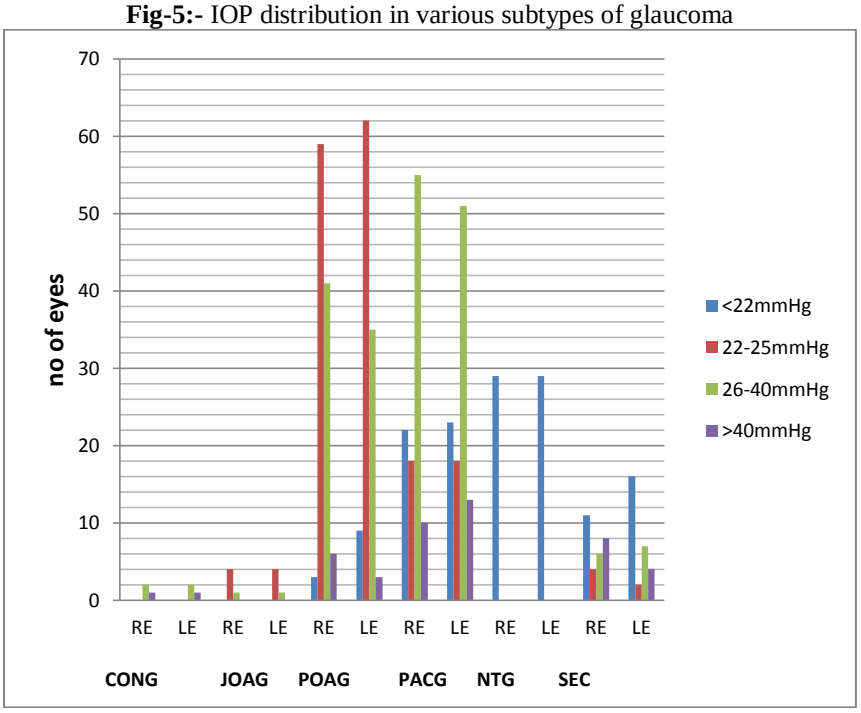
Visual acuity of 6/6-6/12 was seen in 23.29% of eyes, 6/18 – 6/36 was seen in 34.47% of eyes and VA of 6/60 – 3/60 was seen in 27.26% of eyes. A visual acuity of <3/60 was seen in 14.98% of eyes. Perception of light was absent in 29 eyes (5.23%) which again shows the poor scenario of our health system.

Fig 4:- Distribution of various subtypes of glaucoma



In our study there were 109 (38.92%) cases of POAG and 105 (37.5%) cases of PACG. The ratio of POAG: PACG were 1.03:1. The percentage of NTG patients were 10.36%. Secondary glaucoma constituted 10.36 % patients. We came across only 3(1.07%) cases of congenital glaucoma in this study. There were also 5 cases of JOAG (1.79%) in this study.

Fig-5:- IOP distribution in various subtypes of glaucoma



The mean age of POAG patients was 58.22±8.95 years, PACG patients was 61.67±9.13 years and NTG patients was 60.38±9.89 years. In our study highest number of eyes belonged to the 1OP range of 26-40 mmHg (35.89) followed by 22-25 mmHg (30.54%).Only 8.21% eyes had IOP > 40 mmHg. All NTG patients had IOP < 22mmHg. The mean IOP of right eye in our study was 27.29±10.25 mmHg and the mean IOP of left eye was 26.7±10.02 mmHg

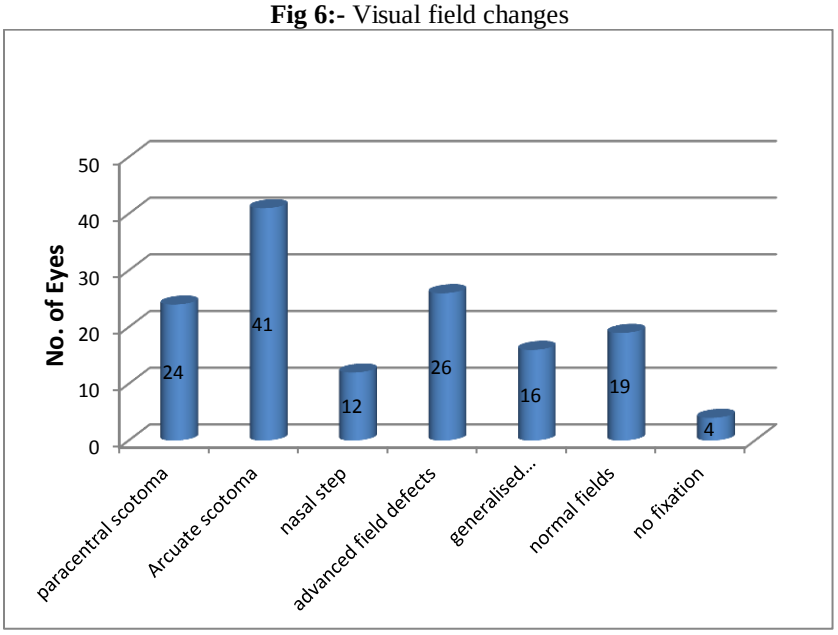
Table 3:- optic disc changes

Disc changes	No of eyes (n-560)	Percentage
C/D ratio>0.5	352	62.86
NRR thinning	191	34.1
Peripapillary atrophy	54	9.64
Disc haemorrhage	14	2.5
Laminar dot sign	21	3.75
No change	80	14.29
No documentation	54	9.64

A Cup/Disc ratio of > 0.5 was seen in 352 eyes (62.86%). Thinning of neuroretinal rim was seen in 191(34.1%) eyes and peripapillary atrophy in 54(9.64%) eyes.

Most of the eyes (51.97%) had Shaffer's Grade IV angle. 13.75% eyes had Grade III angle and 12.14% eyes had Grade II angle. Grade I and Grade 0 angles were present in 13.57% and 6.07% eyes respectively. In 2.5% of eyes gonioscopy could not be performed due to unco-operative nature of patient or acute pain in that eye.

Fig 6:- Visual field changes



142 eyes for 71 patients were taken for visual field analysis. In 4 eyes fixation was absent. Mostly the patients with NTG and POAG suspect were taken. Arcuate scotoma was the most common defect seen in 28.87% of eyes. Advanced fields defects were also seen 18.3% of eyes which indicates the ignorance of people about the disease.

Out of 32 cases of secondary glaucoma 15(51.72%) patients had lens induced glaucoma. Traumatic glaucoma and pigmentary glaucoma were 2(6.89%) cases each. There were 3 cases of steroid induced glaucoma and 2 cases of uveitic glaucoma. We also got 4 cases of neovascular glaucoma and 1 case of glaucoma secondary to intraorbital hemangioma.

Discussion:-

As per this study, the male population was 54.64% and the female population was 45.35% . This might be due to the health seeking behaviour of the male population in our society. Similar results were obtained by **Chaitra et al (2015)**[4] where there were 51.2% male patients. In a study done by **Jackson et al (2014)**[5] in Botswana females were the majority of patients (52.5%) which is slightly different from our result. In this study 61.42% cases were BPL because people here are mostly poor farmers or daily wage workers who find it very hard to make both their ends meet. It also reflects that glaucoma is more prevalent in lower socioeconomic group as also shown by **Baltimore Eye Survey (1991)**[6]. In our study majority of patients belong to age group 51-60 years (32.86%) followed by 61-70 years (23.21%). This is due to the fact that increasing age itself is a risk factor for glaucoma progression. In a similar study by **Gogate P et al (2011)**[7] 46% population were 41-60 years of age and 46.5% were 61-80 years. In study by **Zhao et al**[8] in Chinese population the mean age was 56.73 ± 18.13 years and that of our study was 58.26 ± 12.56 years which is slightly high. The most common presenting symptom is reduced vision (63.57%) cases followed by headache in 42.14% cases. Cause of reduced vision in our study may also be due to presence of cataract or age related macular degeneration. High number of cases with reduced vision shows the lack of awareness among people to have proper eye check-up. In this study hypertension (22.86%) and diabetes (12.14%) were important systemic association of glaucoma. In **Blue Mountain Eye Study (1996)**[9] HTN was present in 45.7% of subjects and was significantly associated with Open Angle Glaucoma. This relation was strongest in subject with poorly controlled treated HTN. Hypertension was also associated with ocular hypertension, a relationship that could in part reflect the influence of BP on IOP. **Klein et al**[10] in the **Beaver Dam Eye Study** observed a significant a significant direct correlation between changes in systemic blood pressure and changes in intraocular pressure. The **Beaver Dam Eye Study (1992)**[11], found an incidence of 7.8% of POAG in diabetes compared with 3.9% in those without diabetes (P=0.0005), concluded that the presence of open angle glaucoma is increased in people with older onset diabetes. Diabetes is known to cause microvascular damage and may affect vascular auto regulation of the retina and optic nerve. The **Baltimore Eye Survey** by **Tielsch et al (1994)**[12] found family history as an important risk factor for POAG, although clinic based studies are likely to overstate its impact. In this study positive family history was

found in 2.5% of cases. One significant finding of this study is that 14.98% eyes had a visual acuity of less than 3/60. This denotes that glaucoma is a silent killer and people realise it very lately as it is asymptomatic upto the very advanced stage and at that time of presentation to the ophthalmologist, the visual loss is irrecoverable (**Hitchingset al 1993**, **Palimkar et al 2001**). Some of the patients had cataract, diabetes and hypertension and as the majority of patients were in the age group 51-70 years, so the decrease in vision can also be attributed to this rather than glaucoma as a whole. In our study majority of cases were POAG (38.92%) followed by PACG 37.5%. Glaucoma suspects and ocular hypertensive patients were not included in this study. The ratio of POAG: PACG was found to be 1.03:1. In studies conducted by **Ramakrishnan R et al (2004)**[13] in South India and **Nangia V et al (2013)**[14] in Central India also concluded the ratio of POAG to PACG was 3.4:1 and 7.7:1 respectively. Juvenile Open Angle Glaucoma constituted 1.79% of the two hundred and eighty cases in our study which is quite similar to study done by **Chaitra et al**[4] where they found 1.2% cases of JOAG in 250 patients. NTG (10.36%) was high in our study which reflects that they are the vulnerable groups of glaucoma patients which might be missed if they are not examined properly by detailed fundus examination and visual field examination. In our study highest number of eyes belonged to the 1OP range of 26-40 mmHg (35.89%). The IOP rise was higher in PACG group compared to POAG group. In secondary glaucoma cases the pattern of IOP rise was highly variable. In the present study a Cup/Disc ratio of > 0.5 was seen in 352 eyes (62.86%) and thinning of neuroretinal rim was seen in 191(34.1%) eyes. **Caprioli et al (1992)**[15] demonstrated that neuroretinal rim area correlates more strongly with field damage than C/D ratio. In a study by **Jonas et al**[16] multiple Cox regression analysis revealed that the progression of glaucoma depended significantly on the area of the neuroretinal rim (temporal sector, P = 0.003) and beta zone of parapapillary atrophy (temporal inferior sector, P = 0.02). In a retrospective study of 102 glaucoma patients followed for 15yrs,**Eid and colleagues**[17] found 29% paracentral scotoma, 20% nasal steps and18% arcuate scotomas as predominant field defects however in this study arcuate scotoma was the most common defect (28.87%). **K. Rhee & Young Kim**[18] found more depressed paracentral points were found in POAG patients. Out of 29 cases of secondary glaucoma 15(51.72%) patients had lens induced glaucoma.This included glaucoma due to pupillary block associated with intumescent or hypermature morgagnian cataract, phacolytic glaucoma, phacotoxic glaucoma and secondary glaucoma associated with displacement of lens. **Sarkar et al (2010)**[19] in their study found lens induced glaucoma was the most common cause of secondary glaucoma (324/3166; 10.2 %) quite similar to this study.

Conclusion:-

It is mandatory for everyone above the age of 40 years to have IOP checked once a year especially if there is any risk factor for glaucoma like diabetes mellitus, myopia, family history of glaucoma, prolonged use of steroids etc. Although not curable, glaucoma is still treatable and prevention of progressive vision loss, disability and blindness is possible through early detection and timely intervention. Additionally, a large percentage of India's population is rural where again a disproportionate percentage of glaucoma is found which is quite evident from this study.

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