Original Article

The Prevalence of Glaucoma: Study From the Rural Area of Chhattisgarh, India

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Abstract

Aim: The main objective of the current study is toinvestigate that the prevalence and type of glaucoma inthe rural area of Chhattisgarh. *Material and methods:* A retrospective study was conducted inthe department of ophthalmology at Lakhiram Agrawal Memorial Govt. Medical College and associated Kirodimal Govt. Hospital, Raigarh, (CG), total 513 patients were screened in the age group of 40 years to above. Some ophthalmic examination was done by the before pre-operative condition, some screening techniques were including such as slit lamp examination, IOP by applanation tonometry, dilated fundus examination, gonioscopy, 90 D examination and visual fields. *Result:* Out of 513 patients, fifty-four (10.52%) were diagnosed to glaucoma / glaucoma suspect, out of 54, 27 (5.26%) patients were POAG, 18 (3.5%) had PACG, 5 (0.97%) had lens induced glaucoma and 4 (0.77%) were glaucoma suspected. *Conclusion:* The finding of the current study concluded that the Performing of a comprehensive eye evaluation for cataract surgery was great importance in the detection of undiagnosed glaucoma. It is the most important causes of the rural area of Chhattisgarh in central India population.

Keywords: Glaucoma; Cataract Surgery; Prevalence.

Introduction

The term glaucomais a group of progressive optic neuropathies; it is characterizedby the degeneration of retinal ganglion cells and resulting from the changes in the optic nerve head. It caused the loss of ganglion cells,therefore related to the level of intraocular pressure [1]. The Cataract and glaucoma are frequently coexisting ocular conditions in the elderly group of the population worldwide; cataract and glaucoma are a natural part of the aging process [2]. People over 60 years of age have affected more common with glaucoma, this is the more common and serious sight-threatening conditions. Glaucoma is responsible for significant ocular morbidity in India [3]. Primarily glaucoma was accountedfor the 2/3rds of the morbidity in India and worldwide [4]. Currently, there is a significant lacuna of studies about cataract and glaucoma in this region of India. Our study is a step toward it with the aim to find out the prevalence of glaucoma in the patientswith cataract who were referred to thehigher study center and institutions.

Material & Methods

Research design-
The current study was done in purposive research design.

Sample and Procedure-

For the purpose of our study, we used screening techniques and scientific method for sample selection, total 513 participants involved in a study out of which 54 patients were affected by glaucoma.

The retrospective study was conducted in the department of ophthalmology, at Lakhiram Agrawal Memorial Govt. Medical College and associated Kirodimal Govt. Hospital, Raigarh, Chhattisgarh, India. All the 513 consecutive patients werereferred for cataract surgery in the month of

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September to November 2017, before the cataract surgery some screening techniques were done.

The procedure of sampling and screening for cataract surgery: The detailed history and demographical profile were taken using self-made questionnaire, slit lamp examinations were done, ocular co-morbidity, intraocular pressures, fundus examination, gonioscopy, 90D examination, and visual fields were done by appropriate apparatus. The External examination and pupillary evaluation were done in the normal flashlight. The Slit lamp bio-microscopy was done to rule out any abnormalities of the anterior segment. The anterior chamber depth was graded according to the Van Herick's technique. Intraocular pressure (IOP) was recorded with the Goldmann applanation tonometer under the topical anesthesia. Gonioscopy was performed to examine the irideocorneal angle. The Goldman three mirror lenses were used and the angle was graded according to the Shaffer system. The degree of trabecular meshwork pigmentation and other angle abnormalities were recorded. Stereoscopic evaluation of the optic nerve head was performed using a 90 diopter (D) lens at the slit lamp. The vertical and horizontal cup-disc ratios (CDRs) were measured and recorded with the notching, splinter haemorrhages, and peripapillary atrophy.

Statistical analyses-

Purpose of the current study, the data were analyzed by descriptive analyses technique with the help of the SPSS 22 version.

Results

Finding of the result in the present study shows in the different tables. Total 513 subjects were examined (230 men 45%, 283 women 55%) of which 54 (10.52%) patients were suspected of glaucoma, 5.26% have OAG, 3.50% have ACG, 0.78% are glaucoma suspect and 0.98% have Lens induced glaucoma.

Table 1 and Table 2 shows that the males were more commonly involved among OAG and females were more among angle closure disease. Majority of patients with glaucoma were found to be >60yr of age. The mean IOP by Goldman applanation tonometer was 20.1 mmHg. Gonioscopy performed in both eyes of 52 glaucoma suspect subjects. Gonioscopy could not be done in 2 subjects because of corneal opacities. The mean Vertical cup-disc ratio (VCDR) was 0.4-0.6. Majority of cases with OAG was found to be in an early glaucomatous stage while ACG was found in moderately advanced glaucoma stage, which suggests that ocular morbidity and early progression is more common with angle closure disease.

Primary Open Angle Glaucoma-

Table 3 reveals that there were 27 (5.26%) subjects (12 women, 16 men). The mean age was > 60 years. The mean IOP value was 21.2 mm Hg. Mean VCDR 0.4-0.6, fundus could not be seen in 3 subjects because of dense cataract and corneal opacity. Humphrey visual fields 30-2 were done in 20 subjects and advised after cataract surgery in rest. Out of 20 subjects, 14 were at the early glaucomatous stage, 4 were moderately advanced glaucoma, 1 severe glaucoma and 1 patient with end-stage glaucoma. Pseudo exfoliation was noted in 2 subjects.

Table 1: Shows the age and sex distribution in the patients

Variables		N	n%
Age (years)	40-50	50	9.7
	50-60	143	27.8
	>60	320	62.4
Sex	Male	230	45
	Female	283	55

Table 2: Shows the Glaucoma suspect and Gonioscopy findings in the patients

	Variables	n	n%	Mean
Glaucoma Suspect	No	459	89.5	
	Yes	54	10.5	
	OAG		5.26	
	ACG		3.50	
	Lens-induced glaucoma		0.98	
Gonioscopy	Performed	52		
	Not Performed	2		
	IOP (mmHg)			20.1
	VCDR			0.4-0.6

Table 3: Shows the sex distribution and examination finding of the Primary Open-Angle Glaucoma in the patients

	Variables	N	n%	Mean
Primary Open Angle Glaucoma		27	5.26	
Age				64 years
Sex	Male	15	55.5	
	Female	12	44.5	
	IOP (mmHg)			21.2
	VCDR			0.4-0.6
Staging of Glaucoma (n=20)	early glaucomatous stage	14	70	
	Moderately advanced glaucoma	4	20	
	severe glaucoma	1	5	
	end-stage glaucoma	1	5	

Primary Angle-Closure Glaucoma

Table 4 shows that the primary angle-closure glaucomawas found in 18 subjects (3.50%) (10 women, 8 men); the mean age was between 40 to 50 years. The mean IOP value was 22 mm Hg. The mean VCDR was 0.5-0.6. The fundus could not be seen in 4 subjects because of dense cataract in 3 subjects and 1 has corneal opacity. On gonioscopy, out of 17 patient 3 patients had PAS

Table 4: Shows thesex distribution and findings of the primary Angle-Closure Glaucoma

Variables		N	n%	Mean
Primary Angle-Closure Glaucoma		18	3.50	
Age				46 years
Sex	Male	8		
	Female	10		
	IOP (mmHg)			22
	VCDR			0.5-0.6
Staging of Glaucoma (n=14)	early glaucomatous stage	3	21.4	
	Moderately advanced glaucoma	10	71.4	
	severe glaucoma	0	0	
	end-stage glaucoma	1	7.1	

present. Out of 14 patients, 3 were at the early glaucomatous stage, 10 were moderately advanced glaucoma and 1 patient withend-stage glaucoma.

Glaucoma Suspects

Table 5 reveals thatthere were 4 persons have glaucoma suspect (1woman, 3 men). Out ofwhich 2

Table 5: Shows the sex distribution and findings of the Glaucoma suspects

Variables		n	n%
Glaucoma Suspects		4	
Sex	Male	3	75
	Female	1	25
	ocular hypertension	2	50
	PACS	1	25
	suspicious discs	1	25

subjects had ocular hypertension, 1 was diagnosed as PACS, and 1 had suspicious discs but no field changes.

Lens-induced Glaucoma

Table 6 reveals that 5 patients showing the lens induced glaucoma. Fourpatients with phacomorphic glaucoma presented with very high

Table 6: shows the IOP examination findings in the Lens-induced Glaucoma

Variables		n	n%	Mean
Lens-induced Glaucoma		5		
IOP (mmHg)	phacomorphic glaucoma	4	80	Unrecordably high
	photolytic glaucoma	1	20	39

IOP (unrecordably high) were advised urgent cataract surgery after control of IOP. One patient with phacolytic glaucoma presented with IOP 39mm Hg has also advised cataract surgery after controlling IOP.

Discussion

Purpose of the present study we have searched the various studies done in this field and various research agencies reports, some reports, and findings were supported our current work. The WHO report estimated that the 47.8% of global blindness is due to glaucoma, the cataract burden was significantly high in the South Asia region with includes India, 51% of blindness is due to the cataract [5]. The cataract surgery is a major cause of avoidable blindness in the developing countries [6]. Cataract surgery and glaucoma are

frequently coexisting ocular conditions in the elderly age population worldwide. Our study findings are similar to the Chennai glaucomastudy, it reported that the glaucoma was detected in 20% of aphakic and 4.3% of pseudophakic eyes in urban population [7]. Other similar studies have found that the age-specific prevalence for the eight population groups was derived by regional models separately for OAG and ACG. Similar findings were obtained fromstudies conducted in different region and countries of the world i.e. Europe OAG [8,9] Europe ACG, [10,11] Africa OAG, [12,13,14] Africa ACG, India OAG, [15,16,17] India ACG, [18,19,20] China and South East Asia OAG, [12,18,19] China and South East Asia ACG, [12,18,19] Japan OAG, [21,22,23] Japan ACG, [24] Latin America OAG, [25,26] Latin America ACG (Europe estimate used), and Middle East/North Africa OAG and ACG. The Glaucoma blindness was estimated by the Foster et al. (2002) and they found that 10% of those with OAG and 25% of those with ACG were assumed to be bilaterally blind in the worldwide [27].

Other studies have estimated that the numbers of glaucoma in worldwideby 2020, 60 million people will have OAG and ACG, and glaucoma will be the second leading causes of the world blindness, These estimates could be done by the surveys of different research in different regions such as North Africa and Middle East Africa, OAG was estimated that the 2.22 million people wereaffected with glaucoma in the United States in 2002 [28]. other studies have predicted that 9.4 million Chinese people had OAG and ACG in 2001 [29]. Another study predicted for the years 2010 that 9.2 million will have either OAG or ACG in China [30]. Another study, based on the major population was suggested that the 12% of world blindness (4.4 million people) is caused by glaucoma [31].

The prevalence of glaucoma in our study is 10.52% of those planned for cataract surgery. If these numbers are similar for the rest of the country this approach would result in detection of a large number of those with undiagnosed glaucoma.

Conclusion

For many people in the country the only point of contact with the eye care system is when they seek or are "screened" for cataract surgery inadequate examination at this time is a lost opportunity to detect and treat other non-cataract ocular pathology, hence our approach in eye camps should be on holistic eye examination and comprehensive treatment for all ocular pathologies including cataract. Finally, the finding of the current study concluded that the Performing of a comprehensive eye evaluation for cataract surgery was great importance in the detection of undiagnosed glaucoma in the rural area of Chhattisgarh in central India population.

Conflict of interest: authors declares no conflict of interest.

References

1. Weinreb RN, Aung T, Medeiros FA. The pathophysiology and treatment of glaucoma: a review. Jama. 2014 May 14;311(18):1901-11.

2. Skalicky SE, Martin KR, Fenwick E, Crowston JG, Goldberg I, McCluskey P. Cataract and quality of life in patients with glaucoma. Clinical & experimental ophthalmology. 2015 May 1;43(4):335-41.

3. Shori R, Prasad GL, Shori C. Prevalence of glaucoma in rural India. Panacea Journal of Medical Sciences. 2016 Dec 30;6(3):125-7.

4. George R, Ramesh SV, Vijaya L. Glaucoma in India: estimated burden of disease. Journal of glaucoma. 2010 Aug 1;19(6):391-7.

5. Vijaya L, George R, Baskaran M, Arvind H, Raju P, Ramesh SV, Kumaramanickavel G, McCarty C. Prevalence of primary open-angle glaucoma in an urban south Indian population and comparison with a rural population: the Chennai Glaucoma Study. Ophthalmology. 2008 Apr 1;115(4):648-54.

6. Foster A. Vision 2020: The Cataract Challenge. Community Eye Health, 2000;13:17-21.

7. Ronnie George, Hemamalini Arvind, M Baskaran, S Ve Ramesh, Prema Raju and LingamVijaya. The Chennai glaucoma study: Prevalence and risk factors for glaucoma in cataract operated eyes in urban Chennai. Indian J Ophthalmol. 2010;58:243–5.

8. World Health Organisation. Global initiative for the elimination of avoidable blindness: An informal consultation. Geneva: *WHO*; 1997.

9. Foster A. Cataract and "Vision 2020- the right to sight" initiative. Br J Ophthalmology, 2001;85:635-9.

10. Bonomi L, Marchini G, Marraffa M, et al. Prevalence of glaucoma and intraocular pressure distribution in a defined population. The Egna-Neumarkt Study. Ophthalmology 1998;105:209–15.

11. Anton A, Andrada MT, Mujica V, et al. Prevalence of primary open-angle glaucoma in a Spanish population. The Segovia Study. J Glaucoma 2004;13:371–6.

12. Bonomi L, Marchini G, Marraffa M, et al. Epidemiology of angle-closure glaucoma. Prevalence, clinical types, and association with peripheral anterior chamber depth in the Egna-Neumarkt glaucoma study. Ophthalmology 2000;107:998–1003.

13. Buhrmann RR, Quigley HA, Barron Y, et al. The prevalence of glaucoma in a rural East African population. Invest Ophthalmol Vis Sci2000;41:40–8.

14. Bourne RRA, Sukudom P, Foster PJ, et al. Prevalence of glaucoma in Thailand: a population-based survey in Rom Klao District, Bangkok. Br J Ophthalmol 2003;87:1069–74.

15. Foster PJ, Baasanhu J, lsbirk PH, et al. Glaucoma in Mongolia. A population-based survey in HO¨vsgO¨l Province, Northern Mongolia. Arch Ophthalmol 1996;114:1235–41.

16. Cedrone C, Culasso F, Cesareo M, et al. Prevalence of glaucoma in Ponza, Italy: a comparison with other studies. Ophthalmic Epidemiology 1997;4: 59–72.

17. Dandona L, Dandona R, Srinivas M. Open-angle glaucoma in an urban population in southern India. Ophthalmology 2000;107:1702–9.

18. Giuffre G, Giammanco R, Dardanoni, et al. Prevalence of glaucoma and distribution of intraocular pressure in a population. The Casteldaccia Eye Study. Acta Ophthalmol Scand 1995;73:222–5.

19. Foster PJ, Oen FTS, Machin D, et al. The prevalence of glaucoma in Chinese residents of Singapore. A cross-sectional population survey of the TanjongPagar District. Arch Ophthalmol 2000;118:1105–11.

20. Iwase A, Suzuki Y, Araie M, et al. The prevalence of primary open-angle glaucoma in Japanese. The Tajimi Study. Ophthalmology 2004;111:1641–8.

21. Mitchell P, Smith w, Attebo K, et al. Prevalence of open-angle glaucoma in Australia. The Blue Mountains Eye Study. Ophthalmology 1996;103:1661–9.

22. Jacob A, Thomas R, Koshi SP, et al. Prevalence of primary glaucoma in an urban South Indian population. Indian J Ophthalmol 1998;46:81–6.

23. Quigley HA, West SK, Rodriguez J, et al. The prevalence of glaucoma in a population-based study of Hispanic subjects. Arch Ophthalmol 2001;119:1819–26.

24. Rahman MM, Rahman N, Foster PJ, et al. The prevalence of glaucoma in Bangladesh: a population-based survey in Dhaka division. Br J Ophthalmol 2004;88:1493–7.

25. Rotchford AP, Johnson GJ. Glaucoma in Zulus. A population-based cross-sectional survey in a rural district in South Africa. Arch Ophthalmol 2002;120:471–8.

26. Rotchford AP, Kirwan JF, Muller MA, et al. Temba Glaucoma Study: a population-based cross-sectional survey in urban South Africa. Ophthalmology 2003;110:376–82.

27. Foster PJ, Buhrmann R, Quigley HA, et al. The definition and classification of glaucoma in prevalence surveys. Br J Ophthalmol 2002;86: 238–42.

28. Varma R, Ying-Lai M, Francis BA, et al. Prevalence of open-angle glaucoma and ocular hypertension in Latinos. The Los Angeles Latino Eye Study. Ophthalmology 2004;111:1439–48.

29. Vijaya L, et al. Prevalence of angle-closure glaucoma in a rural South Indian population. (in preparation).

30. Wensor MD, McCarty CA, Stanislavsky YL, et al. The prevalence of glaucoma in the Melbourne Visual Impairment Project. Ophthalmology 1998;105:733–9.

31. David R, Duval DON, Luntz MH. The prevalence and management of glaucoma in an African population. S Afr Arch Ophthalmol 1984;10:55–62.